

PRACTICE EXAM 8: SIMULATION (50 QUESTIONS)

Time: Two sessions of 60 minutes each (recommended)

Total questions: 50

Calculator and EQAO Grade 9 formula sheet permitted.

1. Solve for x in the equation $(\frac{3}{4})x = 9$.

- A. 12
- B. 6.75
- C. 27
- D. 3

2. Evaluate the expression $(-2)^4$.

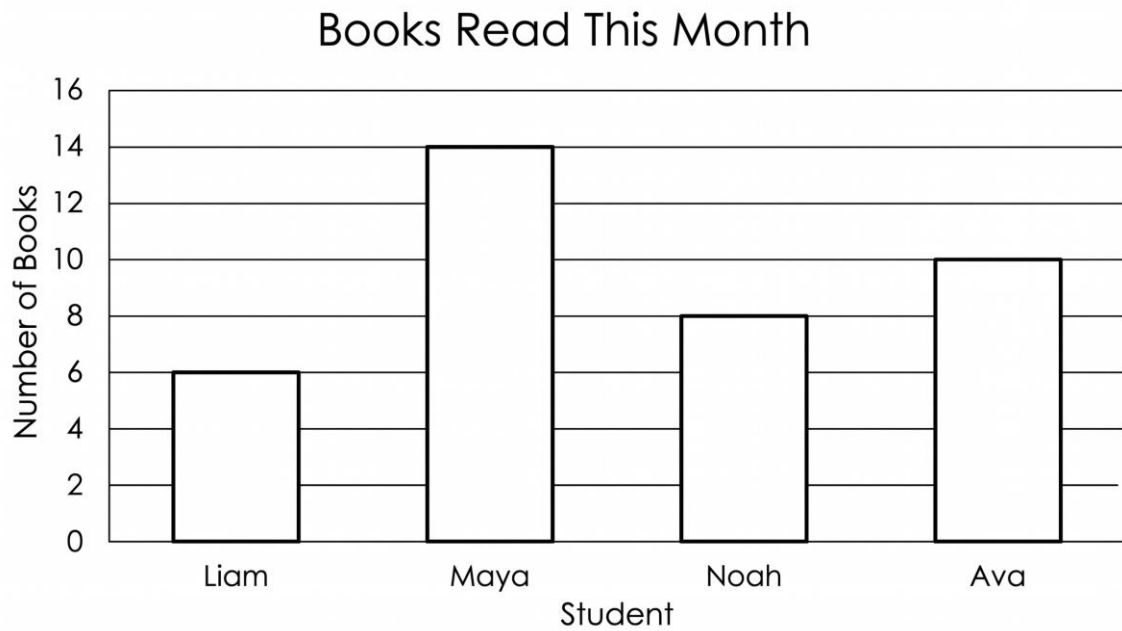
- A. -16
- B. -8
- C. 8
- D. 16

3. A circle has a diameter of 14 cm. What is its area, to the nearest whole number? ($A = \pi r^2$, use $\pi \approx 3.14$.)

- A. 44 cm²
- B. 88 cm²
- C. 154 cm²

D. 616 cm^2

4. Look at the bar graph below showing the number of books read by four students this month. How many more books did Maya read than Liam?



- A. 6
- B. 8
- C. 20
- D. 4

5. Solve for x in the equation $x^2 - 5x + 6 = 0$.

- A. $x = -2$ or $x = -3$
- B. $x = 1$ or $x = 6$
- C. $x = 2$ or $x = 3$
- D. $x = 5$ or $x = 6$

