PRACTICE EXAM 17: 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 $6x - 5 = 3x + 16$.

A. 7

B. 5

C. 9

D. 3

2. What is the value of 3^4?

A. 12

B. 27

C. 64

D. 81

3. A right triangle has legs measuring 5 cm and 12 cm. What is the length of the hypotenuse?

A. 17 cm

B. 13 cm

C. 11 cm

D. 15 cm

4. Find the mean of the data set 16, 20, 24, 28, 32.

A. 20

B. 28

C. 24

D. 26

5. Solve for x in the equation $(3x)/8 = 6$.

A. 2

B. 8

C. 48

D. 16

6. A $80 pair of shoes is 15% off. How much money is saved?

A. $12

B. $15

C. $68

D. $65

7. Given the relation $f(x) = x^2 - 5x + 2$, what is the value of $f(3)$?

A. 2

B. 6

C. −4

D. 11

8. What is the value of 8^{-1}?

A. −8

B. 1/8

C. 8

D. −1/8

9. A triangle has a base of 12 cm and a height of 8 cm. What is its area?

A. 96 cm^2

B. 48 cm^2

C. 20 cm^2

D. 60 cm^2

10. What is the slope of the line passing through the points (0, 5) and (4, 13)?

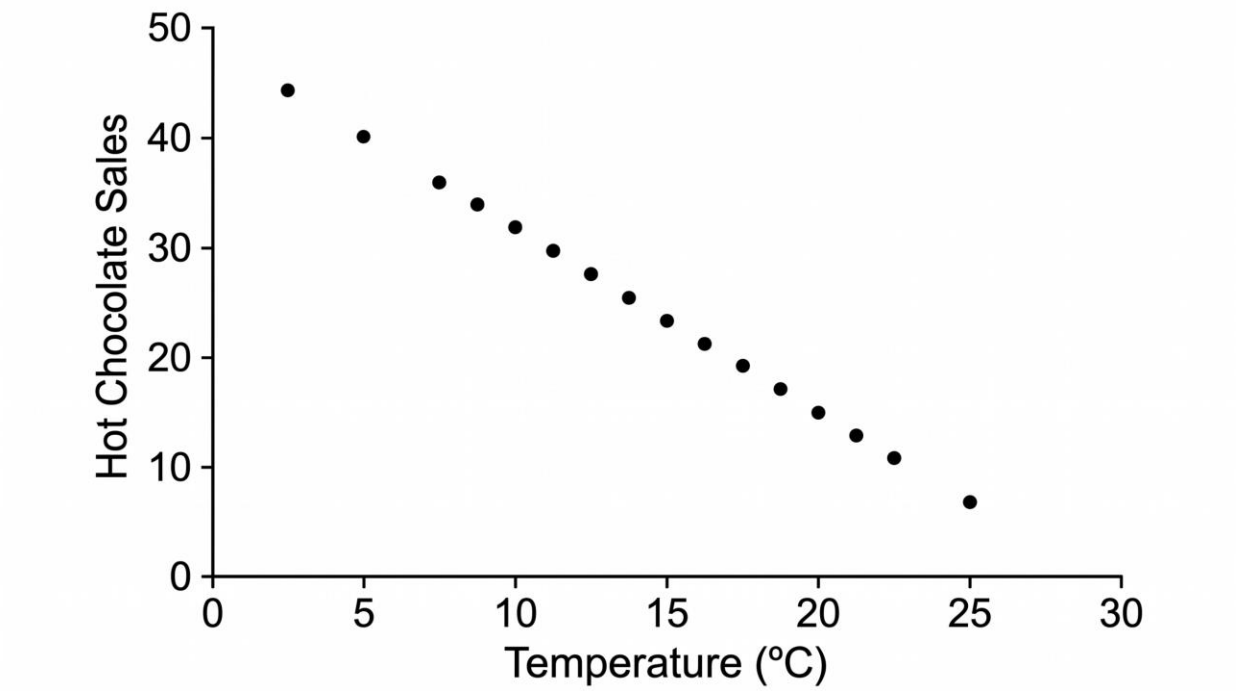
A. 1/2

B. 4

C. 2

D. 8

11. Look at the scatter plot below. Which statement best describes the correlation between the variables?



A. a strong positive correlation

B. essentially no correlation

C. a weak positive correlation

D. a strong negative correlation

12. Simplify the expression $4(x + 3) - 2(x - 1)$.

A. $2x + 14$

B. $2x + 10$

C. $6x + 14$

D. $2x - 14$

13. Evaluate the expression $50 - 6 \times 4 + 2^3$.

A. 24

B. 50

C. 34

D. 42

14. Solve for x in the proportion $x/12 = 5/20$.

A. 3

B. 5

C. 8

D. 4.8

15. A box measures 8 cm by 6 cm by 2 cm. What is its volume?

A. 16 cm^3

B. 48 cm^3

C. 32 cm^3

D. 96 cm^3

16. What is the simple interest on $10,000 at 2.5% per year for 4 years? (I = Prt.)

A. $250

B. $1,000

C. $2,500

D. $500

17. Expand and simplify the product $(x + 6)(x - 4)$.

A. $x^2 - 24$

B. $x^2 - 2x - 24$

C. $x^2 + 10x - 24$

D. $x^2 + 2x - 24$

18. Find the median of the data set 10, 14, 18, 22, 26, 30.

A. 18

