PRACTICE EXAM 18: 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 $5(x - 2) = 3x + 4$.

A. 5

B. 7

C. 9

D. 3

2. What is the value of 2^6?

A. 64

B. 32

C. 128

D. 48

3. A right triangle has a hypotenuse of 26 cm and one leg of 10 cm. What is the length of the other leg?

A. 16 cm

B. 20 cm

C. 24 cm

D. 18 cm

4. Find the mode of the data set 4, 7, 7, 9, 11, 7, 13.

A. 9

B. 11

C. 4

D. 7

5. Solve for x in the equation $(2x)/3 = 10$.

A. 15

B. 30

C. 5

D. 6.7

6. A store buys a jacket for $40 and marks it up by 35%. What is the selling price?

A. $14.00

B. $75.00

C. $54.00

D. $44.00

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

A. −9

B. 7

C. 11

D. 3

8. What is the value of 15^0?

A. 0

B. 1

C. 15

D. 30

9. A parallelogram has a base of 14 cm and a height of 6 cm. What is its area?

A. 40 cm^2

B. 84 cm^2

C. 20 cm^2

D. 42 cm^2

10. What is the slope of the line $4x - 2y = 8$?

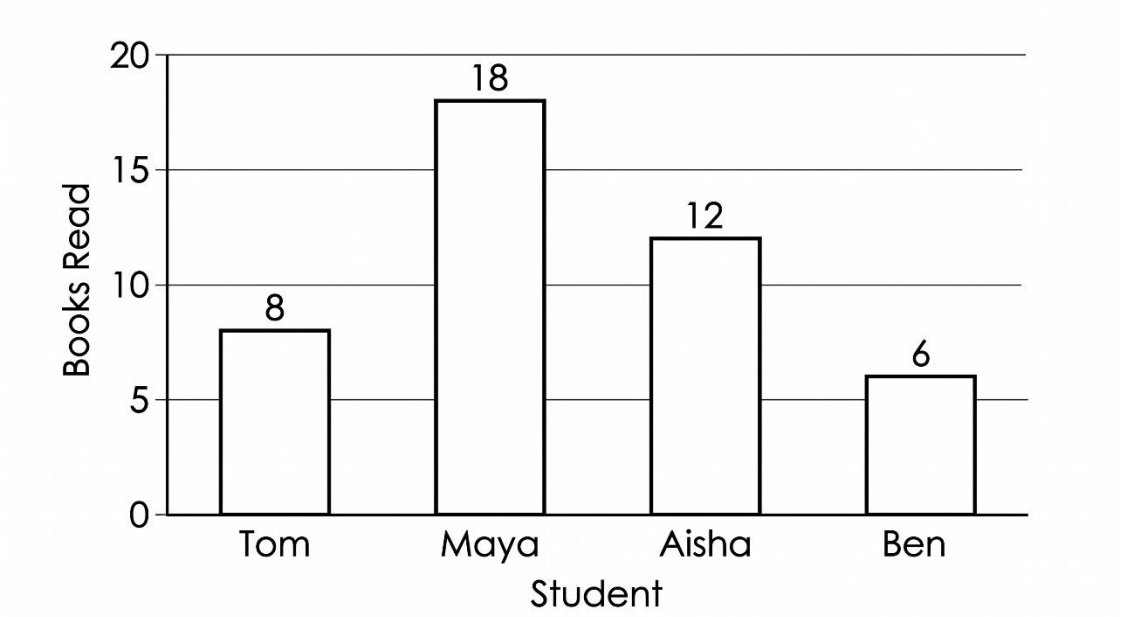
A. -2

B. 4

C. -4

D. 2

11. The bar graph below shows the number of books read by four students. How many more books did Maya read than Tom?



A. 10

B. 6

C. 26

D. 4

12. Simplify the expression $(3x^2)(4x^3)$.

A. $12x^6$

B. $7x^5$

C. $12x^5$

D. $7x^6$

13. Evaluate the expression $(18 - 2 \times 5) + 4^2$.

A. 16

B. 80

C. 24

D. 20

14. Solve for x in the proportion $9/x = 3/8$.

A. 24

B. 8

C. 3

D. 27

15. A cylinder has a radius of 3 cm and a height of 10 cm. What is its volume, expressed in terms of π? ($V = \pi r^2 h$.)

