

# PRACTICE EXAM 9: RED SEAL CARPENTER INTERPROVINCIAL SIMULATION (100 QUESTIONS)

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1. A carpenter is planing the edge of a solid wood door to fit it into a slightly tight jamb. The plane is tearing the wood surface rather than producing smooth shavings. What is the most likely cause of the tearing?

- A. The plane is being pushed across the grain rather than along the grain of the door edge surface
- B. The plane blade is set too shallow and is scraping the surface without engaging the wood fibres
- C. The plane is being pushed against the grain direction — the carpenter should reverse the planing direction to cut with the grain
- D. The door edge is too narrow for the plane width and the blade is catching on both faces simultaneously

2. A carpenter is using a pneumatic finish nailer and the nails are consistently bending inside the trim rather than driving straight. The air pressure is set correctly. What is the most likely cause of the bent nails?

- A. The nails are striking a hard substrate behind the trim such as a metal stud, concrete, or a hidden hardwood blocking member
- B. The nailer magazine spring is too weak and is not feeding the nails into the driver channel at the correct angle
- C. The air hose diameter is too small and the restricted airflow causes inconsistent pressure at the driver piston
- D. The trim wood species is too soft and the nails are deflecting within the material as they penetrate

3. A carpenter discovers that the blade on a portable circular saw wobbles visibly when the saw is running but has no material loaded. What is the most likely cause, and what should the carpenter do?

A. The motor bearings are worn and the entire saw must be sent to a service centre for motor replacement

B. The blade arbour nut is over-tightened, causing the blade to flex against the inner washer during rotation

C. The blade teeth are unevenly worn on one side, creating an imbalance that causes the wobble at speed

D. The blade is warped, improperly mounted, or the arbour nut is loose — the carpenter must stop using the saw immediately and inspect the blade and mounting

4. A carpenter is selecting hearing protection for a task that will last six hours at a noise level of 98 dB. Standard foam earplugs with an NRR of 29 are available. Using the NIOSH derating formula ( $\text{NRR} - 7$ , then divide by 2), what is the estimated real-world noise reduction?

A. 29 dB based on using the full NRR value printed on the earplug packaging without any derating

B. 11 dB estimated real-world reduction based on the NIOSH formula:  $(29 - 7) \div 2 = 11$  dB

C. 22 dB based on subtracting 7 from the NRR without dividing by two for the real-world adjustment

D. 14.5 dB based on dividing the full NRR by two without subtracting the 7 dB correction factor first

5. A carpenter is working inside a building under construction during winter. A propane-fired torpedo heater is being used to heat the interior space. The carpenter begins to feel headache and slight dizziness after two hours of working near the heater. What should the carpenter do?

A. Leave the area immediately, get fresh air, and report the symptoms — the headache and dizziness are classic signs of carbon monoxide exposure from the combustion heater in an enclosed space

B. Drink water and take a 15-minute break in the same area because dehydration is the likely cause

C. Move to the opposite end of the building away from the heater and continue working from that location

D. Turn the heater to a lower setting to reduce the heat output and continue working at the same location

6. A scaffold has been erected adjacent to a building, and a tarp has been wrapped around the scaffold to protect the work area from wind and rain. Why does wrapping a scaffold with tarps create an additional structural concern?

A. The tarp blocks sunlight and prevents the scaffold planking from drying after rain, causing rot in the wood

B. The tarp traps heat inside the scaffold, causing the metal components to expand and loosen the connections

C. The tarp prevents workers from seeing the ground below, creating a disorientation hazard at height

D. The tarp dramatically increases the wind load on the scaffold because it acts as a sail, requiring more frequent tie-ins to the building and potentially heavier bracing

7. A carpenter is using a laser level to establish a reference line on a wall. A coworker asks to borrow the laser for an outdoor task in bright sunlight. The carpenter knows the laser is a green-beam model. What advantage does a green laser have over a red laser for outdoor visibility?

A. Green lasers have a longer range than red lasers because the green wavelength carries more energy

B. Green lasers are more visible to the human eye in bright conditions because the eye is most sensitive to the green portion of the visible spectrum

C. Green lasers do not require a detector for outdoor use because they are always visible in direct sunlight

D. Green lasers can project through glass and water while red lasers cannot penetrate transparent materials

8. A worker falls from a scaffold and is suspended in their fall arrest harness. The worker appears conscious but is unable to climb back onto the scaffold. The rescue plan calls for a rescue within a specific timeframe. Why is rapid rescue critical for a worker suspended in a harness?

- A. The harness webbing degrades rapidly under sustained body weight and will fail within 30 minutes
- B. The worker will develop hypothermia from wind chill exposure while suspended motionless in the harness
- C. Suspension trauma can develop within minutes — blood pools in the legs, reducing circulation to vital organs and potentially causing loss of consciousness and death
- D. The harness constricts the chest and prevents normal breathing, causing suffocation within ten minutes

9. A carpenter is setting up a step ladder on a concrete floor to install a light fixture. The ladder feet have rubber pads. The concrete floor is wet from a recent cleaning. What additional precaution should the carpenter take?

- A. Dry the floor area beneath the ladder before setup, or place the ladder on a dry section of floor, because wet concrete is slippery and the rubber feet may not grip adequately
- B. Set the ladder at a steeper angle than normal to increase the downward force on the rubber feet
- C. Place a piece of plywood under the ladder to bridge across the wet area and provide a dry surface
- D. Have a coworker hold the ladder base while the carpenter climbs, relying on the holder's weight for stability

10. A carpenter is rigging a load using a wire rope sling. During the pre-use inspection, the carpenter finds three broken wires in one rope lay (one complete twist of the strands around the core). The sling's rejection criteria specify that the sling must be removed from service if more than a specified number of broken wires are found. Why are broken wires a concern?

- A. Broken wires conduct electricity and create a shock hazard when the sling contacts an energized surface

- B. Broken wires snag on the load surface and prevent the sling from being removed after the lift is complete
- C. Broken wires unravel the rope strand and reduce the sling's appearance, which affects jobsite morale
- D. Each broken wire reduces the sling's load-carrying capacity and indicates progressive fatigue or corrosion — the sling may fail under load without warning

11. A carpenter is carrying a 4.8-metre piece of lumber across a busy job site. Several other workers are in the area performing various tasks. What is the primary hazard created by carrying long materials through a congested work area?

- A. The long material creates a tripping hazard if the carpenter stumbles and drops it on the walking surface
- B. The leading and trailing ends of the material can strike other workers who are not visible to the carrier, especially when turning corners or passing through doorways
- C. The weight of the long material causes fatigue that reduces the carrier's awareness of surroundings
- D. The material flexes and vibrates while being carried, creating a noise hazard that distracts other workers

12. When using a plumb bob indoors in a still environment, the bob hangs motionless and provides an accurate plumb reference. However, on an outdoor construction site, the carpenter notices the plumb bob swinging persistently. What environmental factor is most likely causing this continuous motion?

- A. Vibration from nearby heavy equipment operating on the site is transmitting through the ground surface
- B. The magnetic field from underground utilities is deflecting the steel plumb bob from the true vertical
- C. Wind — even a light breeze outdoors exerts enough force on the string and bob to prevent it from settling to a stationary plumb position
- D. Solar heating of the string causes thermal expansion that changes the string length and creates oscillation

13. A carpenter is reading a structural drawing that specifies a W250×89 steel beam. The carpenter must build a beam pocket in the foundation wall to receive this beam. The beam depth determines the pocket height. What is the approximate depth of this beam?

- A. 89 mm based on using the second number in the designation as the beam depth dimension
- B. 339 mm based on adding both numbers in the designation together for the total depth
- C. 161 mm based on subtracting the weight from the depth number in the designation
- D. 250 mm based on the first number in the W-shape designation, which indicates the approximate depth

14. A carpenter is reviewing a specification that calls for "S-P-F No. 2" lumber for all wall framing. A delivery of lumber arrives stamped "S-P-F No. 1." Should the carpenter accept this lumber for the framing work?

- A. Yes — No. 1 grade exceeds the specified No. 2 grade, meaning it has fewer defects and higher allowable stresses, making it acceptable as a substitution
- B. No — lumber grades are not interchangeable and No. 1 must be returned for the specified No. 2
- C. Yes, but only if the building inspector approves the substitution in writing before framing begins
- D. No — No. 1 lumber costs more and using it will exceed the project budget without authorization

15. A carpenter is calculating the number of sheets of plywood needed to sheath a gable roof. The roof has two rectangular planes, each 14.0 m long by 5.5 m on the slope. Standard plywood panels are 1.22 m × 2.44 m (2.977 m<sup>2</sup> per sheet). Including a 10% waste allowance, approximately how many sheets are needed?

- A. 52 sheets based on calculating one roof plane and doubling without adding the waste allowance
- B. 57 sheets based on dividing the total area by the panel area, adding 10% waste, and rounding up
- C. 46 sheets based on using an incorrect panel area of 3.5 m<sup>2</sup> per sheet in the division calculation

D. 77 sheets based on multiplying the total area by 0.5 instead of dividing by the panel area

16. A carpenter needs to convert a measurement from metric to imperial. A beam span is specified as 4,200 mm on the metric drawings. Using the conversion factor of 25.4 mm per inch, what is the span in feet and inches?

A. 14 feet 0 inches based on rounding 4,200 mm to the nearest whole foot for simplicity

B. 12 feet 6 inches based on dividing 4,200 by 25.4 and converting the decimal to feet and inches incorrectly

C. 13 feet 9-1/2 inches based on dividing 4,200 by 25.4 to get 165.35 inches, then converting to feet and inches

D. 16 feet 8 inches based on dividing 4,200 by 250 instead of 25.4 for the conversion to inches

17. A carpenter must calculate the volume of a triangular concrete footing. The footing has a cross-section that is triangular — 400 mm wide at the base, 300 mm deep at the centre, and the footing runs for 8.0 metres. What is the volume of concrete required?

A. 0.96 cubic metres based on multiplying base  $\times$  height  $\times$  length without dividing by two for the triangle

B. 0.24 cubic metres based on dividing by two twice instead of once in the triangle area calculation

C. 0.12 cubic metres based on calculating only one metre of footing length instead of the full eight metres

D. 0.48 cubic metres based on calculating the triangular cross-section area as  $(0.4 \times 0.3 \div 2) \times 8.0$

18. When using a builder's level, the carpenter takes a backsight reading of 2.150 m on a benchmark at elevation 98.500 m. The Height of Instrument is therefore 100.650 m. The carpenter then takes a foresight reading of 1.875 m on a concrete footing form. What is the elevation of the top of the form?

- A. 100.375 m based on adding the foresight to the benchmark elevation instead of subtracting from the HI
- B. 98.775 m based on subtracting the foresight from the Height of Instrument:  $100.650 - 1.875 = 98.775$  m
- C. 96.350 m based on subtracting both the backsight and foresight from the benchmark elevation
- D. 102.525 m based on adding the foresight to the Height of Instrument instead of subtracting

19. A carpenter is checking a freshly framed wall for straightness by sighting down the top plate from one end to the other. The plate has a noticeable bow at the midpoint. Before the sheathing is installed, how can the carpenter correct this bow?