B. 22

C. 20

D. 21.7

19. Express the number 0.00056 in scientific notation.

A. 5.6×10^{-4}

B. 56×10^{-5}

C. 5.6×10^{-3}

D. 5.6×10^{4}

20. Solve the inequality $7x + 6 > 4x + 21$ for x.

A. $x < 5$

B. $x > 5$

C. $x < -5$

D. $x > -5$

21. A circle has a radius of 4 cm. What is its circumference, to the nearest whole number? ($C = 2\pi r$, use $\pi \approx 3.14$.)

A. 13 cm

B. 50 cm

C. 8 cm

D. 25 cm

22. The formula I = Prt gives simple interest. Rearranged to solve for r, the formula becomes:

A. r = I/(Pt)

B. r = IPt

C. r = Pt/I

D. r = I − Pt

23. A data set is 55, 12, 40, 28, 60, 19. What is the range of the data set?

A. 40

B. 48

C. 35.7

D. 41

24. What is 16% of 250?

A. 25

B. 32

C. 40

D. 48

25. Solve the system 2x + 5y = 31 and 2x − 5y = 1. What is the value of x?

A. 4

B. 6

C. 8

D. 10

26. A $1,500 investment earns 4% interest compounded annually. What is its value after 2 years?

A. $1,620.00

B. $1,560.00

C. $1,600.00

D. $1,622.40

27. Eight less than three times a number is 16. What is the number?

A. 8

B. 6

C. 10

D. 12

28. Two angles of a triangle measure 44° and 81°. What is the measure of the third angle?

A. 125°

B. 55°

C. 45°

D. 65°

29. What is the greatest common factor of 24 and 60?

A. 6

B. 12

C. 120

D. 4

30. Solve for x in the equation $x/5 + 2 = 7$.

A. 9

B. 35

C. 5

D. 25

31. The mean of six numbers is 22. Five of them are 18, 25, 20, 24, and 19. What is the sixth number?

A. 26

B. 22

C. 24

D. 28

32. Factor the expression $16x^2 + 24x$ completely.

A. $8(2x^2 + 3x)$

B. $4x(4x + 6)$

C. $8x(2x + 3)$

D. $8x^2(2 + 3)$

33. Express 11/25 as a percentage.

A. 44%

B. 22%

C. 25%

D. 11%

34. An arithmetic sequence has a first term of 6 and a common difference of 7. What is the 5th term?

A. 28

B. 34

C. 41

D. 35

35. A cone has a radius of 5 cm and a height of 12 cm. What is its volume, expressed in terms of π? ($V = (1/3)\pi r^2 h$.)

