# PRACTICE EXAM 7: TRADE SIMULATION (100 QUESTIONS)

**Time Limit: 240 Minutes | Passing Score: 70%**

*Residential weighting. This exam focuses on residential construction methods, IRC provisions, and practical field knowledge for the B, B-3, and CR-61 license tracks.*

**SITEWORK (Questions 1–17)**

1. A contractor is preparing a building pad for a new single-family home. The site has a high water table. Which type of foundation system is best suited for this condition?

A. Standard stem wall with a full basement below grade

B. Deep pier foundation extending below the water table

C. Raised slab-on-grade with perimeter drainage and a dewatering system

D. Crawlspace foundation with a vented soil cover below the floor

2. The minimum bearing capacity of soil required for a standard residential footing under the IRC presumptive load-bearing table for sandy gravel is what value?

A. Three thousand pounds per square foot for sandy gravel

B. One thousand five hundred pounds per square foot for clay

C. Two thousand pounds per square foot for sand or gravel mix

D. Four thousand pounds per square foot for compacted gravel

3. OSHA classifies soils into three types for excavation safety. Type A soil has an unconfined compressive strength of what minimum value?

A. 0.5 tons per square foot or greater for all Type A soils

B. 0.75 tons per square foot for undisturbed Type A soils

C. 2.0 tons per square foot for cemented Type A soils only

D. 1.5 tons per square foot or greater for undisturbed cohesive soil

4. A contractor is installing a residential foundation in an area with expansive clay soil. Which foundation strategy best mitigates damage from soil expansion?

A. Standard spread footings at minimum code depth with no modification

B. Post-tension slab or deepened footings extending below the zone of moisture change

C. Shallow footings with a gravel base to allow free drainage

D. A floating slab with no connection between the slab and the perimeter walls

5. The IRC requires the top of the foundation to extend a minimum of how many inches above the adjacent finished grade?

A. Four inches above the finished grade for wood frame walls

B. Six inches above the finished grade for masonry veneer walls

C. Eight inches above the adjacent finished grade in termite-prone areas

D. Twelve inches above the adjacent grade for all construction types

6. A residential lot has a natural slope of ten percent toward the proposed building location. Before construction begins, the contractor must address which primary concern?

A. Surface water drainage must be diverted around the foundation to prevent soil saturation

B. The slope must be reduced to less than five percent per building code

C. A retaining wall must be built on the uphill side regardless of setback distance

D. The foundation depth must be doubled on the downhill side of the building

7. What is the minimum footing depth for residential construction in Arizona areas where the frost line does not affect foundation design?

A. Twenty-four inches below undisturbed ground surface for all locations

B. Eighteen inches below grade to protect against frost penetration

C. Thirty inches below finished grade as a universal minimum

D. Twelve inches below undisturbed ground surface as the IRC minimum

8. When backfilling around a residential foundation, the fill must be placed in lifts of what maximum thickness and compacted?

A. Twelve-inch loose lifts compacted to ninety percent density

B. Eight-inch loose lifts compacted to the specified density

C. Eighteen-inch lifts compacted with a walk-behind compactor

D. Six-inch lifts compacted to ninety-five percent Proctor density

9. The IRC requires a minimum crawlspace ventilation area of one square foot for every how many square feet of crawlspace floor area?

A. One hundred fifty square feet of floor area as the standard ratio

B. One hundred square feet of floor area for all crawlspaces

C. Three hundred square feet of floor area for ventilated designs

D. Two hundred square feet of floor area in dry climate zones

10. A contractor discovers that the building pad elevation is six inches lower than the plan-specified elevation after rough grading. What is the most appropriate corrective action?

A. Proceed with construction and adjust the foundation height accordingly

B. Add six inches of topsoil across the pad to bring it to the correct elevation

C. Pour the foundation six inches deeper to compensate for the grade difference

D. Import and compact approved structural fill to bring the pad to the specified elevation

11. Positive lot drainage requires finish grading to slope away from the foundation. The IRC requires a minimum slope of six inches in the first how many feet?

A. Five feet from the foundation in all directions

B. Eight feet from the foundation for clay soil conditions

C. Ten feet from the foundation in all directions

D. Fifteen feet from the foundation on the downhill side

12. A residential property has a retaining wall within four feet of the proposed foundation. What concern must the contractor evaluate before excavating?

A. Whether the retaining wall has a valid building permit on file

B. Whether the excavation will undermine the retaining wall or surcharge the foundation

C. Whether the retaining wall is made of pressure-treated lumber

D. Whether the HOA approved the retaining wall construction

13. When installing a residential septic system, the minimum horizontal distance between the septic tank and the dwelling foundation is typically what value?

A. Five feet as the standard minimum setback distance

B. Fifteen feet for all residential applications in Arizona

C. Twenty-five feet in all jurisdictions regardless of soil type

D. Ten feet for standard residential septic system installations

14. A contractor is grading a residential lot and needs to establish a level reference point on the site. The permanent benchmark is a brass cap set in the sidewalk across the street. What instrument is used to transfer the elevation to the building pad?

A. A tape measure stretched from the benchmark to the pad

B. A plumb bob suspended from the benchmark elevation

C. A transit set up at the midpoint between the two locations

D. A builder's level or laser level set up to shoot a grade reading

15. The slope of a residential driveway should not exceed what maximum grade for safe vehicle access?

A. Eight percent as the recommended maximum for residential driveways

B. Fourteen percent as the maximum for residential driveways

C. Twenty percent as the maximum for short residential driveways

D. Five percent as the maximum grade for all paved surfaces

16. A contractor needs to compact the subgrade for a residential concrete driveway. The subgrade soil is native clay. What should the contractor do before placing gravel base?

A. Seal the clay with a liquid polymer before placing the base course

B. Remove the clay entirely and replace it with imported sandy gravel

C. Scarify, moisture condition, and compact the clay to the required density

D. Cover the clay with landscape fabric before placing the gravel base

17. A residential lot has an existing large tree within eight feet of the proposed foundation. What is the primary construction concern?

A. Tree roots may damage the foundation and soil moisture changes from the tree can cause settlement

B. The tree will block sunlight and prevent proper concrete curing

C. Building permits cannot be issued for structures within ten feet of any tree

D. The tree must be removed regardless of the site plan or landscaping design

**CONCRETE (Questions 18–34)**

18. A residential foundation plan calls for concrete footings with a minimum compressive strength of 2,500 psi. This specification refers to what characteristic of the concrete?

A. The tensile strength of the concrete in the cured footing

B. The flexural strength of the concrete under bending loads

C. The bond strength between the concrete and the reinforcement

D. The compressive load the concrete can resist at twenty-eight days

19. The standard residential footing width for a two-story wood-frame home on soil with a bearing capacity of 2,000 psf is typically what dimension?

A. Twelve inches wide for single-story construction only

B. Fifteen inches wide as a minimum for two-story buildings

C. Twenty-four inches wide for all residential applications

D. Eighteen inches as a common minimum width

20. The minimum thickness of a residential slab-on-grade is what dimension under the IRC?

A. Two and one-half inches for patios and non-structural slabs

B. Four inches for garage floors and walkway slabs only

C. Three and one-half inches as the minimum residential standard

D. Six inches for all residential slab-on-grade applications

21. A contractor is placing concrete for a residential garage floor in Phoenix during August. The air temperature is 112°F. Which measure is most critical to prevent quality problems?