- A. Adjust the temporary diagonal braces to push or pull the top of the wall at the bow location until the plate is straight, then re-secure the braces
- B. Remove the double top plate and replace it with a straighter piece of lumber from the material pile
- C. Install the sheathing over the bow because the rigid panels will pull the wall straight as they are nailed
- D. Add a third top plate at the bowed section to stiffen the wall and prevent the bow from worsening

20. A carpenter is laying out a rectangular concrete pad that measures  $3.0\text{ m} \times 4.0\text{ m}$ . After setting the four corners, the carpenter measures both diagonals to check for square. What should each diagonal measure if the pad is perfectly square?

- A. 7.0 metres based on adding the two sides together for the diagonal measurement of the rectangle
- B. 3.5 metres based on averaging the two sides and using the average as the diagonal dimension
- C. 5.0 metres based on the Pythagorean theorem:  $\sqrt{(3.0^2 + 4.0^2)} = \sqrt{(9 + 16)} = \sqrt{25} = 5.0\text{ m}$
- D. 12.0 metres based on multiplying the two sides together for the diagonal area measurement

21. A carpenter is using a tape measure to mark stud layout on a 12-metre wall plate. After marking the first ten studs, the carpenter discovers that the cumulative measurement has drifted 5 mm from the expected position. What is the most likely cause of this cumulative error?

- A. Parallax error from reading the tape at a slight angle at each mark, with each small reading error compounding over successive measurements
- B. The wall plate lumber has shrunk 5 mm since delivery due to moisture loss during site storage
- C. The chalk line used to mark the plate position was snapped at an angle, offsetting all marks equally
- D. The stud spacing specification was miscalculated before the layout began and every mark is wrong

22. A carpenter is estimating how many litres of concrete sealer are needed for a 200 square metre warehouse floor. The sealer manufacturer specifies a coverage rate of 8 square metres per litre. How many litres of sealer are required for one coat?

- A. 1,600 litres based on multiplying the floor area by the coverage rate instead of dividing by it
- B. 16 litres based on dividing the floor area by 12.5 instead of the specified coverage rate of 8
- C. 25 litres based on dividing the 200 m<sup>2</sup> floor area by the 8 m<sup>2</sup> per litre coverage rate
- D. 200 litres based on using one litre per square metre regardless of the manufacturer's coverage rate

23. A carpenter needs to calculate the slope of a ramp for accessibility compliance. The ramp must rise 600 mm over a horizontal run of 7,200 mm. What is the slope ratio?

- A. 1:6 based on dividing the rise by the run but using the wrong units for one of the dimensions
- B. 1:12 based on dividing the run by the rise:  $7,200 \div 600 = 12$ , expressed as 1 unit of rise per 12 units of run
- C. 1:24 based on doubling the run in the calculation for a safety factor on the accessibility requirement
- D. 1:3 based on dividing the run by the rise using centimetres for the run and millimetres for the rise

24. A carpenter is checking a foundation layout using the 3-4-5 method. The carpenter measures 6.0 m along one wall and 8.0 m along the adjacent wall. The diagonal should be exactly 10.0 m for a square corner. The measured diagonal is 10.05 m. What does this tell the carpenter?

- A. The corner is perfectly square because 10.05 m is within normal measurement tolerance of the 10.0 m target
- B. The corner is slightly greater than 90 degrees (obtuse) and the walls need to be moved closer together
- C. The tape measure is defective and reads 0.05 m too long at the 10-metre distance across the diagonal
- D. The corner is slightly out of square — the 50 mm deviation should be evaluated against the project tolerance before deciding whether correction is needed

25. A carpenter is performing a material takeoff for floor joists. The floor plan shows a rectangular floor area of 12.8 m × 8.4 m. The joists span the 8.4 m dimension at 400 mm on centre. How many joists are needed for this floor system, not including any doubled joists at openings?

- A. 21 joists based on dividing only the width by the spacing without adding the starter joist
- B. 33 joists based on dividing the 12.8 m length by 0.4 m spacing and adding one for the starter
- C. 42 joists based on dividing the 8.4 m span by 0.2 m (half the spacing) for double joist count
- D. 64 joists based on multiplying the number of joist spaces by two for joists on both sides of the beam

26. When a carpenter reads "o.c." on a construction drawing (for example, "studs @ 400 mm o.c."), the measurement is taken from which point on one member to which point on the adjacent member?

- A. From the centre of one member to the centre of the next member, producing a consistent module regardless of member width
- B. From the outside face of one member to the outside face of the next member for a face-to-face distance

C. From the inside face of one member to the inside face of the next member for a clear space measurement

D. From the edge of one member to the near edge of the next member for the minimum gap between them

27. A carpenter is building a concrete form for a tapered pier — a concrete column that is wider at the bottom than at the top. The form must produce a smooth, consistent taper on all four sides. How is this tapered form constructed?

A. Four identical rectangular form panels are set at the top dimension and the concrete is allowed to overflow

B. Shims are inserted between the form panels and the bracing at the bottom to push the panels outward

C. Four trapezoidal form panels are cut with the correct taper angle on each side and assembled to produce the tapered cross-section from bottom to top

D. A standard rectangular form is built and tapered concrete blocks are placed inside to displace the concrete

28. A carpenter is constructing formwork for a concrete wall with a planned construction joint — a planned stopping point where the pour will be interrupted and resumed the next day. What must be installed at the construction joint location in the form?

A. A sheet of polyethylene across the wall section to prevent the two concrete batches from bonding

B. A double row of snap ties at the joint location to provide extra strength at the weak plane between pours

C. An accelerating admixture added to the last batch of concrete to ensure it hardens quickly at the joint

D. A vertical bulkhead (stop end) with a keyway strip or roughened surface that provides mechanical interlock between the two concrete placements

29. When ordering ready-mix concrete, the carpenter specifies "32 MPa, 80 mm slump, air-entrained, with a maximum aggregate size of 14 mm." The concrete supplier asks why a smaller maximum aggregate size (14 mm instead of the standard 20 mm) is needed. What is the most likely reason?

- A. The smaller aggregate produces a smoother surface finish on the exposed concrete wall face
- B. The smaller aggregate is needed to flow through congested rebar spacing or narrow form sections where larger aggregate would bridge and cause honeycombing
- C. The smaller aggregate reduces the concrete weight per cubic metre, making it easier to pump
- D. The smaller aggregate cures faster than larger aggregate mixes due to the increased surface area

30. A carpenter is placing concrete in a slab-on-grade and notices that the concrete truck driver has been spinning the drum at high speed for the past 15 minutes while waiting to discharge. Why is prolonged high-speed mixing a concern?

- A. Prolonged high-speed mixing generates friction heat that accelerates the hydration reaction, reduces the slump, and may cause the concrete to begin stiffening before placement and finishing
- B. Prolonged mixing causes the aggregate to float to the surface of the drum and separate from the paste
- C. Prolonged mixing wears out the drum fins and allows the concrete to solidify against the drum walls
- D. Prolonged mixing introduces excess air that increases the air content beyond the specified maximum

31. A carpenter strips forms from a concrete retaining wall and the structural engineer requests that the wall be back-painted with a bituminous dampproofing coating before backfilling. What does dampproofing protect against?

- A. Structural loads from the earth pressing against the wall during backfill compaction operations
- B. Chemical attack from acids in the soil that dissolve the cement paste in the concrete over time
- C. Moisture migration through the concrete by capillary action — dampproofing resists the passage of moisture through the porous concrete in the absence of hydrostatic pressure

D. Freeze-thaw damage on the earth-side face of the wall caused by ground water freezing against the wall

32. A carpenter is placing reinforcing steel in a wall form. The vertical rebar extends up from the footing as dowels. The wall vertical rebar must be spliced to these dowels. The engineer specifies a 600 mm lap splice. During installation, the carpenter discovers that one dowel is only 400 mm long — 200 mm shorter than required. What should the carpenter do?

A. Proceed with the 400 mm lap and add a U-shaped rebar stirrup around the splice for reinforcement

B. Report the short dowel to the supervisor and request direction from the structural engineer, as a 400 mm lap does not meet the specified 600 mm splice length

C. Bend the short dowel at 90 degrees and extend it horizontally to compensate for the missing 200 mm

D. Drive the short dowel deeper into the footing concrete to expose more length above the footing surface

33. When finishing a concrete slab, the carpenter uses an edging tool along the perimeter where the slab meets the edge forms. The edger creates a smooth, rounded edge along the slab perimeter. What is the primary purpose of this rounded edge?

A. The rounded edge increases the aesthetic appeal of the slab by creating a decorative border effect

B. The rounded edge makes it easier to strip the edge forms because the concrete does not grip the square corner

C. The rounded edge allows the carpenter to measure the slab thickness by checking the edge profile depth

D. The rounded edge strengthens the slab perimeter by compacting the concrete at the edge and preventing chipping and spalling from impact and freeze-thaw at the vulnerable exposed corner

34. A carpenter is building forms for a concrete stairway that is integral with a retaining wall. The stairway rises from a lower patio to an upper terrace. The forms must produce both the stairway steps

and the retaining wall sides in a single monolithic pour. What is the primary challenge of this combined pour?

- A. The combined forms must resist the lateral pressure from the retaining wall concrete while simultaneously maintaining the precise step dimensions for the stairway — requiring careful integration of the wall form bracing with the stair riser forms
- B. The concrete must be poured in two separate operations — wall first, then stairs — requiring a cold joint
- C. The stairway riser forms prevent the vibrator from reaching the retaining wall section behind the steps
- D. The combined weight of the wall and stair concrete exceeds the standard ready-mix truck capacity

35. A concrete slab specification calls for "6 mm welded wire mesh, 152 × 152 mm" reinforcement. What do the numbers in this designation describe?

- A. The wire diameter is 6 mm and the wire weight is 152 grams per linear metre for each direction
- B. The mesh has 6 mm gauge wire with a yield strength of 152 MPa for the standard welded wire product
- C. The wire diameter is 6 mm and the grid spacing is 152 mm × 152 mm (6 inches × 6 inches) between wires in both directions
- D. The mesh panel is 6 mm thick overall and measures 152 mm × 152 mm in plan view for each sheet

36. A carpenter is placing concrete in a grade beam form that spans 6 metres between pile caps. The grade beam is 300 mm above the ground surface. During the pour, the carpenter notices that the bottom of the form is deflecting downward at the midpoint under the weight of the concrete. The shores supporting the form at midspan appear to be settling into the soft ground. What immediate action should the carpenter take?

- A. Continue pouring and plan to raise the beam to the correct elevation after the concrete has hardened

- B. Stop the pour, add additional shoring or cribbing under the settling shores to restore the form elevation, and verify the form is at the correct height before resuming
- C. Increase the pour rate to fill the form faster before the deflection increases beyond the acceptable limit
- D. Remove the concrete from the deflected section with shovels and re-shore the form before placing again

37. A carpenter is building formwork for a concrete parapet wall on a roof — a short wall that extends above the roof surface at the perimeter of a flat or low-slope roof. The parapet is 900 mm tall and 200 mm thick. Unlike a below-grade foundation wall, the parapet is exposed to weather on both sides. What formwork consideration is specific to parapet walls?

- A. The forms must be designed to resist wind loads on the exposed form surfaces in addition to the concrete pressure, and the base must be securely anchored to the roof structure to prevent the forms from being blown over
- B. The forms must be insulated to prevent the thin wall from freezing before the concrete gains strength
- C. The forms must be removed within four hours to prevent the concrete from bonding permanently to them
- D. The forms require a waterproofing membrane applied to the interior surfaces before the pour begins

38. A carpenter is placing concrete for a foundation wall in a trench. The ready-mix truck discharges the concrete through a chute that extends over the trench. The carpenter notices that the concrete separates as it flows down the long chute — the gravel rolls to the bottom of the chute and arrives at the form first, followed by a rush of soupy paste. What is this separation called, and how is it prevented?