A. 300π cm^3

B. 60π cm^3

C. 50π cm^3

D. 100π cm^3

36. A number is chosen at random from the integers 1 to 15. What is the probability that it is a multiple of 5?

A. 1/3

B. 3/5

C. 1/5

D. 1/15

37. Solve for x in the equation $2(2x - 1) + 3 = 13$.

A. 1

B. 2

C. 4

D. 3

38. A $350 desk has 13% HST added. What is the total cost?

A. $363.00

B. $395.50

C. $400.00

D. $455.00

39. Evaluate the expression $|-14| - |-6| + |-3|$.

A. 5

B. 23

C. 11

D. 17

40. A relation has the y-values 6, 9, 14, 21, 30 for x = 1, 2, 3, 4, 5. What is the value of y when x = 6?

A. 41

B. 38

C. 44

D. 36

41. The probability of an event is 3/10. What is the probability that it does not occur?

A. 3/10

B. 7/10

C. 1/2

D. 10/3

42. Expand the product $(x - 7)(x + 7)$.

A. $x^2 + 49$

B. $x^2 - 14x - 49$

C. $x^2 - 49$

D. $x^2 + 14x + 49$

43. A cube has an edge length of 4 cm. What is its total surface area?

A. 96 cm^2

B. 64 cm^2

C. 48 cm^2

D. 24 cm^2

44. A sum of $480 is shared in the ratio 5 : 3. What is the larger share?

A. $180

B. $240

C. $200

D. $300

45. The parabola $y = (x - 6)^2 + 2$ has its vertex at which point?

A. $(-6, 2)$

B. (6, −2)

C. (6, 2)

D. (−6, −2)

46. A data set is 7, 9, 8, 75, 6, 10. Which value is an outlier?

A. 7

B. 75

C. 9

D. 8

47. A 5-pack of batteries costs $7.50 and an 8-pack costs $13.60. Which is the better value, and what is its unit price?

A. 5-pack, at $1.50 each

B. 8-pack, at $1.70 each

C. 5-pack, at $1.70 each

D. both cost the same per unit

48. A right triangle has legs measuring 20 cm and 21 cm. What is the length of the hypotenuse?

A. 41 cm

B. 25 cm

C. 31 cm

D. 29 cm

49. A monthly income of $4,200 allocates 35% to rent, 30% to food, 15% to other expenses, and the rest to savings. How much is saved?

A. $630

B. $840

C. $420

D. $1,050

50. Evaluate the expression $6 + (10 - 4) \times 3 \div 2$.

A. 24

B. 12

C. 15

D. 9

Practice Exam 17: Answer Key and Full Explanations

1. A — Collect variables on one side: subtracting 3x from both sides gives $3x - 5 = 16$, then adding 5 gives $3x = 21$, so $x = 7$. Moving each term across the equals sign reverses its operation.

2. D — A power means repeated multiplication: $3^4 = 3 \times 3 \times 3 \times 3 = 81$. The exponent counts how many times the base is used as a factor.

3. B — Apply the Pythagorean theorem: $c = \sqrt{(5^2 + 12^2)} = \sqrt{(25 + 144)} = \sqrt{169} = 13$ cm. The hypotenuse is the square root of the sum of the squared legs.

4. C — Add the values and divide by the count: $(16 + 20 + 24 + 28 + 32) \div 5 = 120 \div 5 = 24$. The mean is the total divided by the number of values.

5. D — Multiply both sides by 8: $3x = 48$. Dividing by 3 gives $x = 16$. Clearing the denominator first turns the equation into a simple one-step solve.

6. A — The amount saved is the discount percentage of the price: $80 \times 0.15 = \$12$. Multiplying by the discount rate gives the savings directly, not the sale price.

7. C — Substitute $x = 3$ into $f(x) = x^2 - 5x + 2$: $3^2 - 5(3) + 2 = 9 - 15 + 2 = -4$. The squared term is evaluated before the multiplication and addition.

8. B — A negative exponent gives the reciprocal of the positive power: $8^{-1} = 1/8^1 = 1/8$. The result is a positive fraction, not a negative number.

9. B — Use the triangle area formula $A = \frac{1}{2}bh$: $\frac{1}{2} \times 12 \times 8 = 48$ cm². The one-half factor distinguishes a triangle from a rectangle of the same base and height.