A. 30π cm³

B. 90π cm³

C. 60π cm³

D. 900π cm³

16. A sum of $2,000 is invested at 6% simple interest per year for 3 years. What is the total amount, including principal and interest?

A. $360

B. $2,060

C. $6,000

D. $2,360

17. Expand and simplify the product $(x - 3)(x - 5)$.

A. $x^2 - 8x + 15$

B. $x^2 + 8x + 15$

C. $x^2 - 2x - 15$

D. $x^2 - 15$

18. Find the median of the data set 33, 27, 41, 19, 38.

A. 38

B. 27

C. 33

D. 31.6

19. Express the number 47,000 in scientific notation.

A. 47×10^3

B. 4.7×10^4

C. 4.7×10^5

D. 4.7×10^{-4}

20. Solve the inequality $-3x + 7 < 22$ for x.

A. $x < -5$

B. $x < 5$

C. $x > 5$

D. $x > -5$

21. Two angles are complementary. One of them measures 37°. What is the measure of the other angle?

A. 143°

B. 63°

C. 53°

D. 47°

22. The perimeter of a rectangle is given by $P = 2(l + w)$. Rearranged to solve for w, the formula becomes:

A. $w = P/2 - l$

B. $w = P - 2l$

C. $w = 2P - l$

D. $w = (P - l)/2$

23. A bag contains 4 red and 6 blue marbles. Two marbles are drawn without replacement. What is the probability that both are red?