- A. Bleeding — prevented by adding more cement to the mix to absorb the excess water before placement
- B. Cracking — prevented by reducing the chute angle to slow the concrete flow and maintain cohesion
- C. Hydration — prevented by adding retarder to the mix to slow the chemical reaction during placement

D. Segregation — prevented by reducing the chute length, reducing the angle, using a tremie pipe, or adding baffles to the chute that remix the concrete as it flows

39. A carpenter is constructing a concrete containment wall for a chemical storage area. The specification requires that the concrete be "watertight" — no water leakage through the wall is permitted. What construction practice is most critical for achieving watertight concrete?

A. Using a concrete mix with maximum aggregate size to minimize the paste-to-aggregate ratio in the wall

B. Applying a waterproof coating to the exterior face of the wall after stripping to seal the surface pores

C. Thorough consolidation (vibration) of every lift to eliminate all voids, honeycombing, and air pockets that would create pathways for water to penetrate through the wall thickness

D. Using non-shrink concrete that expands during curing to seal all micro-cracks at the wall form joints

40. A carpenter pours a concrete wall and strips the forms after 24 hours. The concrete surface shows a pattern of horizontal ridges at regular intervals — each ridge corresponds to the location of a waler on the outside of the form. What caused these ridges?

A. The snap ties were over-tightened at the waler locations, pulling the form panels inward at those points

B. The form panels deflected outward between the walers under concrete pressure, creating a slight bulge between each pair of walers that appears as ridges when the forms are stripped

C. The concrete expanded at the waler locations due to heat generated by the chemical reaction in those zones

D. The form release agent pooled at the bottom of each waler and created a chemical reaction with the concrete

41. A carpenter is pouring a concrete slab and must install a construction joint where the pour will be stopped for the day. The joint must allow the slab to expand and contract at this location while maintaining load transfer between the two slab sections. What is installed at this joint?

A. A bead of silicone caulking that fills the joint gap and allows movement while sealing against moisture

B. A steel plate embedded in the concrete at the joint that prevents any movement between the two sections

C. A strip of rigid foam insulation that fills the joint and compresses when the slab sections expand together

D. Smooth steel dowel bars that are greased on one end and embedded in the first pour — when the second pour is placed around them, the dowels transfer loads across the joint while allowing horizontal movement

42. A carpenter discovers that the concrete delivered to the site has begun to set in the truck — the concrete has been in the drum for over two hours. The truck driver offers to add 100 litres of water to "loosen it up" before discharging. Should the carpenter accept this concrete?

A. Yes, because the water will restore the concrete to its original workability and the strength loss is negligible

B. No — concrete that has been in the truck beyond the maximum delivery time and has begun to set cannot be reconditioned by adding water and must be rejected

C. Yes, as long as the water addition is documented and the concrete is placed within 15 minutes of the addition

D. No, but only because adding water changes the concrete colour, which would be visible on exposed surfaces

43. A carpenter is framing a floor system over a full basement. The joists span from the exterior foundation wall to a steel beam at the centre of the building. The beam is a W200×46 supported by steel posts on concrete piers. The joists bear on the top flange of the beam. At the beam connection, what prevents the joist ends from rotating off the beam flange?

A. Blocking panels installed between the joist ends on top of the beam prevent the joists from tipping or rotating off the beam flange

B. The weight of the subfloor panels nailed to the joist tops holds the joists in position on the beam

- C. The friction between the wood joist bottom and the steel beam flange surface prevents any rotation
- D. The rim joist at the perimeter pulls the joist ends laterally, keeping them centred on the beam flange

44. A carpenter is framing a hip roof and must determine the overall length of the ridge board. On a rectangular building with hip rafters at each end, the ridge is shorter than the building length. What is the relationship between the ridge length and the building dimensions?

- A. The ridge length equals the building length minus the building width for a standard rectangular hip roof
- B. The ridge length equals half the building length regardless of the building width dimension
- C. The ridge length equals the building length minus twice the common rafter run (which equals the building width minus the two wall thicknesses)
- D. The ridge length equals the building width minus the building length for standard hip roof construction

45. A carpenter is installing subfloor panels using construction adhesive and screws. The specification calls for #8 × 50 mm screws at 150 mm on centre along panel edges and 300 mm in the field. During installation, the carpenter runs out of screws and considers substituting 63 mm ring-shank nails at the same spacing. Is this substitution acceptable?

- A. No — screws provide superior withdrawal resistance and cannot be substituted with nails in any application
- B. Yes — the specification typically allows equivalent nails as a substitution, and ring-shank nails at the same spacing provide adequate performance when combined with adhesive
- C. No — substituting screws with nails voids the floor system's fire rating and requires engineering approval
- D. Yes, but only if the nail spacing is reduced to 100 mm on centre to compensate for the lower holding power

46. A carpenter is framing a wall that will support a flush beam — the bottom of the beam is flush with the bottom of the joists. The beam is recessed into the wall above the header. What framing member supports the beam end within the wall?

- A. A standard king stud that is the same height as all other studs in the wall section at that location
- B. A cripple stud above the header that transfers the beam load down through the header to the trimmers
- C. The double top plate, which distributes the beam load laterally to the adjacent studs in the wall section
- D. A built-up post within the wall, consisting of multiple studs or a solid timber column, that transfers the concentrated beam load directly to the foundation through the wall

47. A carpenter is installing the rim joist on a floor system and must ensure that the rim joist is flush with the top of the floor joists at every location. At one joist, the rim joist sits 5 mm above the joist top. What will happen if this condition is not corrected before the subfloor is installed?

- A. The subfloor panel will bear on the high rim joist and rock on that point, creating a squeak and a soft spot in the floor above the adjacent joists
- B. The subfloor will bridge across the difference and the 5 mm variation will not be noticeable in the floor
- C. The rim joist will split under the concentrated load from the subfloor bearing on only one edge
- D. The adjacent wall framing will lean inward because the high rim joist pushes the bottom plate out of level

48. A carpenter is framing a cathedral ceiling with exposed rafters — there are no ceiling joists or collar ties. What type of ridge member is required to support this roof system?

- A. A standard 38 mm ridge board that serves only as an alignment surface for the opposing rafter plumb cuts

B. A doubled  $38 \times 235$  mm ridge board with metal straps connecting it to every second rafter pair on the roof

C. A structural ridge beam (LVL, PSL, glulam, or steel) sized by an engineer to carry the full vertical load of the rafters, supported by posts at each end

D. A manufactured roof truss acting as the ridge that spans the building and supports the individual rafters

49. A carpenter is building a knee wall — a short wall in an attic that extends from the floor to the underside of the roof rafters, creating vertical wall surface in a half-storey or bonus room. The knee wall studs run from the attic floor to the rafter. What structural function does the knee wall serve?

A. It carries the ceiling load from the room below upward to the rafters for distribution across the roof system

B. It supports the rafters at an intermediate point along their span, reducing the effective rafter span and the bending forces on the rafters

C. It provides bracing for the floor joists below by transferring lateral loads from the attic to the roof structure

D. It creates fire separation between the attic space and the habitable room below as required by code

50. A carpenter is installing diagonal let-in bracing in a wall that will receive non-structural foam sheathing. The brace runs from the top of the wall at one end to the bottom plate at the other end. The brace must be embedded into notches cut in the stud faces. What is the required depth of the notch in each stud?

A. The full depth of the stud so the brace sits entirely within the wall cavity and does not affect the sheathing

B. Half the depth of the brace material so the brace is partially recessed and partially proud of the stud face

C. One-quarter of the stud depth to maintain maximum structural capacity in the notched stud section

D. The full thickness of the brace material (typically 19 mm for a 1×4 brace) so the brace sits flush with the stud faces and does not interfere with the sheathing or drywall

51. When framing a floor opening for a stairwell, the carpenter installs doubled headers at each end of the opening and doubled trimmers on each side. The headers must be connected to the trimmers with specific hardware. What hardware is required at the header-to-trimmer connection?

A. Metal joist hangers at each header-to-trimmer connection to provide adequate load transfer capacity for the tail joist loads collected by the header

B. Toenails driven at 45 degrees through the header end into the face of the trimmer at each connection

C. Metal tie straps wrapped over the top of the header and down the face of the trimmer on each side

D. Face nails driven through the trimmer into the end grain of the header for a direct bearing connection

52. A carpenter is installing roof sheathing on a truss system and must leave a gap along the ridge for a ridge vent. The gap is typically 25 mm on each side of the ridge. If the carpenter accidentally sheathes over the ridge without leaving the gap, what is the consequence?

A. The ridge vent cannot function because there is no opening in the sheathing for attic air to exhaust

B. The ridge cap shingles will not lie flat because the sheathing creates a bump at the ridge centreline

C. The ridge vent cannot function as an exhaust vent because the continuous sheathing blocks the air path from the attic through the ridge, defeating the entire attic ventilation system

D. The sheathing at the ridge will buckle during hot weather because there is no expansion gap between panels

53. A carpenter is installing wall sheathing and encounters a window rough opening. The sheathing panel extends past the opening. Rather than cutting the opening in the panel before installation, the carpenter installs the full panel over the opening and plans to cut the opening afterward using a router. Is this method acceptable?

- A. No — the panel must be pre-cut before installation because routing through installed panels damages framing
- B. Yes — installing the full panel first and routing the opening afterward is a common, efficient practice that produces clean cuts aligned perfectly with the framing
- C. No — the panel will sag into the opening without support and the cut will be inaccurate and uneven
- D. Yes, but only if the opening is smaller than 600 mm in both dimensions for the router method to work

54. A carpenter discovers that a bearing wall in the first storey does not align directly over the foundation wall below — the bearing wall is offset 75 mm from the foundation wall. This means the bearing wall loads are not directly over the foundation. What structural concern does this offset create?

- A. The offset has no structural consequence because the floor system spans across and redistributes the load
- B. The offset shifts the load path laterally, which may overstress the floor system and create an eccentric load
- C. The offset only matters if it exceeds 100 mm, as 75 mm is within the standard construction tolerance
- D. The offset creates an eccentric load on the floor system that must be evaluated by a structural engineer to determine if the floor joists, beam, and foundation can carry the offset bearing load

55. A carpenter is installing engineered wood I-joists and needs to make a hole for an HVAC duct in the web. The manufacturer's hole chart specifies the maximum allowable hole diameter and the minimum distance from the bearing point. The carpenter needs a 150 mm round hole and the bearing point is 400 mm away. The manufacturer's chart shows that the minimum distance from bearing for a 150 mm hole is 600 mm. What should the carpenter do?

- A. Move the hole location at least 600 mm from the bearing point to comply with the manufacturer's allowable hole placement, or consult the engineer if the duct cannot be relocated
- B. Cut the hole at 400 mm from the bearing and reinforce the web with plywood gussets on both sides
- C. Reduce the hole diameter to 100 mm to meet the minimum distance requirement at 400 mm from bearing

D. Cut the hole as planned because the manufacturer's chart is a guideline, not a structural requirement

56. A carpenter is building a deck and the engineer's design shows that the deck posts must be braced against lateral (sideways) movement. The posts are 2.4 metres tall (from footing to beam). Without lateral bracing, what can happen to the tall posts under load?