10. C — Slope is the change in y over the change in x: $(13 - 5)/(4 - 0) = 8/4 = 2$. The differences are taken in the same order for both coordinates.

11. D — The points fall steadily from upper-left to lower-right with little scatter, so as temperature rises the sales drop in a clear, consistent way. A tight downward trend indicates a strong negative correlation.

12. A — Distribute both brackets: $4(x + 3) = 4x + 12$ and $-2(x - 1) = -2x + 2$. Combining like terms gives $4x - 2x + 12 + 2 = 2x + 14$. The negative sign must multiply both terms in the second bracket.

13. C — Apply order of operations: $6 \times 4 = 24$ and $2^3 = 8$. Working left to right: $50 - 24 + 8 = 34$. Multiplication and the exponent come before the addition and subtraction.

14. A — Cross-multiply the proportion: $20x = 12 \times 5 = 60$, so $x = 3$. Cross-multiplication converts the proportion into a one-step equation.

15. D — Volume of a rectangular prism is length × width × height: $8 \times 6 \times 2 = 96$ cm³. The three dimensions multiply together regardless of order.

16. B — Simple interest is $I = Prt = 10{,}000 \times 0.025 \times 4 = \$1{,}000$. Each factor multiplies directly, with no compounding involved.

17. D — Apply FOIL: $x \cdot x = x^2$, $x \cdot (-4) = -4x$, $6 \cdot x = 6x$, $6 \cdot (-4) = -24$. Combining the middle terms gives $x^2 + 2x - 24$.

18. C — With six values, the median is the average of the third and fourth: $(18 + 22) \div 2 = 20$. An even-sized data set has no single middle value, so the two central values are averaged.

19. A — Scientific notation needs a value between 1 and 10 times a power of ten. Moving the decimal four places to the right gives 5.6, so the exponent is −4: 5.6×10^{-4}. A small number produces a negative exponent.

20. B — Subtract 4x from both sides: $3x + 6 > 21$. Subtracting 6 gives $3x > 15$, so $x > 5$. No division by a negative occurs, so the inequality sign stays the same.

21. D — Substitute into $C = 2\pi r$: $2 \times 3.14 \times 4 = 25.12 \approx 25$ cm. The circumference uses the radius doubled and multiplied by π.

22. A — Divide both sides of $I = Prt$ by the product Pt to isolate r: $r = I/(Pt)$. Dividing by everything multiplied with r reverses the multiplication.

23. B — The range is the maximum minus the minimum: $60 - 12 = 48$. The range measures the full spread between the largest and smallest values.

24. C — Convert the percent to a decimal and multiply: $0.16 \times 250 = 40$. Finding a percent of a number is a single multiplication.

25. C — Adding the two equations eliminates y: $(2x + 5y) + (2x - 5y) = 31 + 1$, giving $4x = 32$, so $x = 8$. The opposite y-terms cancel when the equations are added.

26. D — Compound interest uses $A = P(1 + r)^n$: $1{,}500(1.04)^2 = 1{,}500 \times 1.0816 = \$1{,}622.40$. The exponent of 2 reflects interest earned in each of the two years, including interest on interest.

27. A — Translate the statement into $3n - 8 = 16$. Adding 8 gives $3n = 24$, so $n = 8$. "Eight less than three times" means the subtraction follows the multiplication.

28. B — The angles of a triangle sum to 180°. Subtracting the two known angles: $180 - (44 + 81) = 180 - 125 = 55°$. The three interior angles always total 180 degrees.

29. B — Factor into primes: $24 = 2^3 \times 3$ and $60 = 2^2 \times 3 \times 5$. The GCF takes the lowest power of each shared prime: $2^2 \times 3 = 12$. Using the smaller exponent of every common factor gives the greatest common factor.

30. D — Subtract 2 from both sides: $x/5 = 5$. Multiplying by 5 gives $x = 25$. The constant is removed before clearing the denominator.