6. A worker earns \$1,200 in gross pay. Deductions total 22% of gross pay. What is the worker's net pay?

- A. \$936
- B. \$264
- C. \$978
- D. \$1,022

7. The area of a square is given by $A = s^2$. If $A = 144 \text{ cm}^2$, what is the side length s ?

- A. 72 cm
- B. 288 cm
- C. 36 cm
- D. 12 cm

8. What is $(\frac{2}{3})$ of $(\frac{3}{4})$?

- A. $\frac{5}{7}$
- B. $\frac{1}{2}$
- C. $\frac{8}{9}$
- D. $\frac{1}{4}$

9. A rectangle measures 5 cm by 12 cm. What is the length of its diagonal?

- A. 17 cm
- B. 13 cm
- C. 7 cm
- D. 60 cm

10. Solve the inequality $-4x + 3 > 19$ for x .

- A. $x > -4$
- B. $x > 4$
- C. $x < 4$
- D. $x < -4$

11. Find the median of the data set 3, 8, 11, 15, 19, 22.

- A. 13
- B. 11
- C. 15
- D. 12.7

12. Expand and simplify the expression $3(2x - 4) - 2(x - 5)$.

- A. $4x - 22$
- B. $8x - 2$
- C. $4x - 2$
- D. $4x + 2$

13. A coat is reduced by 25%, then a further 10% is taken off the reduced price. The final price is what single percentage of the original price?

- A. 65%
- B. 35%
- C. 70%
- D. 67.5%

14. The sum of a number and 12 is equal to three times the number. What is the number?

- A. 4
- B. 6
- C. 3
- D. 12

15. A cylinder has a radius of 5 cm and a height of 8 cm. What is its volume, to the nearest whole number?
($V = \pi r^2 h$, use $\pi \approx 3.14$.)

- A. 251 cm³
- B. 1,256 cm³
- C. 628 cm³
- D. 200 cm³

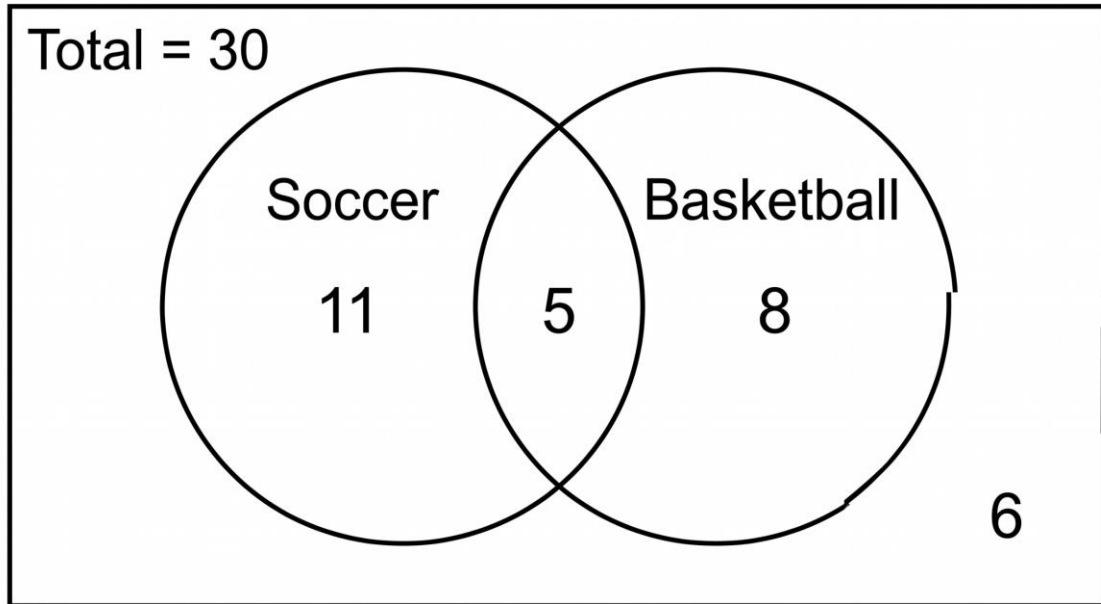
16. A \$2,500 investment earns 4% interest compounded annually. What is its value after 2 years?

- A. \$2,704.00
- B. \$2,700.00
- C. \$2,600.00
- D. \$2,716.00

17. What is the slope of the line $y = -2x + 7$?

- A. -2
- B. 7
- C. 2
- D. -7

18. In the Venn diagram below, a student is chosen at random from the 30 students surveyed. What is the probability that the student plays neither sport?