A. The posts will shrink in height over time as the pressure-treated lumber dries, dropping the deck beam

B. The posts will twist around their vertical axis under the eccentric load of the beam above the post cap

C. The posts can buckle sideways under the compressive load from the beam and deck above, because the tall, slender posts have a high slenderness ratio that makes them vulnerable to lateral displacement

D. The posts will settle into the footings under the sustained load, requiring periodic jacking and shimming

57. When framing a gable roof, the carpenter must install barge rafters (also called fly rafters or rake rafters) at the gable end to form the overhang beyond the gable wall. The barge rafter runs parallel to the common rafters but extends beyond the gable end wall. What supports the barge rafter?

A. The barge rafter rests on the gable end top plate and is supported by the gable end studs below it

B. Lookout rafters (horizontal blocks) that cantilever from the first inboard common rafter outward past the gable wall support the barge rafter at regular intervals along its length

C. The roof sheathing connects the barge rafter to the adjacent common rafter and transfers the load laterally

D. A horizontal fascia board at the eave connects the barge rafter bottom to the rafter tail of the main roof

58. A carpenter is framing a partition wall that must contain a 150 mm diameter plumbing stack vent that runs vertically through the wall. Standard  $38 \times 89$  mm ( $2 \times 4$ ) studs cannot accommodate a 150 mm pipe. What framing solution is used?

- A. The wall is framed with  $38 \times 184$  mm ( $2 \times 8$ ) studs at the pipe location (or the full wall depth is increased to  $2 \times 6$ ) to provide adequate cavity space for the pipe to pass through without notching or compromising the studs
- B. The  $2 \times 4$  studs at the pipe location are drilled with a 150 mm hole that removes most of the stud section
- C. The pipe is routed at a 45-degree angle through the wall to pass between two studs without penetration
- D. The wall is split into two offset  $2 \times 4$  walls that together create a wider cavity to contain the pipe

59. A carpenter has completed framing a gable roof and is checking the work. The carpenter measures from the top of the wall plate to the bottom of the ridge board at the centre of the building. This measurement should equal the calculated total rise of the roof. The measured distance is 15 mm less than the calculated rise. What is the most likely cause of this discrepancy?

- A. The wall plates have settled under the weight of the roof framing since the walls were erected
- B. The lumber used for the rafters has a higher moisture content than assumed, causing the rafters to be longer
- C. The birdsmouth cuts on the rafters are slightly deeper than calculated, lowering the rafter seats on the plate
- D. The ridge board height is exactly as calculated, but the cumulative effect of deeper-than-planned birdsmouths on every rafter pair has lowered the ridge by the amount the seat cuts were over-deepened

60. A carpenter is sheathing an exterior wall and must install the bottom edge of the first row of sheathing so it covers the sill plate and laps down over the rim joist and the top of the foundation wall. Why does the sheathing extend below the bottom plate of the wall?

- A. The sheathing below the bottom plate provides additional racking resistance at the foundation connection
- B. Extending the sheathing covers the sill plate and rim joist for weather protection and air sealing

C. The extended sheathing covers the sill plate-to-foundation junction to prevent air infiltration and provides a continuous surface from the wall down to the foundation for the weather-resistive barrier and cladding to attach to

D. The extended sheathing provides a surface for nailing the starter course of cladding at the base of the wall

61. A carpenter is installing a pre-hung exterior door and discovers that the exterior brick mould (casing) extends beyond the plane of the wall cladding by 6 mm. When the cladding is installed, it will butt against the brick mould. What must be installed at this junction to prevent water from entering behind the cladding?

A. A foam backer rod pressed into the gap between the cladding and the brick mould before caulking

B. A bead of exterior-grade caulking between the cladding and the brick mould to seal the joint against water and air infiltration

C. A metal Z-flashing tucked behind the brick mould and extending over the face of the cladding at the joint

D. A strip of self-adhesive membrane applied over the joint after the cladding is installed to bridge the gap

62. A carpenter is installing a skylight on a low-slope roof (3/12 pitch). The skylight manufacturer specifies that the skylight requires a "curb mount" installation on this roof pitch. What is a curb, and why is it required on low-slope roofs?

A. A curb is a decorative trim ring installed around the skylight for aesthetic purposes on visible roof areas

B. A curb is a temporary brace that supports the skylight during installation and is removed afterward

C. A curb is an insulation blanket wrapped around the skylight frame to prevent condensation in cold weather

D. A curb is a raised frame built on the roof deck that elevates the skylight above the roof surface to prevent water from pooling around the skylight perimeter and leaking into the building

63. A carpenter is installing pre-finished metal siding panels on a commercial building. The panels interlock vertically and are fastened to horizontal girts (metal purlins) on the wall. When fastening, the carpenter must leave the screw slightly loose in the elongated mounting slot. Why?

- A. The loose screws allow the panels to be easily removed for maintenance access to the wall behind them
- B. The loose screws reduce the vibration transmission from the wall structure to the metal siding panels
- C. The elongated slots and loose screws allow the metal panels to expand and contract with temperature changes without buckling
- D. The loose screws prevent the screw heads from dimpling the pre-finished surface of the metal panels

64. A carpenter is applying asphalt shingles on a roof with multiple dormers. At each dormer, the carpenter must flash the junction between the dormer cheek wall (side wall) and the main roof surface. What flashing method is used at this junction?

- A. Step flashing — individual L-shaped pieces of metal flashing woven into each shingle course along the dormer wall, with each piece lapping over the one below
- B. Continuous flashing — a single long piece of metal bent into the junction and running the full length of the wall
- C. Valley flashing — a wide strip of metal centred on the junction line with shingles overlapping on each side
- D. Counter flashing — metal strips embedded in the dormer wall mortar joints that lap over the roof surface

65. A carpenter installs a vinyl siding J-channel around a window opening before installing the horizontal siding panels. The J-channel at the bottom of the window must be prepared differently from the side and top channels. What special preparation is needed at the bottom J-channel?

- A. The bottom J-channel is installed upside down so the channel opening faces upward to catch water

- B. The bottom J-channel must have drainage notches (small V-cuts or slots) cut at each end to allow water that collects in the channel to drain outward rather than pooling behind the siding
- C. The bottom J-channel is omitted entirely because water drains away from the bottom of the window naturally
- D. The bottom J-channel is doubled (two channels stacked) to provide a deeper pocket for the cut siding edge

66. A carpenter is installing exterior cladding on a building and must detail the area where a deck ledger board is bolted through the wall. The ledger penetrates the weather-resistive barrier with multiple bolt holes. What flashing detail prevents water from entering the wall at the ledger location?

- A. A continuous bead of caulking applied between the ledger face and the wall sheathing to seal the contact surface
- B. A self-adhesive flashing membrane installed behind the ledger (between the ledger and the sheathing), wrapping upward behind the housewrap above the ledger and extending downward over the housewrap below to create a drainage path
- C. A drip edge flashing installed beneath the ledger that directs water away from the bolt holes and foundation
- D. Stainless steel bolts that do not corrode and therefore do not create rust staining paths for water penetration

67. A carpenter is installing cedar bevel siding and must join two pieces end to end along a wall run because the wall is longer than the available siding lengths. What type of joint is used, and where should it be located?

- A. A butt joint with caulking between the two ends, positioned randomly along the wall wherever convenient
- B. A lap joint with one piece overlapping the other by 50 mm, positioned directly over a wall stud for nailing
- C. A scarf joint with both pieces cut at opposing 45-degree angles, positioned over a wall stud so both pieces can be nailed through the overlapping bevelled ends

D. A tongue-and-groove joint with matching profiles milled into each end, positioned at the midpoint of the wall

68. When installing asphalt shingles on a hip roof, the carpenter must trim the shingles along the hip line. The trimmed shingles on each side of the hip create exposed nail heads along the cut edge. How does the carpenter address these exposed nails?

A. The hip cap shingles installed over the hip line cover the exposed nail heads and trimmed edges on both sides of the hip

B. Each exposed nail is sealed with a dab of roofing cement before the adjacent course is installed above

C. The exposed nails are removed and replaced with staples that sit flush with the shingle surface

D. A continuous strip of self-adhesive membrane is applied over the trimmed edges before the hip caps

69. A carpenter is installing exterior wall insulation as part of a rain screen assembly. The rigid foam insulation boards are installed over the structural sheathing with mechanical fasteners. The joints between insulation boards must be treated to prevent thermal bridging at the joints. What is the recommended treatment?

A. The joints are left open to allow moisture drainage between the foam boards in the rain screen cavity

B. The joints are filled with spray foam insulation and shaved flush with the board surface after curing

C. The joints are covered with sheathing tape to prevent air movement through the gaps between boards

D. The joints between foam boards are staggered from the sheathing joints below and taped with a compatible tape to minimize air leakage and thermal bridging at the joint locations

70. A carpenter is completing the exterior finishing and must install the gable end vent — a louvered vent in the gable end wall that provides exhaust ventilation for the attic. The vent must be sized to provide adequate exhaust area. How is the vent sized relative to the attic ventilation requirement?

- A. The vent is a standard size selected from the manufacturer's catalogue without calculation based on attic area
- B. The vent is sized to match the total intake area at the soffits so the intake and exhaust are exactly balanced
- C. The vent area is determined by the attic floor area using the 1/300 or 1/150 ratio, with the gable vents providing the exhaust portion of the total required ventilation area
- D. The vent is sized based on the gable end wall area rather than the attic floor area for proper proportioning

71. A carpenter has installed horizontal vinyl siding up to the soffit line and must install the final (top) course of siding beneath the soffit. The top course must be cut to width (ripped) to fit the remaining space. After cutting, the nailing slots are removed. How is the cut panel secured?

- A. The cut panel is face-nailed through the siding surface because no other fastening method is available
- B. A utility trim (undersill trim) is installed at the soffit line, and the cut edge of the panel is punched with a snap-lock punch to create tabs that lock into the utility trim
- C. The cut panel is secured with construction adhesive applied to the back face before pressing into position
- D. The cut panel is held in place by friction between the panel below and the soffit J-channel above

72. A carpenter is installing a pre-hung exterior door and must shim the jamb at the hinge locations. The shims must be placed at specific points for the door to operate properly. How many shims are typically placed at each hinge location?

- A. Two shims placed as a pair (one from each side, creating a flat parallel bearing) behind the jamb at each hinge to provide solid, non-compressible support for the hinge screws
- B. One shim placed behind the jamb at the top hinge only because the door weight is concentrated at the top
- C. Three shims stacked at each hinge to build out the jamb to the correct reveal dimension from the stud

D. No shims are needed at the hinges because the hinge screws pull the jamb tight against the rough opening

73. A carpenter is installing a continuous ridge vent and notices that the attic has both soffit intake vents and gable end exhaust vents already installed. Now the ridge vent will also serve as an exhaust vent. What conflict does this dual exhaust system create?

- A. The ridge vent and gable vents create excessive ventilation that cools the attic too rapidly in summer
- B. The gable vents will draw air from the attic space and prevent the ridge vent from functioning properly
- C. The two exhaust systems are compatible and complement each other without any conflict in the system
- D. The gable vents can short-circuit the ridge vent — wind entering through one gable vent exits through the other gable vent, bypassing the soffit-to-ridge airflow path and leaving portions of the attic unventilated

74. A carpenter is installing exterior window shutters and must select the correct fastener length. The shutters are 19 mm thick PVC, the cladding is 12 mm fibre cement, and the sheathing beneath is 12 mm OSB. The fastener must penetrate into the wall studs. What is the minimum total fastener length needed to reach the studs with adequate penetration?