A. Adding calcium chloride to the mix to speed up the finishing process

B. Using ice or chilled water in the mix and protecting the placement from direct sun

C. Increasing the water content to maintain workability during placement

D. Placing the concrete in the morning and allowing it to cure uncovered through the afternoon

22. Concrete flatwork such as driveways and sidewalks should have a minimum slope of what value for drainage?

A. One-half percent slope for covered walkway applications

B. Three percent slope for all residential flatwork surfaces

C. Five percent slope for driveways in arid climate zones

D. One-quarter inch per foot (approximately two percent) for drainage

23. A contractor pours a residential driveway and wants to create a non-slip surface. Which finishing technique should be used?

A. Broom finishing perpendicular to the direction of traffic

B. Hard troweling to produce a smooth, polished surface

C. Exposed aggregate finish by washing away the surface paste

D. Stamped concrete finish with a smooth stone pattern

24. Residential concrete driveways should have expansion joints between the driveway and the garage floor. What material is typically used for these joints?

A. A flexible wood strip inserted into the wet concrete

B. A rigid foam board placed at the joint before pouring

C. A compressible fiber expansion joint filler at least one-half inch thick

D. A bead of polyurethane sealant applied after the concrete cures

25. A contractor is installing reinforcement in a residential footing. The plans call for two No. 4 bars running continuously. Where should the bars be positioned vertically within the footing?

A. At the top of the footing resting directly on the form boards

B. In the lower portion of the footing supported on chairs or dobies with adequate cover

C. At the exact center of the footing for balanced load distribution

D. At the top and bottom of the footing with one bar at each location

26. Concrete test cylinders taken from a residential foundation pour are standard 6-inch by 12-inch cylinders. How many cylinders constitute a standard set for one test?

A. One cylinder tested at twenty-eight days for acceptance

B. Two cylinders tested at twenty-eight days for the acceptance average

C. Six cylinders tested at seven, fourteen, and twenty-eight days

D. A minimum of two cylinders with additional cylinders for seven-day breaks if desired

27. The IRC requires a minimum of one No. 4 rebar how far from the top and bottom of a continuous footing?

A. Three inches clear from the top and three inches clear from the bottom

B. Six inches from the top of the footing and touching the bottom

C. One inch from each edge of the footing form for minimum cover

D. At the exact center of the footing regardless of depth

28. Concrete curing compound is sprayed on fresh concrete surfaces to retain moisture during curing. This compound should not be applied to surfaces that will receive what treatment?

A. Exterior paint applied over a concrete primer system

B. A clear concrete sealer for moisture protection purposes

C. A bonded topping, tile adhesive, or other applied finish material

D. Landscape edging or decorative border elements at the perimeter

29. A residential concrete slab develops a crack within the first twenty-four hours after placement. The crack is shallow and runs in a random pattern across the surface. This is most likely what type of crack?

A. Structural cracking from overloading before adequate strength gain

B. Plastic shrinkage cracking caused by rapid surface moisture loss

C. Alkali-silica reaction cracking from reactive aggregate in the mix

D. Freeze-thaw cracking from premature exposure to cold temperatures

30. When placing concrete in residential forms, the maximum free-fall height to avoid segregation is generally limited to what distance?

A. Two feet for all concrete placement operations

B. Eight feet in standard construction without specialized equipment

C. Ten feet when using flexible tremie tubes or drop chutes

D. Four to five feet without a chute or other method to reduce free-fall

31. A contractor is forming residential concrete steps. The riser height is seven inches and the tread depth is eleven inches. Under the IRC, do these dimensions comply with the residential stair requirements?

A. Yes, because the riser does not exceed 7¾ inches and the tread meets the ten-inch minimum

B. No, because residential concrete steps require a minimum tread depth of twelve inches

C. No, because the riser height must not exceed six inches for concrete exterior steps

D. Yes, but only if a non-slip finish is applied to the tread surface after curing

32. Fiber mesh reinforcement added to residential concrete slabs serves what primary purpose?

A. Replacing structural rebar for all footing and foundation applications

B. Increasing the compressive strength of the cured concrete slab

C. Reducing plastic shrinkage cracking during the early curing period

D. Eliminating the need for control joints in the finished slab

33. A contractor is pouring a residential pool deck. To prevent the deck surface from becoming dangerously hot in Arizona's summer sun, which concrete finish or treatment is most appropriate?

A. Dark-colored stamped concrete with a glossy sealer coating

B. A cool-deck or textured acrylic coating system designed to reduce surface temperature

C. Standard broom finish with no additional treatment or sealer

D. Exposed aggregate finish with dark-colored decorative stones

34. A contractor's ready-mix delivery ticket shows a water-cement ratio of 0.50. The contractor asks the driver to add ten gallons of water at the site to improve workability. What is the consequence?

A. The concrete strength increases because the additional water improves hydration

B. The concrete becomes non-compliant with the specification and may not achieve design strength

C. The addition of water has no measurable effect on the final concrete properties

D. The water-cement ratio changes but the concrete still meets the original specification

**MASONRY (Questions 35–43)**

35. A contractor is building a residential CMU stem wall foundation. The minimum nominal wall thickness for a single-story residence with a standard roof is typically what dimension?

A. Eight inches using standard nominal CMU for load-bearing residential walls

B. Six inches for single-story residential applications with light roof loads

C. Twelve inches for all residential foundation stem walls regardless of height

D. Four inches for non-load-bearing stem walls below the first floor

36. The IRC requires that hollow masonry foundation walls be capped with a minimum four-inch solid masonry course or filled with concrete. What is the purpose of this requirement?

A. To provide a level surface for aesthetic mortar joint finishing

B. To create additional weight for resisting wind uplift forces

C. To cap the cores and provide a solid bearing surface for the sill plate

D. To prevent insects from entering through the hollow masonry cores

37. Mortar for residential masonry construction in Arizona's hot climate should be mixed with what water temperature consideration?

A. Cold water to extend the working time before the mortar stiffens

B. Hot water to accelerate setting and reduce wait time between courses

C. Distilled water to prevent mineral deposits on the masonry surface

D. Room temperature water regardless of the ambient conditions

38. A residential masonry fireplace chimney must extend at least how far above the roof surface at the point of penetration?

A. Two feet above any structure within twenty feet of the chimney

B. Eighteen inches above the highest point of the roof penetration

C. Three feet at the point of penetration and two feet above anything within ten feet

D. Three feet above the highest point where the chimney passes through the roof, and two feet higher than any part of the building within ten feet

39. Residential masonry veneer is attached to the wood-framed backup wall using corrosion-resistant metal ties. These ties must be installed at what maximum spacing?

A. One tie per 2.67 square feet of wall area with specific horizontal and vertical limits

B. One tie every four feet horizontally and three feet vertically

C. One tie per four square feet of wall area for residential construction

D. One tie every forty-eight inches on center in both directions

40. A contractor is building a residential block wall as a property boundary fence. The maximum height for a residential masonry fence wall without engineering is typically limited to what dimension under standard residential codes?

A. Eight feet above the adjacent finished grade

B. Four feet for front yard walls and six feet for side and rear

C. Six feet above the adjacent finished grade in most jurisdictions

D. Ten feet if the wall includes pilasters at regular intervals

41. When installing a residential masonry mailbox column, the minimum footing depth should be what dimension to prevent frost heave and wind overturning?

A. Six inches below grade for lightweight decorative columns

B. Twelve inches as a minimum for non-structural landscape features

C. To the local frost depth or a minimum of eighteen inches in non-frost areas

D. Eighteen inches below the finished grade for all mailbox installations

42. A contractor observes white crystalline deposits forming on a residential brick wall within weeks of construction. What is the most effective way to remove this efflorescence?