A. 4/25

B. 1/6

C. 2/9

D. 2/15

24. A quantity increases from 50 to 65. What is the percent increase?

A. 15%

B. 30%

C. 23%

D. 65%

25. Solve the system $y = 2x + 1$ and $x + y = 10$. What is the value of x?

A. 7

B. 5

C. 1

D. 3

26. A $120 item is discounted by 25%. What is the sale price, before tax?

A. $90.00

B. $30.00

C. $95.00

D. $144.00

27. Five more than twice a number is 29. What is the number?

A. 17

B. 12

C. 24

D. 14

28. A rectangular prism measures 5 cm by 4 cm by 3 cm. What is its total surface area?

A. 60 cm^2

B. 47 cm^2

C. 94 cm^2

D. 120 cm^2

29. What is the least common multiple of 6 and 8?

A. 2

B. 48

C. 14

D. 24

30. Solve for x in the equation $(x - 4)/3 = 5$.

A. 11

B. 7

C. 19

D. 15

31. The mean of four test scores is 78. After a fifth test, the mean rises to 80. What was the fifth score?

A. 88

B. 80

C. 82

D. 90

32. Factor the trinomial $x^2 + 7x + 12$.

A. $(x + 2)(x + 6)$

B. $(x + 3)(x + 4)$

C. $(x + 1)(x + 12)$

D. $(x - 3)(x - 4)$

33. Express the fraction 3/8 as a decimal.

A. 0.375

B. 0.38

C. 0.83

D. 2.667

34. An arithmetic sequence has a first term of −2 and a common difference of 5. What is the 6th term?

A. 28

B. 18

C. 30

D. 23

35. A ladder 13 m long leans against a wall, with its base 5 m from the wall. How high up the wall does it reach?

A. 8 m

B. 12 m

C. 18 m

D. 14 m

36. A standard six-sided die is rolled once. What is the probability of rolling a number greater than 4?

A. 1/6

B. 2/3

C. 1/3

D. 1/2

37. Solve for x in the equation $3(x + 2) = 2(x + 7)$.

A. 4

B. 5

C. 6

D. 8

38. A sum of $1,000 is invested at 5% compounded annually for 3 years. What is its value, to the nearest cent?

A. $1,150.00

B. $1,157.63

C. $1,176.25

D. $1,500.00

39. Evaluate the expression $|-9| + |5| - |-2|$.

A. 6

B. 16

C. 12

D. 2

40. A relation gives the y-values 2, 8, 18, 32 for x = 1, 2, 3, 4. What is the value of y when x = 5?

A. 50

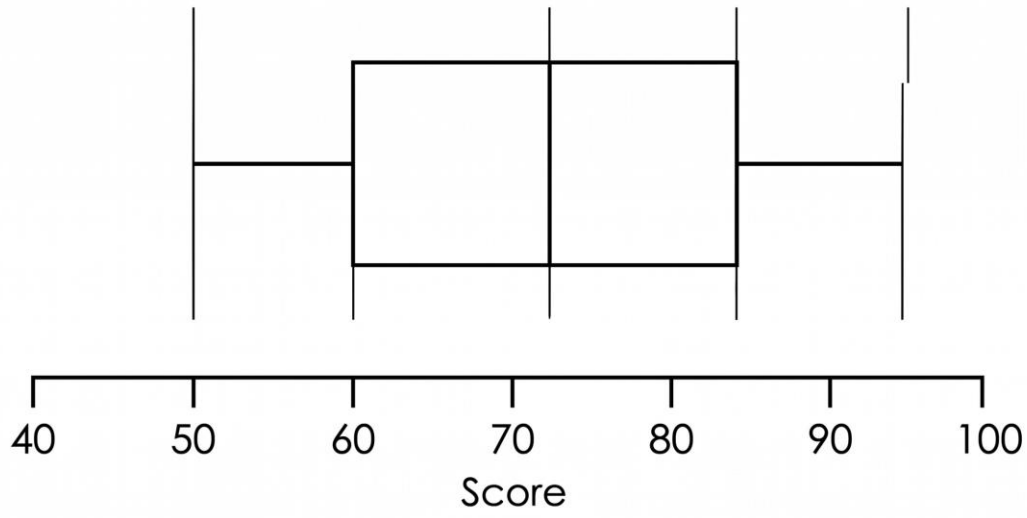
B. 46

C. 44

D. 48

41. The box-and-whisker plot below summarizes a set of test scores. What is the interquartile range (IQR)?

Figure PQ-2:



A. 45

B. 35

C. 24

D. 12

42. Factor the expression $4x^2 - 25$.

A. $(4x - 5)(x + 5)$

B. $(2x - 5)(2x - 5)$

C. $(4x + 5)(x - 5)$

D. $(2x - 5)(2x + 5)$

43. A trapezoid has parallel sides of 8 cm and 12 cm and a height of 5 cm. What is its area? ($A = \frac{1}{2}(a + b)h$.)

A. 100 cm^2

B. 50 cm^2

C. 40 cm^2

D. 60 cm^2

44. Simplify the ratio 18 : 24 to lowest terms.

A. 3 : 4

B. 2 : 3

C. 6 : 8

D. 9 : 12

45. The parabola $y = (x + 4)^2 - 3$ has its vertex at which point?

A. (4, −3)

B. (−4, −3)

C. (4, 3)

D. (−4, 3)

46. A coin is flipped and a spinner with four equal sections numbered 1, 2, 3, 4 is spun. What is the probability of getting heads and a 3?

A. 1/2

B. 1/6

C. 1/8

D. 3/8

47. A 2 kg bag of rice costs $5.00 and a 5 kg bag costs $11.00. Which is the better value per kilogram?

A. 2 kg bag, at $2.20/kg

B. both cost the same per kilogram

C. 2 kg bag, at $2.50/kg

D. 5 kg bag, at $2.20/kg

48. Aiko earns $3,000 per month and saves 18% of it. How much does she save each month?

A. $540

B. $300

C. $180

D. $2,460

49. What is the distance between the points (1, 2) and (4, 6)? (Use $d = \sqrt{((x_2 - x_1)^2 + (y_2 - y_1)^2)}$.)

A. 5

B. 7

C. 25

D. 4

50. Evaluate the expression $40 \div (2 + 3) \times 2 - 1$.

A. 3

B. 15

C. 9

D. 7

Practice Exam 18: Answer Key and Full Explanations

1. B — Subtract 3x from both sides after expanding: $5x - 10 = 3x + 4$ becomes $2x - 10 = 4$, then $2x = 14$, so $x = 7$. Distributing the bracket before collecting like terms is the key first step.

2. A — A power means repeated multiplication: $2^6 = 2 \times 2 \times 2 \times 2 \times 2 \times 2 = 64$. The exponent counts how many times the base is used as a factor.

3. C — Rearrange the Pythagorean theorem for a leg: $\sqrt{(26^2 - 10^2)} = \sqrt{(676 - 100)} = \sqrt{576} = 24$ cm. Subtracting before the square root is required when one leg and the hypotenuse are known.

4. D — The mode is the value that appears most often. The number 7 occurs three times, more than any other value, making it the mode. A data set's mode is about frequency, not size.

5. A — Multiply both sides by 3: $2x = 30$. Dividing by 2 gives $x = 15$. Clearing the denominator first turns the equation into a simple one-step solve.