- A. 32 mm based on the shutter thickness plus the cladding thickness without reaching the sheathing or studs
- B. At least 70 mm to pass through the shutter (19 mm), cladding (12 mm), sheathing (12 mm), and achieve a minimum 25 mm penetration into the stud
- C. 44 mm based on the total thickness of the shutter, cladding, and sheathing without any stud penetration
- D. 100 mm to ensure maximum holding power by penetrating completely through the stud to the opposite side

75. A carpenter is installing a metal roof edge flashing at the eave of a residential roof. The flashing must direct water from the roof surface into the gutter below. If the flashing is installed with its lower edge inside the gutter rather than over it, what problem occurs?

- A. Water flows behind the gutter back instead of into the gutter trough, running down the fascia and potentially entering the wall cavity at the eave behind the cladding
- B. The flashing edge contacts the gutter and creates noise when the roof expands and contracts with temperature
- C. The gutter cannot be cleaned because the flashing blocks access to the gutter interior from above the roof
- D. The flashing acts as a dam that traps leaves and debris at the eave edge, blocking water flow into the gutter

76. A carpenter is completing an exterior cladding installation on a building with a cantilevered second storey that projects 600 mm past the first-storey wall below. At the underside of the cantilever, the carpenter must install a continuous band of cladding that covers the rim joist and the underside of the cantilevered floor joists. What is the primary concern at this horizontal band?

- A. The horizontal band must be flashed at the top where it meets the second-storey wall above to prevent water from entering behind the band and dripping through the floor cavity onto the first-storey ceiling below
- B. The horizontal band must be insulated to prevent cold air from entering the cantilevered floor cavity
- C. The horizontal band must be ventilated to prevent moisture buildup in the enclosed cantilevered floor cavity
- D. The horizontal band must be removable for future access to the cantilevered floor joist ends for inspection

77. A carpenter is installing drywall on a wall that has a structural steel column (a W-shape) in the middle of the wall run. The column flanges protrude past the stud faces. The drywall cannot be applied flat across the column without modification. How should the carpenter detail the drywall around the steel column?

- A. The drywall is applied directly to the column flanges using self-tapping metal screws for a direct attachment
- B. The column is boxed out with framing (metal or wood studs built around the column) to create a flat, continuous surface for the drywall to be applied to uniformly
- C. The drywall is cut to fit tightly around the column profile and the gaps are filled with joint compound
- D. The column is wrapped with rigid foam insulation that builds the surface out flush with the adjacent studs

78. A carpenter is installing a pre-hung door in a wall and must verify that the jamb is not twisted. A twisted jamb causes the door to contact the frame at the top corner on one side and the bottom corner on the opposite side when closed. What tool does the carpenter use to check for twist?

- A. A framing square placed at each corner to check that the jamb meets the head at 90 degrees at both sides
- B. A spirit level placed diagonally across the jamb faces from top corner to bottom corner on each side
- C. A plumb bob hung from the head jamb to check that the string is equidistant from the jamb face at all points
- D. A straightedge or string line placed diagonally across the face of the jamb from one corner to the opposite corner — if the jamb is twisted, the straightedge will not touch all four corners simultaneously

79. When installing baseboard at an inside corner, the carpenter uses a coped joint rather than a mitre joint. In a coped joint, one piece is cut square and butted into the corner, and the other piece is cut to match the profile of the first piece so it fits over it. What is the primary advantage of a coped joint over a mitre joint at inside corners?

- A. A coped joint is faster to cut than a mitre joint because it requires only one angled cut on one piece
- B. A coped joint remains tight as the wood shrinks and the wall moves because the profiled piece slides along the butted piece rather than pulling away as a mitre would
- C. A coped joint requires less caulking than a mitre joint because the tight profile fit seals the joint naturally

D. A coped joint is structurally stronger than a mitre joint because the overlapping profiles interlock

80. A carpenter is installing a floating laminate floor in a room with in-floor radiant heating. The heating system produces warm floor temperatures. What specific concern does radiant heat create for laminate flooring?

A. The heat causes the laminate surface to discolour from prolonged thermal exposure above normal room temperature

B. The heat accelerates the wear of the laminate surface layer, reducing the floor's lifespan by half

C. The heat causes the floor colour to fade unevenly, creating light and dark patterns across the surface

D. Excessive heat causes the laminate to expand more than normal — the manufacturer's maximum floor temperature must not be exceeded, and adequate expansion gaps must be maintained

81. A carpenter is constructing a stairway that has a 90-degree turn with three winder treads at the corner instead of a landing platform. The Building Code requires that winder treads have a minimum depth measured at a specific point. Where is the minimum tread depth measured on a winder?

A. At 150 mm from the narrow end of the winder tread, which represents the measurement point specified by most Canadian Building Codes for the minimum tread depth

B. At the widest point of the winder tread where it meets the outer stringer of the stairway turn

C. At the geometric centre of the winder tread surface, equidistant from the narrow and wide ends

D. At the narrow end of the winder tread where it meets the inner stringer at the turn centre point

82. A carpenter is installing tongue-and-groove hardwood flooring and reaches a point where the last few rows cannot be blind-nailed because the nailer does not fit between the wall and the flooring. How are the last rows of flooring installed?

- A. The last rows are glued to the subfloor only without any mechanical fastening for the remaining boards
- B. The last rows are tapped into position and held by the friction fit of the tongue-and-groove joint alone
- C. The last rows are face-nailed with finishing nails, with the nail heads set below the surface and filled with matching wood putty
- D. The last rows are left floating without glue or nails and held in place by the baseboard installed over them

83. A carpenter is installing a kitchen countertop with a 4-inch backsplash (a short vertical piece that sits on the countertop against the wall). The joint between the backsplash top and the wall must be sealed. What sealant is used at this joint?

- A. A bead of plumber's putty pressed into the joint between the backsplash top and the wall surface
- B. A strip of adhesive-backed foam tape applied to the wall before pressing the backsplash against it
- C. A thin bead of wood glue applied along the backsplash top edge and smoothed with a damp cloth
- D. A bead of silicone or latex caulking applied in a continuous line along the joint between the backsplash and the wall to seal against water and food particles

84. A carpenter has constructed a stairway and the building inspector measures the risers. The first riser (from the lower finished floor to the first tread) measures 195 mm while all other risers measure 180 mm. The inspector rejects this stairway. Why?

- A. The 195 mm first riser exceeds the Building Code maximum riser height of 190 mm for residential stairs
- B. The 15 mm difference between the first riser and the remaining risers exceeds the Building Code's maximum allowable variation between any two risers in the same flight, which is typically 5 to 6 mm
- C. The first riser must always be the shortest riser in the flight for safety when stepping onto the first tread

D. The inspector found that the first riser is taller than the last riser, which is specifically prohibited by code

85. A carpenter is installing a pre-hung interior door and must ensure the door swings freely without rubbing on the floor. The current gap between the bottom of the door and the subfloor is 20 mm. The finished floor will be 12 mm thick laminate. What will the final clearance be after the floor is installed?

A. 8 mm — calculated by subtracting the 12 mm floor thickness from the 20 mm current gap, which is within the acceptable range of 6 to 12 mm for interior doors

B. 20 mm because the finished floor height does not affect the door clearance once the jamb is installed

C. 32 mm because the floor adds to the gap rather than reducing it when measured from the new surface

D. 12 mm because the floor thickness equals the clearance regardless of the starting gap measurement

86. A carpenter is installing ceiling drywall and must cut around a rectangular heating duct that penetrates the ceiling plane. The duct measures 250 mm × 600 mm. What is the correct approach for cutting this opening?

A. Install the drywall panel over the opening area and use a rotary cut-out tool from below to cut the opening

B. Transfer measurements from existing reference points to the drywall panel and cut the opening before installation

C. Measure the duct location from adjacent reference points, transfer these measurements to the drywall panel, and cut the rectangular opening before lifting the panel into position for a precise fit

D. Install the drywall panel and have the HVAC installer cut the opening when connecting the ductwork later

87. A carpenter installs a solid-core interior door in a fire-rated assembly. The door closer is adjusted for closing speed and latching speed. What happens if the closing speed is set too fast?

- A. The door slams shut with excessive force, potentially injuring a person passing through the doorway
- B. The door closes too quickly and the latch bolt does not have time to retract, causing the door to bounce off the strike plate rather than latching properly
- C. The fast closing speed damages the door closer hydraulic mechanism, causing it to leak fluid and fail
- D. The fast closing speed creates a pressure wave that disrupts the fire-rated seal at the door perimeter

88. A carpenter is installing wainscoting (wood panelling on the lower portion of a wall) in a dining room. The wainscoting extends from the floor to a height of 1,200 mm, where it terminates with a chair rail moulding. The upper wall above the chair rail is finished with drywall and paint. What is the primary function of the chair rail?

- A. It protects the lower wall surface from damage by chair backs when chairs are pushed against the wall
- B. It provides a visual transition and a finished top edge for the wainscoting where it meets the upper wall surface
- C. It provides structural support for the wainscoting panels to prevent them from pulling away from the wall
- D. It hides the electrical wiring that runs horizontally at the 1,200 mm height inside the wall cavity

89. A carpenter is installing a pre-hung pocket door and must verify that the track is level before hanging the door. If the track slopes even slightly, what operational problem will the door experience?

- A. A sloped track causes the door to roll toward the low end by gravity, meaning it will not stay in the open or closed position without additional hardware to hold it
- B. A sloped track causes the door to make a grinding noise as the rollers travel across the uneven surface
- C. A sloped track causes the door to rub on the floor at the low end and gap at the high end of the track
- D. A sloped track causes the door panels to separate from the track because the rollers cannot grip the slope

90. When installing crown moulding in a room with a cathedral (vaulted) ceiling, the carpenter encounters a condition where the ceiling plane meets the wall at an angle other than 90 degrees. Standard crown moulding spring angles are designed for 90-degree wall-to-ceiling junctions. How does the carpenter handle this non-standard angle?

A. The carpenter measures the actual wall-to-ceiling angle and adjusts the mitre and bevel cuts on the mitre saw to produce compound cuts that match the non-standard junction angle

B. The carpenter installs standard crown moulding using the normal 90-degree settings and fills any gaps with caulking

C. The carpenter installs the crown moulding flat against the ceiling only and fills the wall gap with trim

D. The carpenter uses flexible crown moulding made of rubber that conforms to any wall-to-ceiling angle

91. A carpenter is renovating a 1970s-era house and removes a section of soffit material. The material is a white, fibrous, cement-like board that is brittle and crumbles when broken. What should the carpenter suspect about this material?

A. The material is standard cement board that was commonly used for soffits in the 1970s and is non-hazardous

B. The material is likely fibreglass board that was used as an exterior panel material in that construction era

C. The material is gypsum board that has deteriorated from moisture exposure during its decades of service

D. The material may be asbestos cement board — a common soffit and siding material in 1960s and 1970s construction that must be tested before further disturbance or removal

92. A renovation project involves adding a second-storey addition to an existing single-storey house. Before designing the addition, a structural engineer inspects the existing first-storey walls and foundation. What is the engineer evaluating?