- A. $3/10$
- B. $1/6$
- C. $1/5$
- D. $2/15$

19. Which of the following numbers is the smallest: -0.5 , $-3/4$, -0.2 , $-5/8$?

- A. -0.5
- B. $-3/4$
- C. -0.2
- D. $-5/8$

20. Given the relation $f(x) = x^2 + 2x - 3$, what is the value of $f(4)$?

- A. 5
- B. 11
- C. 13
- D. 21

21. A cube has a surface area of 96 cm^2 . What is the length of one edge?

- A. 16 cm
- B. 8 cm
- C. 4 cm
- D. 6 cm

22. A taxi charges a \$4 flat fee plus \$2.50 per kilometre. If a ride costs \$24 in total, how many kilometres long was the trip?

- A. 10 km
- B. 6 km
- C. 12 km
- D. 8 km

23. A data set is 5, 6, 7, 8, 9. If the value 9 is changed to 29, what happens to the mean?

- A. It stays the same at 7
- B. It increases from 7 to 11
- C. It decreases from 7 to 5
- D. It increases from 7 to 9

24. What is the value of $\sqrt[3]{(49/64)}$?

- A. $7/8$
- B. $49/64$
- C. $7/64$
- D. $24.5/32$

25. At a shop, 2 pens and 3 notebooks cost \$13, while 2 pens and 1 notebook cost \$7. What is the cost of one notebook?

- A. \$5
- B. \$2
- C. \$4
- D. \$3

26. If $1 \text{ USD} = 1.36 \text{ CAD}$, how many Canadian dollars are equivalent to 250 USD?

- A. \$340
- B. \$184
- C. \$286
- D. \$250

27. Simplify the expression $(6x^5) \div (2x^2)$.

- A. $3x^7$
- B. $4x^3$
- C. $3x^3$
- D. $3x^{2.5}$

28. A rectangle measures 10 cm by 6 cm. A right triangle with legs 6 cm and 4 cm is cut away from one corner. What is the remaining area?

- A. 60 cm^2
- B. 48 cm^2
- C. 72 cm^2
- D. 54 cm^2

29. Estimate the product 0.48×612 by rounding each factor to one significant figure.

- A. 240
- B. 300
- C. 360
- D. 600

30. A line has a slope of 2 and passes through the point (3, 5). What is the y-intercept of the line?

- A. -1
- B. 1
- C. 11
- D. 5

31. A researcher wants to estimate the average height of all Grade 9 students in a large school. Which sampling method is most likely to give an unbiased estimate?

- A. Surveying only the basketball team
- B. Surveying only students in one homeroom
- C. Surveying the tallest 20 students
- D. Randomly selecting students from every homeroom

32. The formula $d = vt$ gives distance in terms of speed and time. Rearranged to solve for t , the formula becomes:

- A. $t = dv$
- B. $t = v/d$
- C. $t = d/v$
- D. $t = d - v$

33. What is the prime factorisation of 60?

- A. $2^2 \times 3 \times 5$
- B. $2 \times 3 \times 10$
- C. 4×15
- D. $2^3 \times 3 \times 5$

34. A quadratic relation has the y -values 1, 4, 9, 16, 25 for $x = 1, 2, 3, 4, 5$. What is the value of y when $x = 7$?

- A. 36
- B. 42
- C. 49
- D. 64

35. A sphere has a radius of 3 cm. What is its volume, expressed in terms of π ? ($V = (4/3)\pi r^3$.)

- A. $12\pi \text{ cm}^3$
- B. $27\pi \text{ cm}^3$
- C. $9\pi \text{ cm}^3$
- D. $36\pi \text{ cm}^3$