6. C — A 35% markup means the selling price is 135% of the cost: $40 \times 1.35 = \$54$. Multiplying by 1 plus the markup rate combines cost and profit in one step.

7. D — Substitute $x = -2$ into $g(x) = 2x^2 + x - 3$: $2(-2)^2 + (-2) - 3 = 2(4) - 2 - 3 = 8 - 2 - 3 = 3$. The squared term stays positive because a negative squared is positive.

8. B — Any non-zero base raised to the power of zero equals 1, so $15^0 = 1$. This rule keeps the laws of exponents consistent across all powers.

9. B — Area of a parallelogram is base × height: $14 \times 6 = 84$ cm². The slant side is not used; only the perpendicular height matters.

10. D — Rearrange into slope-intercept form: $4x - 2y = 8$ gives $-2y = -4x + 8$, so $y = 2x - 4$. The coefficient of x is the slope, which is 2.

11. A — Read the bar heights: Maya read 18 books and Tom read 8. The difference is $18 - 8 = 10$ books. Subtracting the two bar values answers a "how many more" comparison.

12. C — Multiply coefficients and add exponents of like bases: $3 \times 4 = 12$ and $x^2 \times x^3 = x^5$. The product is $12x^5$. Exponents add when powers of the same base are multiplied.

13. C — Work inside the brackets first using order of operations: $2 \times 5 = 10$, so $18 - 10 = 8$. Then $4^2 = 16$, and $8 + 16 = 24$. Brackets and the exponent are resolved before the final addition.

14. A — Cross-multiply the proportion: $3x = 9 \times 8 = 72$, so $x = 24$. Cross-multiplication converts the proportion into a one-step equation.

15. B — Substitute into $V = \pi r^2 h$: $\pi(3^2)(10) = \pi(9)(10) = 90\pi$ cm³. The radius is squared before multiplying by the height.

16. D — Simple interest is $I = Prt = 2{,}000 \times 0.06 \times 3 = \$360$. The total amount adds the interest to the principal: $2{,}000 + 360 = \$2{,}360$. The question asks for principal plus interest, not interest alone.

17. A — Apply FOIL: $x \cdot x = x^2$, $x \cdot (-5) = -5x$, $-3 \cdot x = -3x$, $-3 \cdot (-5) = 15$. Combining the middle terms gives $x^2 - 8x + 15$.

18. C — Order the values: 19, 27, 33, 38, 41. With five values, the median is the middle (third) one, 33. The data must be sorted before locating the centre.

19. B — Scientific notation needs a value between 1 and 10 times a power of ten. Moving the decimal four places left gives 4.7×10^4. The exponent equals the number of places the decimal moves.

20. D — Subtract 7 from both sides: $-3x < 15$. Dividing by -3 reverses the inequality sign: $x > -5$. Dividing by a negative number always flips the direction of the inequality.

21. C — Complementary angles sum to 90°. Subtracting the known angle: $90 - 37 = 53°$. The two angles together form a right angle.

22. A — Divide both sides of $P = 2(l + w)$ by 2: $P/2 = l + w$. Subtracting l isolates w: $w = P/2 - l$. Each operation is reversed to undo the formula.

23. D — The first red has probability 4/10, and without replacement the second is 3/9. Multiplying: $(4/10)(3/9) = 12/90 = 2/15$. The denominator shrinks because one marble is removed.

24. B — Percent increase is the change over the original: $(65 - 50)/50 = 15/50 = 0.30 = 30\%$. The original value, not the new one, is the denominator.

25. D — Substitute $y = 2x + 1$ into $x + y = 10$: $x + 2x + 1 = 10$, giving $3x = 9$, so $x = 3$. Substitution removes one variable so the equation can be solved.

26. A — A 25% discount means paying 75% of the price: $120 \times 0.75 = \$90$. Multiplying by the retained percentage gives the sale price directly.

27. B — Translate into $2n + 5 = 29$. Subtracting 5 gives $2n = 24$, so $n = 12$. "Five more than twice" means the addition follows the multiplication.

28. C — Surface area of a rectangular prism is $2(lw + lh + wh)$: $2(5\times4 + 5\times3 + 4\times3) = 2(20 + 15 + 12) = 2(47) = 94$ cm². All six faces are counted in three matching pairs.