- A. The aesthetic compatibility of the existing wall finishes with the proposed second-storey design concept
- B. Whether the existing first-storey walls, floor system, and foundation have adequate capacity to support the additional loads from the second storey above
- C. The age of the existing structure to determine if it qualifies for heritage building protection from demolition
- D. The electrical capacity of the existing service panel to determine if it can support the second-storey loads

93. A carpenter is renovating a bathroom and must install a new shower pan (base) on a wood-framed floor. The shower pan must be set level and must drain toward the centre drain. Before installing the pan, what must the carpenter verify about the floor framing?

- A. That the floor joists are spaced at exactly 400 mm on centre for the shower pan to span between them
- B. That the floor joists have been fumigated to kill any mould spores that may have developed from moisture
- C. That the floor framing is structurally sound, level, and reinforced if necessary to support the weight of the filled shower, the pan, the tile, and the occupant
- D. That the floor joists are made of the same species as the rest of the house for material consistency

94. During a renovation, a carpenter discovers that an existing load-bearing wall has been previously modified — someone has cut a 1.2-metre opening through the wall without installing a header. The wall supports a floor and roof above. What is the immediate concern?

- A. The loads above the opening are being transferred to the studs on each side of the opening through the top plate alone, which may be inadequate — the wall is at risk of failure and must be temporarily shored and a proper header installed
- B. The opening is adequate because the top plate can span 1.2 metres under the existing loading conditions

C. The wall should be monitored for six months to see if any deflection or cracking develops before acting

D. The opening must be closed immediately by installing studs to fill the gap and restore the original wall

95. A carpenter is performing an energy retrofit by adding blown-in dense-pack cellulose insulation to existing exterior wall cavities through holes drilled in the sheathing or interior drywall. What potential problem can occur if the cavity is already partially insulated with batt insulation?

A. The cellulose and batt insulation are chemically incompatible and will produce toxic fumes when combined

B. The cellulose insulation will compress the existing batt, but both materials will contribute to the total R-value

C. The existing batt insulation prevents the cellulose from being blown in at the required density, creating voids

D. The existing batt insulation can block the cellulose fill tube, preventing uniform distribution — the cellulose may pack unevenly, leaving voids behind the batts that reduce the insulation effectiveness

96. A renovation project requires raising the height of an existing basement by underpinning the foundation — excavating beneath the existing footings in sections and pouring new, deeper footings. This work is performed in carefully sequenced stages. Why must underpinning be done in stages rather than all at once?

A. Pouring all the new footings at once requires more concrete than a single truck can deliver to the site

B. Excavating beneath the entire foundation simultaneously removes all the bearing support at once, which would cause the foundation walls and the building above to collapse — staged underpinning maintains continuous support

C. The building permit only allows a certain number of cubic metres of excavation per day for safety reasons

D. The concrete for each section must cure for 28 days before the adjacent section can be excavated safely

97. A carpenter is renovating an older home and discovers that the existing wiring is a mixture of knob-and-tube in the walls and early Romex (NMD cable) in the ceiling. The renovation involves opening walls for insulation and replumbing. Should the carpenter report the knob-and-tube wiring?

A. Yes — the carpenter should report the knob-and-tube wiring to the homeowner and recommend evaluation by a licensed electrician, as it may need to be replaced or de-energized before insulation is installed in the wall cavities

B. No — knob-and-tube wiring is still code-compliant and does not need to be reported or addressed

C. Yes, but only if the wiring insulation is visibly deteriorated or if the wires are sparking when the wall is opened

D. No — the electrician will discover it during the rough-in inspection and address it at that time automatically

98. A renovation involves installing a beam to replace a bearing wall. The beam must be installed at the underside of the existing ceiling joists. The carpenter must temporarily support the ceiling joists above the wall before removing the wall studs. What temporary support system is used?

A. A single adjustable steel post placed at the centre of the wall span to carry the ceiling joists temporarily

B. Hydraulic jacks placed under each joist end at the wall location to hold the joists individually in position

C. A temporary beam (sometimes called a needle beam) supported by temporary posts, installed parallel to and on each side of the bearing wall to carry the joist loads while the wall is removed

D. The ceiling joists are cut at the bearing wall and allowed to cantilever from the adjacent supports temporarily

99. A carpenter is renovating a commercial kitchen and must install a grease trap access panel in the floor. The floor is a concrete slab covered with commercial quarry tile. The access panel must be flush with the finished floor surface and must be removable for trap cleaning. What type of access panel frame is used in a concrete floor application?

- A. A wooden frame set in the concrete with a plywood cover panel painted to match the tile floor colour
- B. A vinyl frame with a snap-in cover panel that can be pulled up for access and snapped back into position
- C. A plastic recessed frame with a removable plug that is lightweight and corrosion-resistant for kitchen use
- D. A cast-in-place stainless steel or aluminum frame with a removable cover that is recessed to receive tile on its surface so the panel is flush with the surrounding floor when closed

100. A renovation project is complete, the final building inspection has been passed, and the building permit has been closed. The homeowner asks the carpenter for a copy of all documents related to the renovation. What documents should the carpenter provide to the homeowner for their records?

- A. Only the final inspection report because all other documents are the contractor's proprietary property
- B. Copies of the building permit, approved drawings, engineering reports, inspection records, product warranties, and any as-built changes documented during construction
- C. Only the contractor's invoice and the manufacturer warranties for the products installed during the work
- D. A verbal summary of the work performed without any written documentation for the homeowner's records

## Practice Exam 9: Answer Key and Explanations

1. C — Wood fibres have a directional grain, and planing against the grain lifts and tears the fibres rather than shearing them cleanly. Reversing the planing direction so the blade cuts with the grain (from the root end toward the tip of the fibres) produces smooth shavings and a clean surface. Checking the grain direction before planing prevents tearout.

2. A — When the air pressure is correctly set and nails consistently bend, the nails are hitting a hard substrate behind the trim — metal studs, concrete, embedded nails, or hardwood blocking. The nail tip cannot penetrate the hard material and deflects sideways, bending inside the trim. The carpenter must investigate the substrate and drill pilot holes or relocate fasteners.

3. D — A wobbling blade on a circular saw indicates that the blade is warped, the arbour nut is loose, or the blade is improperly seated on the arbour washer. Any of these conditions makes the saw extremely dangerous — the blade can bind, kick back, or shatter during a cut. The saw must be stopped immediately, the blade and mounting inspected, and the defective component replaced.

4. B — The NIOSH derating formula accounts for the difference between laboratory-tested NRR values and real-world performance:  $(\text{NRR} - 7) \div 2 = (29 - 7) \div 2 = 11$  dB effective reduction. At 98 dB exposure, the estimated exposure with earplugs is  $98 - 11 = 87$  dB — still above the 85 dB action level. Dual protection (earplugs plus earmuffs) may be needed.

5. A — Headache and dizziness are classic early symptoms of carbon monoxide (CO) poisoning from combustion equipment operating in an enclosed space. CO is colourless and odourless, so symptoms are often the first warning. The carpenter must leave the area immediately, get fresh air, and report the incident so the ventilation can be assessed and the CO source addressed.

6. D — A tarp wrapped around a scaffold converts the open scaffold frame into a solid sail that catches wind. The wind load on the tarped scaffold is dramatically greater than on the open frame, creating forces that can overturn or collapse the scaffold. Additional tie-ins to the building, heavier bracing, and potentially an engineering assessment are required.

7. B — The human eye is most sensitive to the green portion of the visible spectrum (around 532 nm wavelength), making green laser beams appear approximately four times brighter than red beams of the same power output. This improved visibility makes green lasers easier to see in bright ambient light conditions, though a detector is still needed in direct sunlight.

8. C — Suspension trauma (orthostatic intolerance) develops when a motionless worker hangs in a harness and blood pools in the legs due to gravity and strap compression. Reduced blood return to the heart causes blood pressure to drop, leading to unconsciousness and potentially death within 15 to 30 minutes. Rescue must occur within minutes.

9. A — Wet concrete is slippery, and the rubber feet of a step ladder may not grip adequately on a wet surface. The ladder can slide sideways when the carpenter shifts weight during work. Drying the floor area before setup eliminates the slip hazard. If drying is not possible, the carpenter should relocate to a dry section.

10. D — Each broken wire in a wire rope sling represents a reduction in the sling's total cross-sectional area and load-carrying capacity. Broken wires also indicate progressive fatigue, corrosion, or abrasion damage that will continue to worsen with use. The sling may fail suddenly under load without further warning.

11. B — The leading and trailing ends of a long piece of material extend beyond the carrier's field of vision and can strike other workers when the carrier turns corners, passes through doorways, or navigates around obstacles. The carrier must be aware of the ends at all times and may need a spotter in congested areas.

12. C — Wind is the primary environmental factor that prevents a plumb bob from settling to a stationary vertical position outdoors. Even a light breeze exerts sufficient force on the string and bob to cause persistent swinging. In windy conditions, the carpenter should use a laser plumb, work in a sheltered location, or shield the plumb bob from the wind.

13. D — In the W-shape steel designation system, the first number (250) indicates the approximate depth of the beam in millimetres, and the second number (89) indicates the mass in kilograms per linear metre. The beam pocket height must accommodate the 250 mm depth plus clearance for the bearing plate and levelling shims.

14. A — No. 1 grade lumber exceeds the specified No. 2 grade — it has fewer defects, higher allowable stress values, and better overall quality. Substituting a higher grade for a lower grade is always acceptable from a structural perspective. The carpenter should document the substitution and proceed with the framing.

15. B — Total area =  $2 \times (14.0 \times 5.5) = 154.0 \text{ m}^2$ . Sheets =  $154.0 \div 2.977 = 51.7$  sheets. Plus 10% waste:  $51.7 \times 1.10 = 56.9$ , rounded up to 57 sheets. The 10% waste allowance accounts for cutting waste at hips, valleys, ridges, and edges where partial panels are needed.

16. C —  $4,200 \text{ mm} \div 25.4 = 165.35$  inches. Convert to feet:  $165.35 \div 12 = 13$  feet with a remainder of 9.35 inches. Convert the decimal:  $0.35 \times 16 = 5.6$  sixteenths  $\approx 9/16$  inch. The span is approximately 13 feet 9-1/2 inches. Accurate metric-to-imperial conversion is essential when working with drawings in both systems.

17. D — Triangular cross-section area =  $(\text{base} \times \text{height}) \div 2 = (0.4 \times 0.3) \div 2 = 0.06 \text{ m}^2$ . Volume = area  $\times$  length =  $0.06 \times 8.0 = 0.48 \text{ m}^3$ . The critical step is dividing by 2 for the triangular shape — using the rectangular formula ( $\text{base} \times \text{height}$ ) without dividing produces double the correct volume.

18. B — Height of Instrument (HI) = benchmark elevation + backsight =  $98.500 + 2.150 = 100.650 \text{ m}$ . Footing form elevation = HI - foresight =  $100.650 - 1.875 = 98.775 \text{ m}$ . The foresight is always subtracted from the HI to determine the elevation of the point being measured.

19. A — Temporary diagonal braces can be adjusted (lengthened or shortened) to push or pull the top of the wall at the bow location until the top plate is straight. Once straight, the braces are re-secured to hold the wall in the corrected position until permanent sheathing is installed. This is the standard method for straightening framed walls.