A. Dry brushing followed by rinsing with clean water before applying a sealer

B. Applying muriatic acid at full strength and power washing immediately

C. Sandblasting the affected surface to remove all visible deposits

D. Painting over the deposits with a masonry primer and topcoat

43. In a residential masonry wall, horizontal reinforcement is placed in the mortar bed joints using prefabricated ladder-type or truss-type joint reinforcement. The standard vertical spacing for this reinforcement is what interval?

A. Every other course (approximately every eight inches vertically)

B. Every fourth course (approximately every thirty-two inches vertically)

C. Every sixteen inches vertically or every other course of standard CMU

D. Every forty-eight inches vertically or at six-course intervals

**METAL FRAMING (Questions 44–49)**

44. CFS studs used for load-bearing exterior walls in residential construction must have a minimum steel thickness (gauge) of what designation?

A. Twenty-five gauge (18-mil) for non-load-bearing partitions

B. A minimum of thirty-three mil (20 gauge) for standard load-bearing exterior walls

C. Sixteen gauge (54-mil) for all exterior wall applications

D. Twenty-two gauge (27-mil) for single-story construction only

45. When framing window and door openings in CFS load-bearing walls, the header is typically constructed from what configuration?

A. A single C-shaped stud turned on its side across the opening

B. Two nested CFS tracks with a stud section to form a box beam

C. A solid wood beam inserted into the CFS wall framing

D. Back-to-back C-studs with a track connecting the top and bottom flanges

46. CFS framing connections at the base of exterior walls require a bottom track attached to the foundation. What fastener type anchors the CFS track to a concrete slab?

A. Powder-actuated pins or concrete screws driven through the track into the concrete

B. Standard wood screws driven through pre-drilled holes in the track

C. Structural adhesive applied between the track flange and the concrete surface

D. Toggle bolts inserted through holes drilled in both the track and the concrete

47. Thermal bridging through CFS studs is significantly greater than through wood studs because steel conducts heat more efficiently. What is the most common method to mitigate this in residential construction?

A. Using thicker CFS studs to increase the cavity insulation depth

B. Filling the stud cavity with spray foam insulation for maximum coverage

C. Installing continuous rigid foam insulation on the exterior of the CFS framing

D. Spacing the CFS studs at twenty-four inches instead of sixteen inches on center

48. CFS roof trusses in residential construction must be designed by which professional?

A. The general contractor based on span tables published by the steel manufacturer

B. The framing subcontractor using standard residential truss design software

C. The building inspector during the plan review and approval process

D. A registered professional engineer or the truss manufacturer's design engineer

49. When CFS studs are cut in the field, the exposed steel edge at the cut end is vulnerable to what problem?

A. Corrosion at the cut edge where the galvanized coating has been removed

B. Structural weakening of the entire stud from the cutting operation

C. Delamination of the galvanized coating along the full length of the stud

D. Thermal bridging that increases proportionally with each field cut

**CARPENTRY (Questions 50–66)**

50. Pressure-treated lumber used for residential sill plates in contact with concrete must be treated with what preservative for ground contact applications?

A. A fire-retardant chemical treatment for code compliance

B. A copper-based preservative rated for ground contact use

C. A water-repellent coating applied at the time of installation

D. An oil-based stain sealer applied to all six surfaces before placement

51. A contractor is framing a residential floor using 2×10 joists at sixteen inches on center. The subfloor is ¾-inch tongue-and-groove OSB. What adhesive application is recommended between the joists and the subfloor panels?

A. No adhesive is needed because the mechanical fasteners are sufficient

B. Adhesive applied only at the panel edges for moisture protection

C. Adhesive applied only at butt joints between adjacent panels

D. A continuous bead of construction adhesive on the top of each joist

52. A load-bearing wall running parallel to floor joists above requires what additional framing support in the floor system below?

A. Standard blocking between the joists at forty-eight inches on center

B. Solid bridging at the midspan of each joist in the affected bay

C. Double joists or a beam directly beneath the load-bearing wall above

D. Metal joist hangers at each end of the joists in the affected bay

53. A contractor is framing a window rough opening in a load-bearing wall. The opening width is four feet. How many jack studs (trimmers) are required on each side of the opening under the IRC?

A. One jack stud on each side for openings up to four feet

B. Two jack studs on each side for all load-bearing wall openings

C. Three jack studs on each side for openings wider than three feet

D. The number depends on the header span table in the IRC

54. The IRC requires solid blocking or bridging between floor joists when the joist depth-to-thickness ratio exceeds what proportion?

A. Four to one for joists deeper than six inches nominal

B. Six to one, meaning joists with a nominal depth more than six times their thickness

C. Eight to one for all engineered wood joist products

D. Three to one for all residential floor joist applications

55. A contractor is installing engineered wood I-joists for a residential floor system. The manufacturer's installation guide requires what specific treatment at bearing points?

A. Notching the bottom flange to sit flat on the bearing plate

B. Cutting the top flange to allow deflection under load

C. Drilling holes through the web for mechanical and plumbing runs

D. Web stiffeners or squash blocks at concentrated load and bearing points

56. The maximum allowable hole diameter that may be drilled through the center of a 2×10 floor joist is limited by the IRC. What is the general rule?

A. Holes may not exceed one-half the joist depth when drilled at midspan

B. Holes may not exceed one-quarter the joist depth at any location

C. Holes may not exceed one-third the joist depth and must be at least two inches from the edges

D. Holes may not exceed two inches in diameter regardless of joist size

57. Rim board (band joist) at the perimeter of a floor system serves what structural functions?

A. Closing the floor cavity, supporting the joists laterally, and transferring loads to the wall below

B. Providing a nailing surface for exterior siding material only

C. Acting as the primary structural beam carrying the floor joist loads

D. Serving as a fire block between the floor and the wall cavities

58. A contractor is framing a hip roof. The hip rafter runs diagonally from the ridge to the corner of the building. Compared to a common rafter of the same span, the hip rafter must be what size?

A. The same dimension as the common rafters in the roof system

B. One size smaller because the hip rafter carries less tributary area

C. Any available dimension because hip rafters are non-structural

D. Typically two sizes deeper because it carries loads from both roof planes

59. Collar ties in a residential roof framing system connect opposing rafters in the upper third of the roof. What is the primary purpose of collar ties?

A. To resist the outward thrust at the wall plate exactly like ceiling joists

B. To prevent rafter separation at the ridge under wind uplift and gravity loads

C. To support the ceiling finish material in the upper portion of the attic

D. To provide lateral bracing for the ridge board against wind loads

60. The IRC requires fireblocking in concealed wall spaces at which locations?

A. Only at the top and bottom of each stud cavity in exterior walls

B. At every floor level and at the ceiling in balloon-framed construction

C. At floor and ceiling levels, at soffits, at stair stringers, and at interconnections between concealed spaces

D. Only where the wall intersects with an attached garage separation

61. A contractor is installing roof sheathing on trusses spaced at twenty-four inches on center. What is the minimum panel thickness for this application?

A. Seven-sixteenths inch for twenty-four-inch truss spacing

B. Three-eighths inch for light residential roof loads

C. One-half inch for standard residential roof applications

D. Five-eighths inch for all roof sheathing applications

62. The IRC requires a minimum attic access opening of what dimensions when the attic area exceeds thirty square feet and has a vertical clearance of thirty inches or more?

A. Eighteen inches by eighteen inches as the minimum access size

B. Sixteen inches by twenty-four inches for pull-down stair openings

C. Twenty-two inches by thirty inches as the minimum access size

D. Twenty-four inches by twenty-four inches as the standard opening

63. When installing a ledger board for an exterior residential deck, the ledger must be attached to the house framing using what fastener type?