36. Look at the box-and-whisker plot below. What is the median of the data?

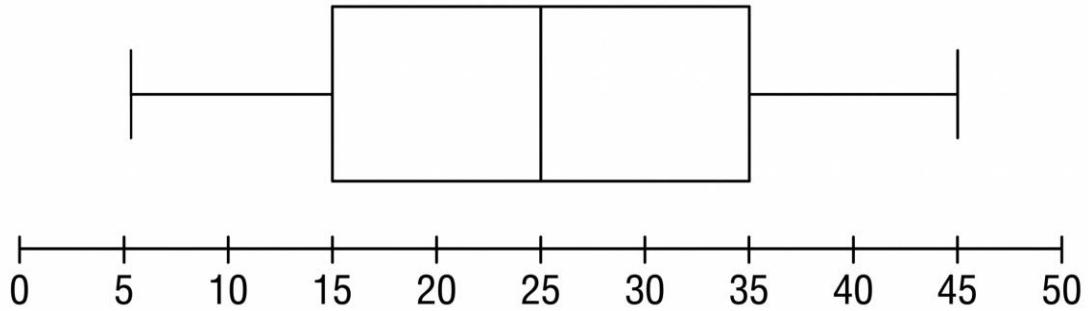


Figure PQ-3: Clean black-line technical box-and-whisker plot

- A. 20
- B. 25
- C. 30
- D. 15

37. Expand and simplify the product $(x + 5)(x - 2)$.

- A. $x^2 - 10$
- B. $x^2 - 3x - 10$
- C. $x^2 + 7x - 10$
- D. $x^2 + 3x - 10$

38. Priya has \$250 saved and adds \$40 each week. After how many weeks will she have \$690?

- A. 9 weeks

- B. 11 weeks
- C. 17 weeks
- D. 13 weeks

39. What is the value of 5^{-2} ?

- A. $1/25$
- B. -25
- C. -10
- D. 25

40. If 3 workers can build a wall in 8 days, how long would it take 4 workers, assuming the same rate?

- A. 10 days
- B. 8 days
- C. 6 days
- D. 11 days

41. A die is rolled 60 times and shows a 4 on 12 of those rolls. What is the experimental probability of rolling a 4?

- A. $1/6$
- B. $1/12$
- C. $1/5$
- D. $4/60$

42. Solve for x in the equation $5(x - 1) = 3(x + 3)$.

- A. 7

- B. 2
- C. 14
- D. -7

43. An isosceles triangle has a vertex angle of 40° . What is the measure of each of the two equal base angles?

- A. 40°
- B. 70°
- C. 100°
- D. 140°

44. Three numbers are in the ratio $2 : 3 : 5$ and their sum is 200. What is the largest of the three numbers?

- A. 40
- B. 60
- C. 80
- D. 100

45. Look at the graph of the parabola below. What are the x-intercepts (zeros) of the relation?

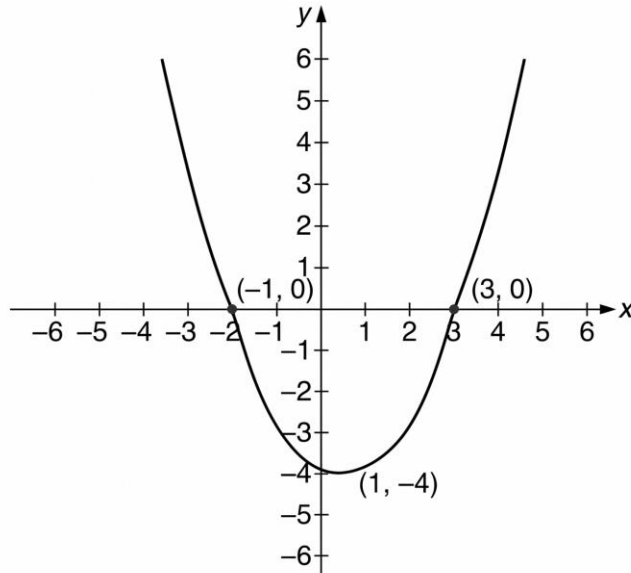


Figure PQ-4

- A. $x = 1$ and $x = -4$
- B. $x = -1$ and $x = 3$
- C. $x = 0$ and $x = 1$
- D. $x = -3$ and $x = 1$

46. A small company has nine employees earning \$35,000 each and one owner earning \$500,000. Which measure best represents a typical employee's salary?