20. C — For a  $3.0 \times 4.0 \text{ m}$  rectangle, the diagonal =  $\sqrt{(3.0^2 + 4.0^2)} = \sqrt{(9 + 16)} = \sqrt{25} = 5.0 \text{ m}$ . This is a 3-4-5 triangle — one of the most common Pythagorean triples used in construction layout. Both diagonals must equal 5.0 m for the rectangle to be perfectly square.

21. A — Cumulative measurement error results from small parallax errors at each mark — reading the tape at a slight angle introduces a consistent bias that compounds with each successive measurement. Over ten marks, each with a fraction-of-a-millimetre reading error, the total drift reaches 5 mm. Using a single pull from one end eliminates cumulative errors.

22. C — Litres required = floor area  $\div$  coverage rate =  $200 \div 8 = 25$  litres for one coat. This is a straightforward division — the coverage rate tells you how many square metres one litre covers, so dividing the total area by the rate gives the total litres needed. Multiplying instead of dividing is the most common error.

23. B — Slope ratio = rise  $\div$  run =  $600 \div 7,200 = 1/12$ . Expressed as a ratio, this means the ramp rises 1 unit for every 12 units of horizontal run. A 1:12 slope is the maximum permitted by most accessibility codes for ramps, providing a grade that wheelchair users can navigate independently.

24. D — The measured diagonal (10.05 m) exceeds the calculated diagonal (10.0 m) by 50 mm, indicating the corner is slightly out of square. The 50 mm deviation should be evaluated against the project tolerance — for most residential foundations, this is within acceptable limits, but for precision work it may require correction.

25. B — Joists span the 8.4 m dimension, and the layout runs along the 12.8 m dimension. Number of joists =  $(12,800 \div 400) + 1 = 32 + 1 = 33$  joists. The "+1" accounts for the starter joist at the beginning of the layout. This basic count does not include doubled joists at openings.

26. A — "On centre" (o.c.) means the measurement is taken from the centre of one member to the centre of the adjacent member. This produces a consistent module regardless of the member width — whether studs are 38 mm, 89 mm, or 140 mm wide, the centre-to-centre spacing remains constant for predictable sheet good alignment.

27. C — A tapered pier requires four trapezoidal form panels — each panel is wider at the bottom and narrower at the top, cut at the correct taper angle. The four panels are assembled with the tapers aligned to produce a symmetrical taper from bottom to top on all four faces. Accurate angle cuts and careful assembly are essential for uniform taper.

28. D — A construction joint requires a vertical bulkhead (stop end) at the planned stopping point. The bulkhead contains the concrete at the end of the first pour. A keyway strip or roughened surface on the bulkhead face creates a mechanical interlock between the first and second pour, ensuring structural continuity across the joint.

29. B — A smaller maximum aggregate size (14 mm instead of 20 mm) is specified when the rebar spacing is tight or the form sections are narrow. Larger aggregate can bridge between closely spaced bars or form faces, blocking the concrete flow and causing honeycombing. The aggregate must be small enough to flow freely around all reinforcement.

30. A — Prolonged high-speed drum rotation generates friction heat from the concrete tumbling against the drum fins and itself. This heat accelerates the hydration reaction, reducing the slump (making the concrete stiffer) and advancing the set. The concrete may become difficult to place and finish, and the accelerated hydration reduces the achievable strength.

31. C — Dampproofing is designed to resist moisture migration through concrete by capillary action — the natural tendency of water to wick through the porous concrete matrix. It is effective against moisture in damp soil but not against hydrostatic water pressure (standing water). Waterproofing membranes are required where hydrostatic pressure exists.

32. B — A 400 mm lap does not meet the engineer's specified 600 mm splice length. The carpenter must report the short dowel and request direction — the engineer may specify a mechanical splice coupler, a

welded connection, or require the short dowel to be removed and replaced with a correctly sized dowel. The carpenter cannot make this structural decision independently.

33. D — The edging tool compresses and rounds the concrete at the slab perimeter, strengthening the exposed edge against chipping and spalling from impact damage and freeze-thaw cycling. A sharp 90-degree concrete edge is fragile and chips easily — the rounded profile distributes impact forces over a larger area and sheds water rather than trapping it.

34. A — A combined stair-and-retaining-wall pour requires the formwork to simultaneously resist the lateral concrete pressure from the retaining wall while maintaining precise riser and tread dimensions for the stairway. The wall form bracing must be integrated with the stair form support system without interfering with either function.

35. C — The designation describes welded wire mesh with 6 mm diameter wire in both directions and a 152 mm × 152 mm (approximately 6 × 6 inch) grid spacing. The mesh provides crack control reinforcement for concrete slabs by resisting the tensile stresses that develop from shrinkage as the concrete cures.

36. B — The pour must be stopped immediately when form deflection is observed. Additional shoring or cribbing must be placed under the settling shores to restore the form to its correct elevation. The form alignment must be verified before the pour resumes. Continuing to pour into a deflecting form produces a beam with the wrong geometry.

37. A — Parapet wall forms are exposed to wind on both sides at the rooftop — a much more severe wind exposure than ground-level forms. The forms must be designed to resist wind loads on the exposed surfaces in addition to concrete pressure. The form base must be securely anchored to the roof structure to prevent wind from overturning the entire form assembly.

38. D — Segregation occurs when the concrete components separate during transport — the heavier aggregate settles and rolls faster than the lighter cement paste. Reducing the chute length, reducing the angle, using a tremie pipe, or installing baffles in the chute remixes the concrete as it flows, maintaining a homogeneous mix at the discharge point.

39. C — For watertight concrete, thorough vibration of every lift is the most critical construction practice. Every void, air pocket, and honeycombed area is a potential pathway for water penetration.

Complete consolidation eliminates these pathways by filling all spaces with dense, void-free concrete paste around the aggregate.

40. B — The horizontal ridges at waler locations indicate that the form panels deflected outward between the walers under the lateral pressure of the wet concrete. The slight bulge between each pair of walers creates a corrugated effect on the concrete surface. Closer waler spacing or stiffer form panels reduce this deflection.

41. D — Smooth steel dowel bars are embedded in the first slab pour with one end greased (or sleeved with a plastic cap). When the second pour is placed around the protruding dowel ends, the dowels transfer vertical loads (shear) across the joint while allowing the greased ends to slide horizontally, accommodating slab expansion and contraction.

42. B — Concrete that has begun to set in the truck has undergone irreversible hydration. Adding water at this stage increases the water-cement ratio of the partially hydrated mix but does not restore the original workability or reverse the setting process. The resulting concrete will have significantly reduced strength and durability and must be rejected.

43. A — Blocking panels installed between the joist ends on top of the beam flange prevent the joists from tipping, rotating, or displacing off the narrow beam flange. Without blocking, individual joists can roll under load or shift laterally, losing bearing contact with the beam. The blocking is nailed to each joist and bears on the beam.

44. C — The ridge length on a rectangular hip roof = building length – building width (or more precisely, building length minus twice the common rafter run). The hip rafters at each end occupy the space equal to the building width, shortening the ridge by that amount. On a square building, the ridge length is zero — the four hip rafters meet at a single peak.

45. B — Most subfloor specifications allow ring-shank nails as an equivalent substitution for screws when construction adhesive is also used. The adhesive provides the primary bond and withdrawal resistance, while the nails (or screws) provide clamping pressure during adhesive cure and long-term mechanical connection. The carpenter should verify with the specification.

46. D — A flush beam carrying concentrated loads requires a built-up post or column within the wall directly beneath the beam end to transfer the beam reaction down to the foundation. Standard studs,

cripple studs, and top plates cannot carry the concentrated point load from a beam. The post is typically built from multiple studs nailed together or a solid timber.

47. A — A rim joist that is 5 mm above the joist top creates a high point. The subfloor panel bears on the high rim joist and pivots, creating a gap over the adjacent joist. This produces a soft spot in the floor (the panel deflects when stepped on) and a squeak (the panel moves on the unsupported joist). The rim must be trimmed flush before the subfloor is installed.

48. C — Without ceiling joists or collar ties to resist outward thrust, the rafters push the walls apart under load. A structural ridge beam, sized by an engineer, carries the full vertical load of the rafters and transfers it to posts at each end. The posts carry the load down to the foundation, eliminating the outward thrust that ceiling joists would otherwise resist.

49. B — The knee wall supports the rafters at an intermediate point, reducing the effective rafter span from the full distance (plate to ridge) to the shorter distance (knee wall to ridge). This reduced span dramatically decreases the bending moment in the rafter, allowing standard-size rafters to span distances that would otherwise require much deeper members.

50. D — The let-in brace must be recessed into the stud faces so it sits flush with the surface. The notch depth equals the brace thickness — typically 19 mm for a 1×4 brace. If the brace protrudes past the stud face, it prevents the sheathing or drywall from lying flat. If the notch is too deep, it unnecessarily weakens the stud.

51. A — Metal joist hangers are required at header-to-trimmer connections because these joints transfer significant loads — the accumulated weight of all the interrupted tail joists, the subfloor, and the live loads above. Face nails and toenails alone cannot carry these concentrated loads. The hanger provides a positive mechanical connection rated for the required capacity.

52. C — A ridge vent works by allowing hot, moist attic air to exhaust through the slot in the sheathing at the ridge. If the sheathing is continuous over the ridge with no slot, the air path from the attic to the vent is completely blocked. The ridge vent becomes a non-functional decorative cap, and the attic loses its exhaust ventilation.

53. B — Installing the full panel over the opening and routing afterward is a common, efficient technique called "cut-in-place" sheathing. The router follows the framing edges precisely, producing

clean cuts aligned perfectly with the studs, header, and sill. This method is faster than pre-cutting and produces more accurate openings.

54. D — A 75 mm offset between the bearing wall and the foundation creates an eccentric load on the floor system — the load is applied 75 mm from the support below. This eccentricity creates bending in the floor joists and can overstress the bottom plate or subfloor at the offset. A structural engineer must evaluate whether the floor system can carry the offset load.

55. A — The manufacturer's hole chart is a structural specification, not a guideline. The minimum distance from bearing for a 150 mm hole is 600 mm, and the hole is only 400 mm from the bearing. Cutting the hole at this location would place it in the high-shear zone, significantly reducing the joist's capacity. The hole must be moved or the duct rerouted.

56. C — Tall, slender posts have a high slenderness ratio (height-to-width ratio) that makes them vulnerable to buckling — a sudden sideways displacement under compressive load. At 2.4 metres tall, an 89 × 89 mm post can buckle under the deck loads. Diagonal bracing between the posts and the beam reduces the effective unbraced length and prevents lateral buckling.

57. B — Lookout rafters (horizontal blocks) cantilever from the first inboard common rafter outward past the gable wall to support the barge rafter. The lookouts are nailed to the first inboard rafter and to the barge rafter, creating a structural framework for the gable overhang. Lookout spacing is typically 400 to 600 mm along the barge rafter length.

58. A — A 150 mm pipe cannot fit within a 38 × 89 mm stud wall — the stud depth is only 89 mm, and drilling a 150 mm hole would remove the entire stud. The wall must be built with deeper studs (2 × 6 or 2 × 8) at the pipe location, or the full wall depth must be increased to accommodate the pipe diameter.

59. D — The ridge height is determined by the rafter seat position on the wall plate (the birdsmouth depth). If the birdsmouths are cut deeper than calculated, the rafter seats sit lower on the plate, which lowers the ridge. The cumulative effect of slightly over-deep birdsmouths on every rafter pair produces a measurable drop in ridge height.