A. Sixteen-penny common nails at twelve inches on center

B. Deck screws driven through the ledger into the rim board

C. Metal angle brackets screwed to both the ledger and the siding

D. Through-bolts or lag screws as specified in the IRC attachment tables

64. A residential deck more than thirty inches above grade requires a guardrail with a minimum height of what dimension?

A. Thirty-six inches above the deck surface for standard applications

B. Thirty-six inches as the IRC minimum for residential deck guardrails

C. Forty-two inches to match commercial guardrail requirements

D. Thirty inches for decks that are less than six feet above grade

65. Deck guardrail balusters must be spaced so that a sphere of what diameter cannot pass through?

A. Four inches, preventing a small child's body from passing through

B. Six inches for residential deck guardrail applications

C. Three and one-half inches for all residential guardrail systems

D. Five inches for horizontal cable rail systems and four for vertical

66. When framing a residential garage, the header for a standard sixteen-foot-wide garage door opening in a load-bearing wall is typically constructed from which material?

A. Double 2×6 members with a plywood spacer set on edge

B. A single 4×12 solid timber beam spanning the full opening

C. Triple 2×8 members nailed together without spacers

D. An engineered LVL or glulam beam sized for the specific span and loads

**THERMAL AND MOISTURE PROTECTION (Questions 67–78)**

67. The IRC requires a minimum insulation R-value of what number for exterior walls in Arizona's Climate Zone 2?

A. R-19 for all wall assemblies in Climate Zone 2

B. R-13 for 2×4 walls as the minimum requirement

C. R-30 for exterior walls in all Arizona climate zones

D. R-11 for walls with continuous exterior insulation

68. In a residential roof assembly with asphalt shingles, the underlayment layer serves what primary purpose?

A. Structural support for the shingle courses during wind events

B. The primary insulation layer reducing heat gain through the roof

C. A secondary weather barrier protecting the sheathing from moisture if shingles are damaged

D. An air barrier preventing attic air from reaching the exterior surface

69. Valley flashing in a residential roof system is installed at the intersection of two roof planes. The minimum recommended width for metal valley flashing is what dimension?

A. Twenty-four inches wide centered in the valley for adequate coverage

B. Twelve inches wide centered in the valley for residential roofs

C. Thirty-six inches wide centered in the valley for all applications

D. Eighteen inches wide centered in the valley as a standard width

70. A contractor is installing a residential exterior door. The door threshold must be flashed and sealed to prevent water intrusion. The flashing at the door sill should be installed in what configuration?

A. On top of the threshold after the door frame is installed

B. Flat across the threshold with no upturn at the sides

C. Under the threshold only with no connection to the WRB

D. Under the threshold with upturned legs at each side integrated into the wall WRB system

71. Residential dryer vent ducts must terminate to the exterior of the building. The maximum allowable length for a four-inch-diameter smooth metal dryer duct is what distance under the IRC?

A. Fifteen feet with a twenty-five-foot maximum for straight runs

B. Thirty-five feet reduced by specific amounts for each elbow

C. Twenty feet regardless of the number of elbows in the duct

D. Fifty feet for smooth metal duct with no elbows in the run

72. The IRC requires bathroom exhaust fans to be vented to the exterior. Venting a bathroom fan into the attic space is prohibited because of what consequence?

A. Moisture from the exhaust causes condensation, mold growth, and structural damage in the attic

B. The exhaust fan noise will be amplified by the attic cavity space

C. The warm exhaust air will overheat the attic insulation material

D. The exhaust creates a positive pressure in the attic that pushes insulation out of place

73. Step flashing at a roof-to-wall intersection is installed by weaving individual L-shaped pieces with each course of shingles. Each step flashing piece should be at least what width?

A. Three inches wide with two-inch-minimum overlap between pieces

B. Six inches wide turned up the wall and four inches across the roof

C. Four inches wide turned up the wall and four inches on the roof deck

D. Eight inches wide with equal portions on the wall and the roof

74. A residential roof has a cricket (saddle) installed behind the chimney. What is the purpose of this framed structure?

A. To provide a mounting surface for the chimney cap and spark arrestor

B. To strengthen the roof framing around the chimney penetration

C. To support antenna or satellite dish equipment near the chimney

D. To divert water around the chimney and prevent pooling and leaks on the uphill side

75. A contractor is installing housewrap as the weather-resistive barrier on a new home. The housewrap must be lapped at horizontal seams by a minimum of what dimension?

A. One inch at all horizontal seams with taped or sealed joints

B. Two inches at horizontal seams with the upper course overlapping the lower

C. Six inches at all horizontal and vertical seam locations

D. Four inches at horizontal seams with no taping required

76. Sill pan flashing at windows is installed before the window unit to catch any water that penetrates the window assembly. The pan must slope in what direction?

A. Toward the exterior to drain water to the outside of the wall

B. Toward the interior to direct water into a collection channel

C. Level across the sill with drain holes at each corner

D. Toward the center of the window opening for centered drainage

77. The IRC requires residential attic spaces to be ventilated with a minimum net free ventilation area of 1/150 of the attic floor area unless what condition reduces the requirement to 1/300?

A. The attic contains mechanical equipment requiring reduced airflow

B. The attic is insulated with spray foam that seals all air leaks

C. Balanced ventilation is provided with fifty percent of the vents in the upper portion and the remainder in the lower portion of the attic

D. The roof pitch exceeds 6:12 allowing natural convection to increase

78. Ice and water shield membrane is required by the IRC in what specific roof location for residential construction?

A. In valleys and at eaves in areas where the average daily temperature in January is 25°F or less

B. Over the entire roof surface for all residential construction

C. Only at plumbing vent and chimney penetrations through the roof

D. At the ridge cap to prevent wind-driven rain from entering the attic

**DOORS AND WINDOWS (Questions 79–85)**

79. A replacement window must meet the same energy code requirements as a new window. In Arizona's Climate Zone 2, the maximum U-factor for a replacement window is what value?

A. 0.30 for all replacement window installations

B. 0.50 for replacement windows in existing construction

C. 0.25 for all window installations regardless of type

D. 0.40 as required by the IECC for Climate Zone 2

80. An exterior door that swings outward requires hinges on the exterior side. What security feature prevents the hinge pins from being removed to open the door?

A. Decorative hinge caps that conceal the pin heads from view

B. Non-removable hinge pins or security studs that interlock when closed

C. Hinges mounted with structural screws into the framing members

D. A deadbolt lock that prevents the door from being pulled open

81. The IRC requires tempered safety glass in windows that meet which condition?

A. All windows on the second floor or higher regardless of location

B. All windows facing the front of the house for aesthetic uniformity

C. Windows with a sill height less than eighteen inches above the floor and within certain proximity to doors and wet areas

D. All operable windows regardless of size or location in the dwelling

82. The minimum width of a residential hallway under the IRC is what dimension?

A. Forty-two inches for hallways serving three or more bedrooms

B. Thirty-six inches as the minimum for standard residential hallways

C. Thirty inches for short hallways serving a single bedroom only

D. Forty-eight inches for all residential hallway applications

83. Sliding glass doors used as egress doors must have a minimum clear opening width of what dimension?

A. Thirty-two inches as the minimum clear passage width

B. Thirty-six inches as the minimum for all sliding door openings

C. Twenty-eight inches for secondary egress from bedrooms

D. Forty inches to accommodate wheelchair access requirements

84. Impact-resistant glazing or window film is required by the IRC in which of the following hazardous locations?

A. All windows within twenty feet of a swimming pool fence

B. All south-facing windows in Climate Zone 2 for energy compliance

C. All windows in bedrooms regardless of size or location

D. Glass in or adjacent to doors, in shower/tub enclosures, and near stairways

85. A residential garage with a pedestrian door to the dwelling must have a door with what minimum fire rating?

A. A solid wood or steel door not less than 1⅜ inches thick, or a twenty-minute fire-rated door

B. A one-hour fire-rated door with a self-closing device installed

C. A standard hollow-core interior door with a door closer

D. A thirty-minute fire-rated door with a panic bar for emergency egress

**FINISHES (Questions 86–94)**

86. The building code requires drywall to be installed on the garage side of the wall between an attached garage and the dwelling. What is the minimum drywall specification for this application?