- A. The mean of all ten salaries
- B. The range of the salaries
- C. The total of all salaries
- D. The median of the salaries

47. A restaurant bill is \$60. A 15% tip is added to the bill. What is the total amount paid?

- A. \$75.00
- B. \$60.15
- C. \$69.00

D. \$90.00

48. A 10 m ladder leans against a wall with its base 6 m from the foot of the wall. How high up the wall does the top of the ladder reach?

A. 8 m

B. 4 m

C. 16 m

D. 12 m

49. A car worth \$24,000 loses 15% of its value during its first year. What is the car's value at the end of the first year?

A. \$20,400

B. \$3,600

C. \$21,600

D. \$20,000

50. Evaluate the expression $50 - 4^2 \div 2 + 3 \times 5$.

A. 50

B. 57

C. 42

D. 63

Practice Exam 8: Answer Key and Full Explanations

- 1. A** — Multiply both sides by the reciprocal of $\frac{3}{4}$, which is $\frac{4}{3}$: $x = 9 \times \frac{4}{3} = 12$. Multiplying by the reciprocal isolates the variable from a fractional coefficient.
- 2. D** — A negative base raised to an even power gives a positive result, since the negatives pair off: $(-2)^4 = (-2)(-2)(-2)(-2) = 16$. An even number of negative factors always yields a positive product.
- 3. C** — The radius is half the diameter, so $r = 7$ cm. Substituting into $A = \pi r^2$: $3.14 \times 7^2 = 3.14 \times 49 = 153.86 \approx 154$ cm². The diameter must be halved before squaring.
- 4. B** — Read each bar's height from the gridlines: Maya is 14 and Liam is 6. The difference is $14 - 6 = 8$ books. Subtracting the two bar heights gives the comparison.
- 5. C** — Factor the trinomial into two binomials whose constants multiply to 6 and add to -5 : $(x - 2)(x - 3) = 0$. Setting each factor to zero gives $x = 2$ or $x = 3$. The zero-product property requires each factor be considered separately.
- 6. A** — Net pay is the gross pay minus deductions, or $100\% - 22\% = 78\%$ of gross. Calculating 78% of \$1,200: $0.78 \times 1,200 = \$936$. Multiplying by the retained percentage is faster than subtracting the deduction.
- 7. D** — Rearrange $A = s^2$ to solve for the side by taking the square root: $s = \sqrt{144} = 12$ cm. The side of a square is the square root of its area.
- 8. B** — The word "of" indicates multiplication: $(\frac{2}{3})(\frac{3}{4}) = \frac{6}{12}$. Simplifying gives $\frac{1}{2}$. Multiplying fractions multiplies numerators and denominators directly.
- 9. B** — The diagonal is the hypotenuse of a right triangle with legs 5 cm and 12 cm. Applying the Pythagorean theorem: $\sqrt{(5^2 + 12^2)} = \sqrt{(25 + 144)} = \sqrt{169} = 13$ cm. This is the 5-12-13 right-triangle relationship.
- 10. D** — Subtract 3 from both sides: $-4x > 16$. Dividing by -4 reverses the inequality, giving $x < -4$. Dividing by a negative always flips the inequality sign.
- 11. A** — With six values (an even count), the median is the average of the two middle values, 11 and 15: $(11 + 15)/2 = 13$. An even-sized set has no single centre value.
- 12. C** — Distribute both brackets, watching the negative: $3(2x - 4) = 6x - 12$ and $-2(x - 5) = -2x + 10$. Combining: $6x - 2x - 12 + 10 = 4x - 2$. The negative in front of the second bracket changes both interior signs.
- 13. D** — Successive percentages multiply. Paying 75% after the first cut, then 90% of that: $0.75 \times 0.90 = 0.675 = 67.5\%$. The two discounts cannot simply be added to 35%, since the second applies to the already-reduced price.