29. D — List multiples: 6, 12, 18, 24 and 8, 16, 24. The smallest value common to both is 24. The least common multiple is the first shared multiple.

30. C — Multiply both sides by 3: $x - 4 = 15$. Adding 4 gives $x = 19$. Clearing the denominator before isolating x keeps the steps simple.

31. A — The first four scores sum to $4 \times 78 = 312$, and all five sum to $5 \times 80 = 400$. The fifth score is $400 - 312 = 88$. Recovering totals from the means is the key step.

32. B — Find two numbers that multiply to 12 and add to 7: 3 and 4. So $x^2 + 7x + 12 = (x + 3)(x + 4)$. The factor pair must satisfy both the product and the sum.

33. A — Divide the numerator by the denominator: $3 \div 8 = 0.375$. The division gives the exact decimal value, which terminates here.

34. D — The nth term is $t_n = t_1 + (n - 1)d$: $-2 + (6 - 1)(5) = -2 + 25 = 23$. The common difference is added five times to reach the sixth term.

35. B — The wall height is a leg, found with the Pythagorean theorem using the ladder as the hypotenuse: $\sqrt{(13^2 - 5^2)} = \sqrt{(169 - 25)} = \sqrt{144} = 12$ m. Subtracting before the square root solves for the vertical leg.

36. C — Numbers greater than 4 on a die are 5 and 6 — two favourable outcomes out of six, giving $2/6 = 1/3$. The fraction is reduced to lowest terms.

37. D — Expand both sides: $3x + 6 = 2x + 14$. Subtracting $2x$ gives $x + 6 = 14$, so $x = 8$. Distributing each bracket before collecting like terms is the key step.

38. B — Compound interest uses $A = P(1 + r)^n$: $1{,}000(1.05)^3 = 1{,}000 \times 1.157625 = \$1{,}157.63$. The exponent of 3 reflects interest compounding in each of the three years.

39. C — Absolute value gives distance from zero: $|-9| = 9$, $|5| = 5$, $|-2| = 2$. Then $9 + 5 - 2 = 12$. Each bar is evaluated before the addition and subtraction.

40. A — The first differences are 6, 10, 14, increasing by 4, which signals a quadratic relation. The next difference is 18, so the value at $x = 5$ is $32 + 18 = 50$. The pattern follows $y = 2x^2$.

41. C — The interquartile range is $Q3 - Q1$: $84 - 60 = 24$. The IQR measures the spread of the middle half of the data and ignores the whiskers.

42. D — This is a difference of squares: $4x^2 - 25 = (2x)^2 - 5^2 = (2x - 5)(2x + 5)$. The middle terms cancel because the two factors are conjugates.

43. B — Area of a trapezoid is $\frac{1}{2}(a + b)h$: $\frac{1}{2}(8 + 12)(5) = \frac{1}{2}(20)(5) = 50$ cm². The two parallel sides are averaged before multiplying by the height.

44. A — Divide both parts by their greatest common factor, 6: $18 \div 6 = 3$ and $24 \div 6 = 4$, giving 3 : 4. A ratio is in lowest terms when its parts share no common factor.

45. B — In vertex form $y = (x - h)^2 + k$, the vertex is (h, k). The bracket $(x + 4)$ gives $h = -4$, and $k = -3$, so the vertex is $(-4, -3)$. The sign inside the bracket is reversed when reading h.

46. C — The flip and the spin are independent, so their probabilities multiply: (1/2)(1/4) = 1/8. Independent events combine by multiplication, not addition.

47. D — Compare unit prices. The 2 kg bag: \$5.00 ÷ 2 = \$2.50/kg. The 5 kg bag: \$11.00 ÷ 5 = \$2.20/kg. The 5 kg bag is cheaper per kilogram, making it the better value.

48. A — Convert the percent to a decimal and multiply: 0.18 × 3,000 = \$540. Finding a percent of an amount is a single multiplication.

49. A — Apply the distance formula: $\sqrt{((4-1)^2 + (6-2)^2)} = \sqrt{(3^2 + 4^2)} = \sqrt{(9 + 16)} = \sqrt{25} = 5$. The horizontal and vertical changes form the legs of a right triangle.

50. B — Apply order of operations: the bracket first, (2 + 3) = 5. Then divide and multiply left to right: 40 ÷ 5 = 8, then 8 × 2 = 16. Finally 16 − 1 = 15. Brackets and the division come before the subtraction.