A. One-half-inch regular drywall on the garage side if the wall does not support structure above, or five-eighths-inch Type X if supporting structure

B. Five-eighths-inch Type X drywall on both sides of the wall

C. One layer of one-half-inch regular drywall on the dwelling side only

D. Double layer of one-half-inch regular drywall on the garage side

87. Tile installed on a shower floor must slope toward the drain at a minimum rate of what value?

A. One-half inch per foot to prevent standing water on the shower floor

B. One percent slope as a minimum for commercial shower applications

C. Three-quarters of an inch per foot for residential shower drains

D. One-quarter inch per foot as the standard minimum slope to the drain

88. A contractor is installing baseboard trim in a new home. The baseboard must be scribed to fit tight against the wall surface. What does "scribing" mean in this context?

A. Pre-drilling nail holes to prevent splitting the baseboard material

B. Transferring the irregular contour of the wall onto the baseboard for custom cutting

C. Applying construction adhesive to the back of the baseboard before pressing it to the wall

D. Cutting the baseboard at a forty-five-degree angle for inside corner joints

89. The drywall ceiling in a residential garage that is directly below living space must have what minimum specification?

A. One-half-inch regular drywall for garages below non-habitable attic space

B. One-half-inch moisture-resistant green board for all garage ceilings

C. Five-eighths-inch Type X drywall for the garage ceiling below habitable space

D. Double layer of one-half-inch regular drywall for all garage ceilings

90. Interior paint labels specify coverage rate in square feet per gallon. The standard coverage rate for one coat of latex wall paint is approximately what value?

A. Three hundred fifty to four hundred square feet per gallon

B. One hundred fifty to two hundred square feet per gallon

C. Five hundred to six hundred square feet per gallon

D. Eight hundred to one thousand square feet per gallon

91. A contractor is installing ceramic tile on a concrete slab floor. The slab has a visible crack that runs across the installation area. What treatment should be applied before tiling to prevent the crack from reflecting through the tile?

A. Fill the crack with rigid epoxy and begin tiling directly over it

B. Grind the crack smooth and apply thinset directly over the area

C. Ignore the crack because concrete cracks do not affect tile installations

D. Install an anti-fracture membrane or crack isolation membrane over the crack before setting tile

92. When installing residential cabinetry, wall cabinets must be securely fastened to the wall framing. What fastener type is required?

A. Drywall screws driven through the cabinet back into the wall studs

B. Structural screws or lag bolts driven through the cabinet mounting rail into wall studs

C. Adhesive applied between the cabinet back and the drywall surface

D. Toggle bolts installed through the drywall where studs are not available

93. The standard height for the bottom of wall-mounted kitchen cabinets above the countertop surface is what dimension?

A. Fifteen inches above the countertop for standard kitchen layouts

B. Twenty-four inches above the countertop for universal access

C. Eighteen inches above the countertop as the industry standard

D. Twelve inches above the countertop for maximum storage access

94. A contractor notices nail pops appearing on a drywall wall surface several months after construction. What is the most common cause?

A. Lumber shrinkage causing the framing to pull away from the fastener heads

B. Defective drywall compound that did not bond properly to the fastener

C. Over-driving the fasteners during installation creating surface craters

D. Excessive humidity causing the drywall paper to swell around the nails

**SAFETY (Questions 95–100)**

95. Under OSHA, a residential construction employer with fewer than how many employees during the previous calendar year is partially exempt from maintaining OSHA injury and illness records?

A. Five employees in the previous calendar year

B. Twenty employees in the previous calendar year

C. Fifteen employees in the previous calendar year

D. Ten employees in the previous calendar year

96. A residential framing crew is working on a second-story wall. The edge of the floor platform is nine feet above the ground. Under OSHA, what fall protection is required?

A. No protection required because residential construction is exempt

B. Conventional fall protection or an alternative fall protection plan for residential construction

C. Only a warning line system at six feet from the edge

D. Fall protection is required only above fifteen feet for residential framing

97. OSHA's residential construction fall protection guidelines allow an alternative to conventional fall protection. What does this alternative require?

A. A verbal safety agreement between the employer and each worker

B. A written fall protection plan that explains why conventional protection is infeasible and describes alternative measures

C. A written fall protection plan developed by the employer explaining infeasibility and describing alternative measures

D. A signed waiver from each worker acknowledging the fall hazard

98. Before a residential trench for a foundation footing is entered by workers, the competent person must perform what action?

A. Inspect the excavation and determine whether protective systems are needed based on depth and soil conditions

B. Obtain a written permit from the local building department for the excavation

C. Test the air quality in the trench using a four-gas atmospheric monitor

D. Install a guardrail system around the entire perimeter of the excavation

99. Portable ladders used on residential construction sites must be placed at what angle for safe use?

A. The base should be one foot out for every three feet of working height

B. The base should be one foot out for every two feet of working height

C. The base should be flush against the wall for maximum stability

D. The base should be one foot out for every four feet of working height

100. Residential construction workers using pneumatic nail guns must wear what minimum PPE?

A. Full-face shield with hearing protection at all times

B. Safety glasses or goggles at minimum for eye protection from flying debris

C. Hard hat and steel-toed boots only when using framing nailers

D. No PPE is required for experienced workers using pneumatic tools

# PRACTICE EXAM 7: ANSWER KEY AND EXPLANATIONS

1. C — A raised slab-on-grade with perimeter drainage and a dewatering system keeps the foundation above the water table while managing groundwater around the structure. Full basements are impractical with high water tables due to hydrostatic pressure and waterproofing challenges. The perimeter drain system intercepts groundwater before it reaches the foundation.

2. A — The IRC presumptive load-bearing table assigns sandy gravel a bearing capacity of three thousand pounds per square foot. This value is used when no site-specific soils investigation is performed. Clay soils are rated at 1,500 psf, sand at 2,000 psf, and crystalline bedrock at 12,000 psf.

3. D — Type A soil has a minimum unconfined compressive strength of 1.5 tons per square foot and must be undisturbed cohesive material such as clay, silty clay, or clay loam. Previously disturbed soil cannot be classified as Type A regardless of its measured strength. Type A allows the steepest excavation slope at ¾H:1V.

4. B — Post-tension slabs and deepened footings extending below the active zone of moisture change are the most effective strategies for expansive soil. These systems resist the heaving forces and distribute loads across a wider area. Standard shallow footings in expansive clay will lift and crack as the soil swells with moisture changes.

5. C — The IRC requires the top of the foundation to extend a minimum of eight inches above the adjacent finished grade in termite-prone areas, which includes most of Arizona. This clearance separates the wood framing from soil contact and allows visual inspection for termite shelter tubes on the exposed foundation surface.

6. A — Surface water flowing toward the building from an uphill slope must be intercepted and diverted around the foundation. A swale, French drain, or other diversion system on the uphill side prevents soil saturation behind the foundation wall, which would create hydrostatic pressure and potential water intrusion.