- 14. B** — Translate into $x + 12 = 3x$. Subtracting x from both sides gives $12 = 2x$, so $x = 6$. Collecting the variable terms on one side isolates the unknown.
- 15. C** — Substitute into $V = \pi r^2 h$: $3.14 \times 5^2 \times 8 = 3.14 \times 25 \times 8 = 628 \text{ cm}^3$. The radius is squared before multiplying by the height.
- 16. A** — Compound interest uses $A = P(1 + r)^n$: $2,500(1.04)^2 = 2,500 \times 1.0816 = \$2,704.00$. The exponent of 2 reflects interest compounding in each of the two years.
- 17. A** — In slope-intercept form $y = mx + b$, the coefficient of x is the slope. Here $m = -2$, so the slope is -2 . The 7 is the y -intercept, not the slope.
- 18. C** — The "neither" region holds 6 students out of the 30 total. The probability is $6/30$, which simplifies to $1/5$. Only the region outside both circles counts as playing neither sport.
- 19. B** — Convert all to decimals: -0.5 , $-3/4 = -0.75$, -0.2 , $-5/8 = -0.625$. The most negative value is -0.75 , which is $-3/4$. On the number line, the value farthest left is the smallest.
- 20. D** — Substitute $x = 4$ into $f(x) = x^2 + 2x - 3$: $4^2 + 2(4) - 3 = 16 + 8 - 3 = 21$. The squared term is evaluated before adding the other terms.
- 21. C** — Rearrange the cube surface-area formula $SA = 6s^2$: $96 = 6s^2$, so $s^2 = 16$ and $s = 4 \text{ cm}$. A cube has six equal square faces, hence the factor of 6.
- 22. D** — Model the fare with $4 + 2.50k = 24$. Subtracting 4 gives $2.50k = 20$, so $k = 8 \text{ km}$. The flat fee is removed before dividing by the per-kilometre rate.
- 23. B** — The original mean is $35/5 = 7$. Replacing 9 with 29 raises the sum to 55, so the new mean is $55/5 = 11$. The mean is sensitive to large outliers, shifting upward when a value rises sharply.
- 24. A** — The square root of a fraction is the square root of the numerator over the square root of the denominator: $\sqrt{49}/\sqrt{64} = 7/8$. Both 49 and 64 are perfect squares, giving an exact result.
- 25. D** — Subtracting the second equation from the first eliminates the pens: $(2 \text{ pens} + 3 \text{ notebooks}) - (2 \text{ pens} + 1 \text{ notebook}) = 13 - 7$, giving $2 \text{ notebooks} = \$6$. One notebook costs $\$3$.
- 26. A** — Multiply the amount in US dollars by the exchange rate: $250 \times 1.36 = \$340 \text{ CAD}$. The rate converts each US dollar into its Canadian equivalent.
- 27. C** — Divide the coefficients and subtract the exponents: $6 \div 2 = 3$ and $x^5 \div x^2 = x^3$, giving $3x^3$. The quotient rule subtracts exponents of like bases.
- 28. B** — The rectangle's area is $10 \times 6 = 60 \text{ cm}^2$. The cut triangle's area is $(1/2)(6)(4) = 12 \text{ cm}^2$. The remaining area is $60 - 12 = 48 \text{ cm}^2$. The removed piece is subtracted from the whole.