60. C — Extending the wall sheathing below the bottom plate covers the sill plate, rim joist, and sill-to-foundation junction. This provides a continuous surface for the weather-resistive barrier and cladding to attach to, prevents air infiltration at the critical sill junction, and creates weather protection for the rim joist and sill area.

61. B — A bead of exterior-grade caulking applied between the cladding and the door brick mould seals the joint against water and air infiltration. This is the standard weatherproofing detail at door and window trim-to-cladding junctions. The caulking must be flexible enough to accommodate seasonal movement and durable enough to resist UV and weather exposure.

62. D — A curb is a raised frame (typically 100 to 200 mm tall) built on the roof deck that elevates the skylight above the roof surface. On low-slope roofs, water does not drain quickly and can pool around a flush-mounted skylight, eventually penetrating the seal. The curb raises the skylight above the water level, and the flashing integrates with the curb sides.

63. C — Metal siding panels expand and contract significantly with temperature changes — a 3.6-metre steel panel can change length by several millimetres across the temperature range. Elongated mounting slots and slightly loose screws allow the panels to slide on the fasteners as they expand and contract, preventing buckling and distortion.

64. A — Step flashing is the standard method for flashing a roof-to-wall intersection on a sloped roof. Individual L-shaped pieces are woven into each shingle course, with each piece lapping over the one below. This creates a continuous watershed from the wall onto the roof surface at every course, following the fundamental upper-over-lower lapping principle.

65. B — The bottom J-channel collects water that runs down behind the siding from the window area above. Drainage notches (small V-cuts) at each end of the bottom J-channel allow this water to drain out at the corners rather than pooling behind the siding and causing moisture damage to the sheathing and framing.

66. B — Self-adhesive flashing membrane installed behind the ledger wraps upward behind the housewrap above the ledger (so water from the wall flows over the membrane) and extends downward over the housewrap below (so water on the membrane drains outward). This creates a complete drainage path that directs water away from the bolt penetrations.

67. C — A scarf joint with both pieces cut at opposing 45-degree angles is the standard method for joining siding end to end. The joint is positioned over a wall stud so both pieces can be nailed through the overlapping bevelled ends. The angled joint sheds water and is less visible than a butt joint because the tapered overlap hides the line.

68. A — Hip cap shingles are installed over the hip line after the field shingles are trimmed along the hip. The cap shingles cover the exposed nail heads and trimmed edges on both sides of the hip, creating a weathertight ridge that protects the vulnerable hip intersection from water penetration.

69. D — Joints between rigid foam insulation boards are staggered from the sheathing joints below to prevent through-wall air pathways that align at both layers. The foam joints are taped with a compatible tape (matching the foam type) to minimize air leakage and thermal bridging at the joint locations.

70. C — Gable end vents are sized using the same attic ventilation ratio as soffit and ridge vents — typically 1/300 or 1/150 of the attic floor area, depending on the presence of a vapour barrier. When gable vents provide the exhaust portion, they must be sized to balance the intake area provided by the soffit vents.

71. B — When the nailing slots are removed by the rip cut, a utility trim (undersill trim) is installed at the soffit line. The cut edge of the panel is punched with a snap-lock punch to create tabs that lock into the utility trim, securing the panel without visible fasteners. This is the standard method for terminating the top course.

72. A — Shims at each hinge location must be installed as a pair — one from each side, creating a flat, parallel bearing surface behind the jamb. The paired shims provide solid, non-compressible support that resists the forces transferred through the hinge screws when the door is operated. Single shims create a wedge that can compress.

73. D — Gable vents can short-circuit the ridge vent ventilation system. Wind entering one gable vent exits the other gable vent, creating a horizontal air path that bypasses the intended soffit-to-ridge vertical airflow. This leaves the areas of the attic away from the gable vents poorly ventilated. When a ridge vent is installed, gable vents should typically be sealed.

74. B — Total material thickness = shutter (19) + cladding (12) + sheathing (12) = 43 mm. Add minimum 25 mm stud penetration =  $43 + 25 = 68$  mm minimum. A 70 mm fastener provides adequate penetration. Fasteners that do not reach the studs rely on sheathing alone, which cannot resist the wind forces on the shutters.

75. A — If the drip edge lower edge sits inside the gutter rather than extending over it, water flowing off the roof runs behind the gutter back instead of into the trough. This water runs down the fascia board,

saturates the wood, and can enter the wall cavity at the eave. The drip edge must extend over the gutter lip so water drops directly into the trough.

76. A — The horizontal band at the underside of a cantilever is a critical flashing location. Water running down the second-storey wall above reaches the cantilever projection and must be diverted outward by flashing at the top of the band. Without this flashing, water enters the cantilevered floor cavity and drips through the ceiling of the first storey below.

77. C — A steel column protruding past the stud faces cannot receive drywall directly. The column is boxed out with a framing enclosure — metal or wood studs built around the column — that creates flat, continuous surfaces on all exposed sides. The drywall is applied to this enclosure, producing a finished column cover that hides the steel.

78. D — A twisted jamb can be detected by placing a straightedge diagonally across the jamb face from one corner to the opposite corner. If the jamb is twisted, the straightedge touches two diagonally opposite corners but gaps away from the other two. A plumb check on each side also reveals twist — one side may read plumb while the other does not.

79. B — A coped joint remains tight as the wood shrinks seasonally because the profiled (coped) piece slides along the flat face of the butted piece rather than pulling away. A mitred inside corner opens visibly when the wood shrinks — the two angled faces separate, creating a gap. Coped joints are the professional standard for inside corners.

80. D — Radiant heat causes laminate flooring to expand more than flooring at normal room temperature. The manufacturer specifies a maximum floor surface temperature (typically 27°C or 80°F) that must not be exceeded. Adequate expansion gaps must be maintained at all walls and fixed objects because thermal expansion from radiant heat is additive to normal humidity-driven expansion.

81. A — Most Canadian Building Codes measure the minimum winder tread depth at 150 mm from the narrow end of the tread. This measurement point represents the inside of the normal walking path on the winder. The minimum tread depth at this point (typically 200 to 210 mm) ensures adequate foot room at the tightest part of the turn.

82. C — The last few rows of hardwood flooring are face-nailed with finishing nails because the pneumatic flooring nailer cannot fit between the wall and the flooring. The nail heads are set below the

surface with a nail set and the holes are filled with matching wood putty. After sanding and finishing, the filled nail holes are nearly invisible.

83. D — A continuous bead of silicone or latex caulking along the joint between the backsplash top and the wall seals the gap against water, food particles, and grease. Without this seal, liquids that splash onto the countertop run behind the backsplash and damage the wall surface and the substrate below.

84. B — The Building Code requires that the variation between the tallest and shortest risers in any single flight not exceed 5 to 6 mm (depending on the jurisdiction). A 15 mm difference between the first riser (195 mm) and the remaining risers (180 mm) far exceeds this tolerance. Unequal risers are a tripping hazard because they disrupt the climber's expected stride rhythm.

85. A — Final clearance = current gap – finished floor thickness =  $20 - 12 = 8$  mm. This 8 mm clearance is within the acceptable range of 6 to 12 mm for standard interior doors. The door will swing freely above the laminate surface without rubbing, and the gap is small enough to be visually acceptable.

86. C — The carpenter measures the duct location from fixed reference points (walls, adjacent panels, or the panel edge already in position), transfers these measurements to the drywall panel, and cuts the rectangular opening before lifting the panel to the ceiling. Cutting before installation ensures accuracy and is safer than overhead cutting with power tools.

87. A — A door closer set too fast slams the door shut with excessive force, which can injure a person's fingers, hands, or body as they pass through the doorway. The closing speed should be adjusted so the door closes firmly but at a controlled pace — typically 5 to 8 seconds from the full-open position to latching.

88. B — The chair rail provides a visual transition between the wainscoting below and the painted wall above, creating a finished top edge for the wainscoting panel system. It also serves the practical function of protecting the wall from chair back damage, which is the origin of its name.

89. C — A sloped pocket door track causes the door to ride to the low end by gravity. When the low end is at the closed position, the door slides shut on its own. When the low end is at the open position, the door cannot be pushed closed without fighting gravity. A perfectly level track ensures the door stays wherever it is positioned.

90. A — When the ceiling meets the wall at an angle other than 90 degrees, the standard mitre and bevel settings for crown moulding do not produce correct cuts. The carpenter must measure the actual junction angle with a protractor or angle finder and calculate the corresponding compound mitre and bevel angles. Many mitre saws have angle charts for non-standard ceiling angles.

91. D — White, fibrous, brittle cement board used as soffit material in 1960s and 1970s construction is very likely asbestos cement board — one of the most common asbestos-containing building products from that era. The material must be tested by an accredited laboratory before any further disturbance. If confirmed positive, professional abatement is required.

92. B — The structural engineer evaluates whether the existing first-storey walls (studs, headers, plates), the floor system (joists, beams, subfloor), and the foundation (footings, walls) can support the additional dead loads and live loads from a second storey. Existing structures were designed only for the original single-storey loads and may require reinforcement.

93. C — The floor framing beneath a shower must support the combined weight of the shower pan, tile, mortar bed, water (a full shower holds significant water weight during use), and the occupant. The framing must be structurally sound, level, and reinforced if the existing joists are undersized for the concentrated wet-area loads.

94. A — A 1.2-metre opening in a bearing wall without a header means the loads from above are being transferred through the top plate alone, which was not designed to span 1.2 metres under bearing loads. The wall is at risk of progressive failure. Temporary shoring must be installed immediately to carry the loads while a proper header is designed and installed.

95. D — Existing batt insulation in the wall cavity can block the cellulose fill tube, preventing uniform distribution of the blown-in material. The cellulose may pack tightly on one side of the batt but leave voids behind it, creating insulation gaps that reduce the effective R-value. The installer must verify complete fill using infrared imaging or test holes.

96. B — Excavating beneath the entire foundation at once removes all bearing support simultaneously, which would cause the foundation walls to settle, crack, or collapse, and the building above would be severely damaged or destroyed. Staged underpinning maintains continuous support — each section is poured and allowed to gain strength before the adjacent section is excavated.

97. A — Knob-and-tube wiring was designed to dissipate heat through the air space surrounding the exposed conductors. If insulation is installed in the wall cavities (as planned in this renovation), the

wiring cannot dissipate heat, creating a fire hazard. A licensed electrician must evaluate the wiring and determine whether it needs to be replaced or de-energized before insulation is installed.

98. C — Temporary support for ceiling joists during bearing wall removal requires a temporary beam (needle beam) installed parallel to and on each side of the bearing wall. The temporary beams are supported by temporary posts bearing on a plate that distributes the load to the floor system. This system carries the joist loads while the wall is removed and the permanent beam is installed.

99. D — A cast-in-place stainless steel or aluminum frame is set flush with the finished floor surface during concrete placement. The removable cover panel is recessed to receive a layer of the same tile as the surrounding floor, making the access panel virtually invisible when closed. The frame and cover are corrosion-resistant for the demanding kitchen environment.

100. B — The homeowner should receive a complete set of renovation documents including copies of the building permit, approved drawings (including any revisions), structural engineering reports, inspection records from the building department, product warranties for all installed materials, and documentation of any as-built changes made during construction. These documents are essential for future maintenance, insurance, and resale.