7. D — In Arizona, where the frost line does not affect foundation design, the IRC minimum footing depth is twelve inches below undisturbed ground surface. This depth ensures the footing bears on undisturbed native soil rather than topsoil or disturbed fill material that could settle under load.

8. B — Backfill around residential foundations should be placed in eight-inch loose lifts and compacted to the specified density. Thicker lifts cannot be uniformly compacted throughout their

depth, leading to uneven settlement. Each lift must be moisture-conditioned to the optimum water content before compaction.

9. A — The IRC requires one square foot of ventilation opening for every one hundred fifty square feet of crawlspace floor area. Ventilation openings must be placed to provide cross-ventilation and covered with corrosion-resistant mesh to prevent pest entry while allowing airflow.

10. D — The correct remedy for a low building pad is to import approved structural fill material, place it in compacted lifts, and bring the pad to the specified elevation. Topsoil contains organic material and is not suitable for structural support. Adjusting the foundation depth does not address the site drainage design that depends on the correct pad elevation.

11. C — The IRC requires finish grade to slope a minimum of six inches within the first ten feet from the foundation in all directions. This positive drainage slope directs surface water away from the building, preventing moisture accumulation against the foundation wall and potential water intrusion.

12. B — An excavation near an existing retaining wall can undermine the wall's foundation or impose surcharge loads on the new foundation. The contractor must evaluate the depth and condition of the retaining wall footing relative to the proposed excavation to prevent collapse of the wall or damage to the new foundation.

13. A — The standard minimum setback between a residential septic tank and the dwelling foundation is five feet. This distance prevents sewage leaks from saturating the soil beneath the foundation. Greater distances are required for drain fields, wells, and property lines.

14. D — A builder's level or laser level is used to transfer elevations across a construction site from an established benchmark. The instrument provides a level line of sight (or laser plane) that allows the operator to calculate the difference in elevation between any two points on the site.

15. B — The recommended maximum residential driveway slope is fourteen percent (approximately 1.7 inches per foot). Steeper grades create traction problems in wet conditions and difficulty for vehicles with low ground clearance. Local codes may impose lower limits based on climate conditions.

16. C — Native clay subgrade must be scarified (loosened), brought to optimum moisture content, and compacted to the required density before the gravel base is placed. Compacting clay that is too dry or too wet results in poor density and future settlement under the concrete driveway.

17. A — Tree roots can damage foundations through direct mechanical force, and the tree's moisture demand causes the surrounding soil to shrink during dry periods and swell during wet periods. This cyclical moisture change creates differential settlement that can crack foundations, especially in clay soils common in Arizona.

18. D — The 2,500 psi specification refers to the compressive strength the concrete must achieve at twenty-eight days under standard curing conditions. This is verified by breaking test cylinders at twenty-eight days. Compressive strength is the primary design property for concrete foundations.

19. B — For a two-story wood-frame home on soil with a bearing capacity of 2,000 psf, the IRC typically requires a minimum footing width of fifteen inches. This width provides adequate bearing area to distribute the combined dead and live loads from two stories plus the roof without exceeding the soil's bearing capacity.

20. C — The IRC requires a minimum slab thickness of three and one-half inches for residential slabs-on-grade. This is the actual thickness of a nominal four-inch slab. Thicker slabs may be required for garage floors, driveways, or other applications subject to vehicle loads.

21. B — In extreme Arizona heat, using ice or chilled water in the concrete mix reduces the concrete temperature at delivery, extending the working time before flash set occurs. Protecting the placement area from direct sun with shade structures or fog misting further reduces the risk of premature stiffening.

22. D — Concrete flatwork should slope a minimum of one-quarter inch per foot (approximately two percent) for adequate surface drainage. This slope moves water off the surface fast enough to prevent ponding while being gentle enough for comfortable walking and safe vehicle traffic.

23. A — Broom finishing creates a textured, non-slip surface by dragging a broom perpendicular to the direction of traffic across the partially set concrete. The broom lines provide traction in wet conditions. The perpendicular orientation ensures water drains off the textured surface effectively.

24. C — Expansion joints between the driveway and the garage floor use a compressible fiber expansion joint filler at least one-half inch thick. This material accommodates thermal expansion and contraction of the concrete slabs without transmitting forces between adjacent slabs that could cause cracking.

25. B — Footing reinforcement is positioned in the lower portion (tension zone) of the footing, supported on chairs or dobies to maintain the required three inches of clear cover from the bottom and sides. The lower placement puts the steel where tensile stresses from bending are greatest.

26. D — A standard test set typically consists of a minimum of two cylinders for the twenty-eight-day acceptance break, with additional cylinders cast for seven-day early strength evaluation if desired. The twenty-eight-day average of the two-cylinder set constitutes one strength test result.

27. A — The IRC requires a minimum of one No. 4 rebar placed with three inches clear from the top and three inches clear from the bottom of a continuous residential footing. This positioning provides adequate concrete cover for corrosion protection while placing the steel in the zone where it resists bending stresses.

28. C — Curing compounds leave a film on the concrete surface that prevents bonding of applied finishes such as topping slabs, tile adhesives, coatings, and overlays. If the concrete will receive a bonded finish, wet curing methods (water, wet burlap, plastic sheeting) must be used instead of membrane-forming compounds.

29. B — Plastic shrinkage cracks appear within the first few hours after placement when the surface dries faster than bleed water can replenish it. They are shallow, random, and map-like in pattern. In Arizona's hot, dry, windy conditions, plastic shrinkage cracking is extremely common without proper protection.

30. D — The maximum recommended free-fall height for concrete placement is four to five feet to prevent segregation of the coarse aggregate from the cement paste. For greater heights, tremie tubes, drop chutes, or elephant trunks should be used to control the flow and prevent the aggregate from separating.

31. A — The dimensions comply: seven-inch risers are less than the 7¾-inch maximum, and eleven-inch treads exceed the ten-inch minimum. Both dimensions satisfy the IRC residential stair requirements. The variation between the largest and smallest riser must not exceed three-eighths of an inch.

32. C — Fiber mesh (polypropylene fibers) reduces plastic shrinkage cracking during the early curing period by reinforcing the concrete matrix before it gains significant strength. Fiber mesh does not replace structural reinforcement and does not eliminate the need for control joints.

33. B — Cool-deck or textured acrylic coating systems are specifically designed to reduce surface temperature on pool decks and patios in hot climates. These light-colored, textured coatings reflect solar radiation and provide a barefoot-comfortable surface that can be twenty to thirty degrees cooler than standard concrete.

34. D — Adding water at the jobsite increases the water-cement ratio above the designed value, which reduces the compressive strength and increases shrinkage and porosity. The concrete becomes non-compliant with the original mix design specification. If additional workability is needed, a water-reducing admixture should be used instead.

35. A — The minimum nominal wall thickness for a load-bearing residential CMU stem wall is eight inches using standard CMU. This width provides adequate structural capacity for single-story homes with standard roof loads and allows sufficient space for reinforcement and grouting in required cells.

36. C — Capping hollow CMU foundation walls with solid masonry or concrete-filled block provides a solid, continuous bearing surface for the wood sill plate. Without capping, the sill plate would bear only on the thin face shells of the hollow block, creating concentrated loads and potential crushing.

37. A — In Arizona's hot climate, cold water extends the mortar's working time by slowing the hydration reaction. Hot ambient temperatures cause mortar to stiffen prematurely, reducing the mason's ability to properly place and tool the joints. Cold mixing water counteracts this accelerated set.

38. D — The IRC requires residential chimneys to extend at least three feet above the highest point where they pass through the roof and at least two feet higher than any portion of the building within ten feet. This height ensures adequate draft and prevents downdrafts from nearby roof surfaces.