- 29. B** — Rounding to one significant figure gives $0.48 \approx 0.5$ and $612 \approx 600$. Multiplying the rounded values: $0.5 \times 600 = 300$. Estimation simplifies the factors before multiplying.
- 30. A** — Substitute the point into $y = mx + b$: $5 = 2(3) + b = 6 + b$. Solving gives $b = -1$. The y-intercept is found by back-substituting the known point and slope.
- 31. D** — A representative sample must give every member of the population a fair chance of selection. Randomly selecting from every homeroom captures the full range of students, while the other methods over-represent particular groups. Random selection across all groups minimises bias.
- 32. C** — Divide both sides of $d = vt$ by v to isolate t : $t = d/v$. Dividing by the speed reverses the multiplication that produced the distance.
- 33. A** — Break 60 into prime factors: $60 = 2 \times 2 \times 3 \times 5 = 2^2 \times 3 \times 5$. Each factor in the answer must be prime, which rules out the options containing 10, 15, or an incorrect power of 2.
- 34. C** — The values are perfect squares, following $y = x^2$. At $x = 7$, $y = 7^2 = 49$. Recognising the squaring pattern allows direct calculation without listing every term.
- 35. D** — Substitute into $V = (4/3)\pi r^3$: $(4/3)\pi(3^3) = (4/3)\pi(27) = 36\pi \text{ cm}^3$. The radius is cubed before multiplying by $4/3$.
- 36. B** — The median of a box-and-whisker plot is the vertical line inside the box, located here at 25. The box edges mark the quartiles, while the inner line marks the median.
- 37. D** — Apply FOIL: $x \cdot x = x^2$, $x \cdot (-2) = -2x$, $5 \cdot x = 5x$, $5 \cdot (-2) = -10$. Combining the middle terms: $x^2 + 5x - 2x - 10 = x^2 + 3x - 10$.
- 38. B** — Model the savings with $250 + 40w = 690$. Subtracting 250 gives $40w = 440$, so $w = 11$ weeks. The starting balance is removed before dividing by the weekly amount.
- 39. A** — A negative exponent means the reciprocal of the positive power: $5^{-2} = 1/5^2 = 1/25$. The result is a positive fraction, not a negative number.
- 40. C** — The total work is fixed at $3 \times 8 = 24$ worker-days. With 4 workers, the time is $24 \div 4 = 6$ days. More workers means fewer days — an inverse relationship.
- 41. C** — Experimental probability is the number of successes over the number of trials: $12 \div 60 = 1/5$. This is based on observed results, which may differ from the theoretical $1/6$.
- 42. A** — Expand both sides: $5(x - 1) = 5x - 5$ and $3(x + 3) = 3x + 9$. Setting $5x - 5 = 3x + 9$, subtract $3x$ and add 5 to get $2x = 14$, so $x = 7$.
- 43. B** — The base angles of an isosceles triangle are equal, and all three angles sum to 180° . Subtracting the vertex angle and splitting the remainder: $(180 - 40)/2 = 70^\circ$. The two equal angles share what is left after the vertex angle.

- 44. D** — The ratio $2 : 3 : 5$ has $2 + 3 + 5 = 10$ total parts. The largest share is $5/10$ of 200: $(5/10) \times 200 = 100$. Finding the value per part is implicit in taking the fraction of the whole.
- 45. B** — The x-intercepts are where the parabola crosses the x-axis, shown on the graph at $(-1, 0)$ and $(3, 0)$. So the zeros are $x = -1$ and $x = 3$. The vertex $(1, -4)$ is not an intercept.
- 46. D** — The median is resistant to extreme values, while the single \$500,000 salary inflates the mean far above what any employee earns. Because nine of ten salaries are \$35,000, the median best reflects a typical worker. Skewed data with an outlier favours the median.
- 47. C** — Adding a 15% tip means paying 115% of the bill: $60 \times 1.15 = \$69.00$. Multiplying by 1 plus the tip rate combines the bill and tip in one step.
- 48. A** — The wall height is found by rearranging the Pythagorean theorem, with the ladder as the hypotenuse: $\sqrt{(10^2 - 6^2)} = \sqrt{(100 - 36)} = \sqrt{64} = 8$ m. Subtracting before the square root solves for a leg.
- 49. A** — Losing 15% means retaining 85% of the value: $24,000 \times 0.85 = \$20,400$. Multiplying by the retained fraction gives the depreciated value directly.
- 50. B** — Apply order of operations: $4^2 = 16$, then $16 \div 2 = 8$ and $3 \times 5 = 15$. Working left to right: $50 - 8 + 15 = 57$. Exponents and the multiplication/division are completed before the additions and subtractions.