31. A — The six numbers sum to $6 \times 22 = 132$. The five known values total $18 + 25 + 20 + 24 + 19 = 106$, so the sixth is $132 - 106 = 26$. Recovering the total from the mean is the key step.

32. C — The greatest common factor of $16x^2$ and $24x$ is $8x$. Factoring it out: $16x^2 + 24x = 8x(2x + 3)$. Dividing each term by $8x$ leaves the bracket completely factored.

33. A — Convert the fraction to a decimal then a percent: $11 \div 25 = 0.44 = 44\%$. Dividing the numerator by the denominator gives the decimal form before scaling to a percent.

34. B — The nth term is $t_n = t_1 + (n - 1)d$: $6 + (5 - 1)(7) = 6 + 28 = 34$. The common difference is added four times to reach the fifth term.

35. D — Substitute into $V = (1/3)\pi r^2 h$: $(1/3)\pi(5^2)(12) = (1/3)\pi(300) = 100\pi$ cm³. The radius is squared before applying the one-third factor.

36. C — Multiples of 5 from 1 to 15 are 5, 10, and 15 — three favourable outcomes out of 15, giving $3/15 = 1/5$. The fraction is reduced to lowest terms.

37. D — Distribute first: $2(2x - 1) = 4x - 2$, so $4x - 2 + 3 = 13$, which simplifies to $4x + 1 = 13$. Then $4x = 12$, so $x = 3$. The bracket is expanded before combining constants.

38. B — Adding 13% HST means paying 113% of the price: $350 \times 1.13 = \$395.50$. Multiplying by 1 plus the tax rate combines the price and tax in one step.

39. C — Absolute value gives distance from zero: $|-14| = 14$, $|-6| = 6$, $|-3| = 3$. Then $14 - 6 + 3 = 11$. Each bar is evaluated before the subtraction and addition.

40. A — The first differences are 3, 5, 7, 9, increasing by 2, which signals a quadratic relation. The next difference is 11, so the value at $x = 6$ is $30 + 11 = 41$. The pattern follows $y = x^2 + 5$.

41. B — The probabilities of an event and its complement sum to 1: $1 - 3/10 = 7/10$. The "does not occur" case covers everything left over.

42. C — This is a difference of squares: $(x - 7)(x + 7) = x^2 - 7^2 = x^2 - 49$. The middle terms cancel because they are opposites.

43. A — A cube has six identical square faces, so $SA = 6s^2 = 6(4^2) = 6(16) = 96$ cm². Each face area is squared before multiplying by six.

44. D — The ratio 5 : 3 has $5 + 3 = 8$ parts. The larger share is 5/8 of \$480: $(5/8) \times 480 = \$300$. Taking the fraction of the total finds the larger portion.

45. C — In vertex form $y = (x - h)^2 + k$, the vertex is (h, k). Here the bracket is $(x - 6)$, so $h = 6$, and $k = 2$, giving the vertex (6, 2). The sign inside the bracket is reversed when reading h.

46. B — An outlier is a value far from the rest of the data. The values cluster between 6 and 10, but 75 sits far above them, making it the outlier. Distance from the main group identifies an outlier.

47. A — Compare unit prices. The 5-pack: \$7.50 ÷ 5 = \$1.50 each. The 8-pack: \$13.60 ÷ 8 = \$1.70 each. The 5-pack is cheaper per unit, making it the better value at \$1.50 each.

48. D — Apply the Pythagorean theorem: $c = \sqrt{(20^2 + 21^2)} = \sqrt{(400 + 441)} = \sqrt{841} = 29$ cm. The hypotenuse is the square root of the sum of the squared legs.

49. B — Rent, food, and other expenses total 35% + 30% + 15% = 80%, leaving 20% for savings. Calculating 20% of \$4,200: $0.20 \times 4{,}200 = \$840$. Finding the leftover percentage first is the efficient route.

50. C — Apply order of operations: the bracket first, $(10 - 4) = 6$, then multiply and divide left to right: $6 \times 3 = 18$, then $18 \div 2 = 9$. Finally $6 + 9 = 15$. Brackets and the multiplication/division come before the addition.