39. A — Masonry veneer ties must be installed at a maximum spacing of one tie per 2.67 square feet of wall area, typically achieved with horizontal spacing of thirty-two inches and vertical spacing of approximately sixteen to eighteen inches. These ties transfer lateral loads from the veneer to the backup structure.

40. C — Most residential jurisdictions limit masonry fence walls to six feet above the adjacent finished grade without requiring engineering. Walls exceeding this height typically require engineered design with reinforcement, larger footings, and pilasters to resist wind loads and prevent overturning.

41. C — Mailbox column footings should extend to the local frost depth or a minimum of eighteen inches below grade in non-frost areas to prevent frost heave and provide adequate resistance to wind overturning. Shallow footings allow the column to lean or topple during high winds.

42. A — Dry brushing followed by rinsing with clean water is the safest and most effective initial treatment for new efflorescence. Most new efflorescence is water-soluble and will dissolve with water alone. Full-strength acid can damage the mortar joints and discolor the brick surface.

43. C — Horizontal joint reinforcement in residential masonry walls is typically placed at sixteen-inch vertical intervals, which corresponds to every other course of standard eight-inch-high CMU. This spacing provides crack control reinforcement that distributes shrinkage and thermal stresses evenly across the wall.

44. B — Load-bearing exterior CFS walls in residential construction require a minimum steel thickness of thirty-three mil (20 gauge) for standard applications. This thickness provides adequate axial load capacity and connection strength for typical residential loads. Non-load-bearing partitions can use lighter gauges.

45. D — CFS headers over window and door openings in load-bearing walls are typically constructed from back-to-back C-studs with a track connecting the top and bottom flanges, creating a box-beam configuration. This assembly provides the bending strength needed to span the opening and support loads from above.

46. A — CFS bottom tracks are anchored to concrete slabs using powder-actuated pins or concrete screws driven through the track flange into the concrete. These fasteners provide adequate shear

and uplift resistance while allowing efficient field installation without drilling or adhesive cure time.

47. C — Continuous rigid foam insulation installed on the exterior of CFS framing is the most effective method to mitigate thermal bridging. Steel studs conduct heat four hundred times faster than wood, making exterior insulation essential to achieving adequate thermal performance in CFS wall assemblies.

48. D — CFS roof trusses must be designed by a registered professional engineer or the truss manufacturer's licensed design engineer. Like wood trusses, CFS trusses are engineered as complete structural systems where every member carries calculated loads, and field modifications are prohibited.

49. A — Field-cut CFS edges expose bare steel where the protective galvanized coating has been removed during cutting. These exposed edges are vulnerable to corrosion, especially in exterior applications. Touch-up with a cold galvanizing compound is recommended for all field-cut edges in moisture-exposed locations.

50. B — Sill plates in contact with concrete or masonry must be pressure-treated with a copper-based preservative (such as ACQ, CA-B, or MCA) rated for ground contact use. The preservative protects against decay and insect damage in the permanently moist environment at the concrete-to-wood interface.

51. D — A continuous bead of construction adhesive applied on the top of each joist before the subfloor panel is placed creates a composite action between the joist and panel. This adhesive-nail combination dramatically reduces floor squeaks and increases the floor's effective stiffness and load capacity.

52. C — A load-bearing wall running parallel to floor joists must be supported by double joists or a beam directly beneath it. A single joist cannot carry the concentrated loads from a bearing wall above. The doubled joist or beam transfers the wall loads down to the foundation support system.

53. A — The IRC requires one jack stud (trimmer) on each side of a window or door opening up to four feet wide in standard load-bearing wall framing. The jack studs support the header directly and transfer the header loads down to the bottom plate and foundation.

54. B — The IRC requires blocking or bridging when the joist depth-to-thickness ratio exceeds six to one. For example, a 2×12 joist (actual 1.5" × 11.25") has a ratio of 7.5:1, exceeding the threshold. Bridging prevents the joist from rotating or buckling laterally under load.

55. D — Engineered wood I-joists require web stiffeners or squash blocks at bearing points and concentrated load locations. The thin OSB web can buckle under concentrated compression forces. Web stiffeners fit tightly between the flanges and transfer loads from the top flange through the web to the bearing surface below.

56. C — Holes drilled through solid sawn floor joists must not exceed one-third of the joist depth and must be located at least two inches from the top and bottom edges. These limits preserve adequate wood cross-section above and below the hole to resist the bending stresses in the joist.

57. A — The rim board closes the open ends of the floor cavity at the perimeter, provides lateral support to the joist ends preventing rotation, and transfers gravity and lateral loads from the wall above to the wall below. It is a critical but often overlooked structural element.

58. D — Hip rafters carry tributary loads from both roof planes that meet at the hip line, making their tributary area approximately twice that of a common rafter. They are typically two sizes deeper than common rafters — for example, 2×10 or 2×12 when commons are 2×8 — to resist the increased bending loads.

59. B — Collar ties connect opposing rafters in the upper third of the roof to prevent the rafter pairs from separating at the ridge under gravity and wind uplift loads. They are distinct from ceiling joists or rafter ties, which resist outward thrust at the wall plate level in the lower portion of the roof.

60. C — The IRC requires fireblocking at floor and ceiling levels, at soffits, at stair stringers, at interconnections between horizontal and vertical concealed spaces, and at other locations where fire could spread through concealed cavities. Fireblocking slows fire and hot gas migration through hidden wall and floor spaces.

61. A — The minimum roof sheathing panel thickness for trusses or rafters at twenty-four-inch spacing is seven-sixteenths inch (7/16") for standard residential roof loads. The span rating stamped on the panel (such as 24/16) indicates the maximum support spacing for roof and floor applications respectively.

62. C — The IRC requires a minimum attic access opening of twenty-two inches by thirty inches when the attic area exceeds thirty square feet with a vertical clearance of thirty inches or more. This opening allows maintenance access to mechanical equipment, insulation, and other components located in the attic space.

63. D — Deck ledger boards must be attached to the house framing using through-bolts or lag screws as specified in the IRC ledger connection tables. Nails and standard deck screws do not provide adequate withdrawal resistance to resist the gravity and lateral loads transferred from the deck to the house structure.

64. B — The IRC requires a minimum guardrail height of thirty-six inches on residential decks more than thirty inches above the adjacent grade. This is shorter than the forty-two-inch commercial requirement. The guardrail must resist a 200-pound load applied at the top rail in any direction.

65. A — Guardrail balusters must be spaced so that a four-inch sphere cannot pass through at any point. This dimension is based on preventing a small child's head and body from passing between

the balusters. The four-inch rule applies to all residential guardrails including decks, stairs, and balconies.

66. D — A sixteen-foot garage door header in a load-bearing wall typically requires an engineered LVL or glulam beam specifically sized for the span and applied loads. Standard dimensional lumber combinations cannot safely span sixteen feet under typical residential loads without engineering.

67. B — The IRC requires a minimum wall insulation R-value of R-13 for 2×4 wall assemblies in Arizona's Climate Zone 2. Higher R-values (R-20) apply to 2×6 walls. The relatively low wall insulation requirement reflects Arizona's mild winter temperatures compared to northern climate zones.

68. C — Underlayment beneath asphalt shingles serves as a secondary weather barrier that protects the roof sheathing from moisture if shingles are damaged or blown off during storms. It is not the primary waterproofing layer — the shingles provide primary protection — but it provides critical backup protection.

69. A — Metal valley flashing should be at least twenty-four inches wide, centered in the valley with twelve inches extending to each side. This width ensures adequate overlap with the shingle courses on each roof plane and provides a wide channel for the concentrated water flow that valleys carry during storms.

70. D — Door sill pan flashing is installed under the threshold with upturned legs at each side, integrated into the wall weather-resistive barrier system. The upturned legs prevent water from flowing off the sides of the pan into the wall cavity. The pan slopes toward the exterior to drain water outward.

71. B — The IRC limits residential dryer duct length to thirty-five feet for four-inch-diameter smooth metal duct, reduced by specific deductions for each elbow: five feet for each 90-degree elbow and two and one-half feet for each 45-degree elbow. This limit ensures adequate airflow for lint removal and fire prevention.

72. A — Venting a bathroom fan into the attic introduces warm, moisture-laden air that condenses on cold attic surfaces, promoting mold growth, wood decay, and insulation damage. All bathroom and kitchen exhaust must terminate to the exterior of the building, not into the attic, crawlspace, or other enclosed space.

73. C — Each step flashing piece should be at least four inches wide on the wall surface (turned up) and four inches on the roof deck. The pieces are woven with each shingle course so that water cascading down the wall-to-roof intersection is always directed onto the shingle surface below.

74. D — A cricket (saddle) behind the chimney diverts water around the chimney on the uphill side, preventing water from pooling against the chimney back. Without a cricket, water accumulates

behind the chimney, eventually penetrating the flashing and causing leaks. The IRC requires a cricket when the chimney width exceeds thirty inches.

75. B — Housewrap horizontal seams must be lapped a minimum of two inches with the upper course overlapping the lower course in shingle-lap fashion. This orientation ensures that water flowing down the surface drains over the lap rather than behind it. Vertical seams require a minimum six-inch overlap.

76. A — Sill pan flashing must slope toward the exterior so that any water collecting in the pan drains to the outside of the wall. A back dam at the interior edge prevents water from flowing into the building. The pan integrates with the window flanges and the wall WRB to create a complete moisture management system.

77. C — The 1/150 ventilation ratio can be reduced to 1/300 when balanced ventilation is provided with at least fifty percent of the vents in the upper portion of the attic (ridge or high gable) and the remainder in the lower portion (soffit or low eave). This balanced arrangement promotes effective cross-ventilation.

78. A — Ice and water shield (self-adhering bituminous membrane) is required at valleys and eaves in areas where the average daily temperature in January is 25°F or less. Most of Arizona is exempt from this requirement due to warm winter temperatures, but higher-elevation areas may require it.

79. D — The maximum U-factor for windows in IECC Climate Zone 2 is 0.40, applying equally to new construction and replacement windows. Replacement windows must meet the same energy code requirements as new installations to ensure the building's thermal performance is maintained.

80. B — Non-removable hinge pins or security studs (also called safety studs) prevent an intruder from removing the exposed hinge pins to separate the door from the frame. Security studs interlock the hinge leaves when the door is closed, making pin removal ineffective.

81. C — The IRC requires tempered safety glazing in windows with a sill height less than eighteen inches above the floor, in glazing adjacent to doors, in wet areas such as showers and tubs, and in glazing near the bottom of stairways. These locations pose an elevated risk of accidental human impact.

82. B — The IRC requires residential hallways to be a minimum of thirty-six inches wide. This width allows passage by a single person while providing adequate space for furniture moving and emergency evacuation. Hallways wider than thirty-six inches improve accessibility but are not required by code.

83. A — Sliding glass doors used for egress must provide a minimum clear opening width of thirty-two inches when the operable panel is fully open. This matches the minimum clear width required for swinging egress doors and ensures adequate passage for emergency escape.

84. D — The IRC requires tempered or safety glazing in hazardous locations including glass in and adjacent to doors, in shower and tub enclosures, in stairway landings, and at other locations where human impact with the glass is foreseeable. These requirements prevent serious injury from broken glass.

85. A — The garage-to-dwelling pedestrian door must be a solid wood or steel door not less than 1⅜ inches thick, or a twenty-minute fire-rated door assembly. The door must also be self-closing. This separation protects dwelling occupants from garage fires involving vehicles, fuel, and stored chemicals.

86. A — The garage side of the wall separating an attached garage from the dwelling requires one-half-inch regular drywall when the wall does not support habitable rooms above. When the wall or ceiling supports structure above habitable space, five-eighths-inch Type X drywall is required for the fire separation.

87. D — Shower floor tile must slope a minimum of one-quarter inch per foot toward the drain. This slope ensures water flows to the drain without ponding on the shower floor. The slope is established in the mortar bed or pre-sloped shower pan beneath the tile.

88. B — Scribing is the process of transferring the irregular contour of the wall surface onto the baseboard material so it can be cut to fit tightly against the wall. A compass or scribe tool traces the wall's irregularities onto the baseboard, which is then cut along the traced line.

89. C — The garage ceiling directly below habitable living space requires five-eighths-inch Type X drywall to provide fire separation. This requirement applies to both the ceiling and the wall between the garage and the dwelling. The Type X rating provides the additional fire resistance needed for this critical separation.

90. A — Standard latex wall paint covers approximately three hundred fifty to four hundred square feet per gallon for a single coat on properly primed smooth surfaces. Coverage decreases on rough, porous, or textured surfaces. Two coats are typically required for complete coverage and color uniformity.

91. D — An anti-fracture membrane or crack isolation membrane installed over the existing crack prevents the crack movement from reflecting upward through the tile and grout. These flexible membranes absorb the differential movement at the crack while providing a stable bonding surface for the tile installation.

92. B — Wall cabinets must be fastened to wall studs using structural screws or lag bolts driven through the cabinet's mounting rail (the reinforced strip at the top and bottom back of the cabinet). Standard drywall screws lack the shear strength needed to support the combined weight of the cabinet and its contents.

93. C — The standard height from the countertop surface to the bottom of wall-mounted kitchen cabinets is eighteen inches. This dimension provides adequate workspace below the cabinets while keeping the upper cabinet contents within comfortable reach for most adults.

94. A — Nail pops are most commonly caused by lumber shrinkage after construction. As the framing members dry and shrink, they pull away from the fastener heads, pushing the drywall compound outward. Using screws instead of nails and allowing framing to dry before finishing significantly reduces nail pop occurrence.

95. D — Employers with fewer than ten employees during the previous calendar year are partially exempt from maintaining OSHA Form 300 injury and illness records. However, they must still report fatalities within eight hours and hospitalizations, amputations, and eye losses within twenty-four hours.

96. B — At nine feet above the ground — exceeding the six-foot trigger height — conventional fall protection (guardrails, safety nets, or personal fall arrest systems) is required. For residential construction, OSHA allows an alternative fall protection plan when the employer can demonstrate that conventional methods are infeasible.

97. C — OSHA's residential fall protection guidelines allow employers to develop a written fall protection plan as an alternative to conventional protection. The plan must explain why conventional methods are infeasible or create a greater hazard, and must describe the alternative measures that will be implemented to protect workers.

98. A — Before any worker enters a residential trench, the competent person must inspect the excavation, evaluate the soil conditions, and determine whether protective systems such as sloping, benching, shoring, or shielding are needed based on the depth and the soil classification.

99. D — Portable ladders must be set at a 75.5-degree angle, achieved by placing the base one foot out from the wall for every four feet of working height (the 4:1 rule). This angle provides the optimal balance between stability (resisting kick-out at the base) and tip-back resistance.

100. B — Workers using pneumatic nail guns must wear safety glasses or goggles at minimum to protect against flying debris, nail fragments, and wood chips ejected during firing. Eye injuries are the most common pneumatic tool injury on residential construction sites, and eye protection is always required.