PRACTICE EXAM 19: 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 $4x + 9 = 2x + 23$.

A. 5

B. 6

C. 7

D. 9

2. What is the value of $\sqrt{196}$?

A. 14

B. 16

C. 13

D. 98

3. A right triangle has legs measuring 9 cm and 40 cm. What is the length of the hypotenuse?

A. 31 cm

B. 49 cm

C. 45 cm

D. 41 cm

4. Find the mean of the data set 12, 15, 18, 21, 24.

A. 15

B. 18

C. 21

D. 20

5. Solve for x in the equation $(5x)/4 = 15$.

A. 3

B. 60

C. 4

D. 12

6. A $90 textbook is 20% off. How much money is saved?

A. $20

B. $72

C. $18

D. $70

7. Given the relation $f(x) = 3x^2 - 2x + 1$, what is the value of $f(2)$?

A. 9

B. 5

C. 13

D. 17

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

A. −25

B. 1/25

C. 25

D. −1/25

9. A circle has a radius of 6 cm. What is its area, to the nearest whole number? ($A = \pi r^2$, use $\pi \approx 3.14$.)

A. 38 cm²

B. 113 cm²

C. 226 cm²

D. 18 cm²

10. What is the slope of the line passing through the points (−2, 1) and (2, 9)?

A. 2

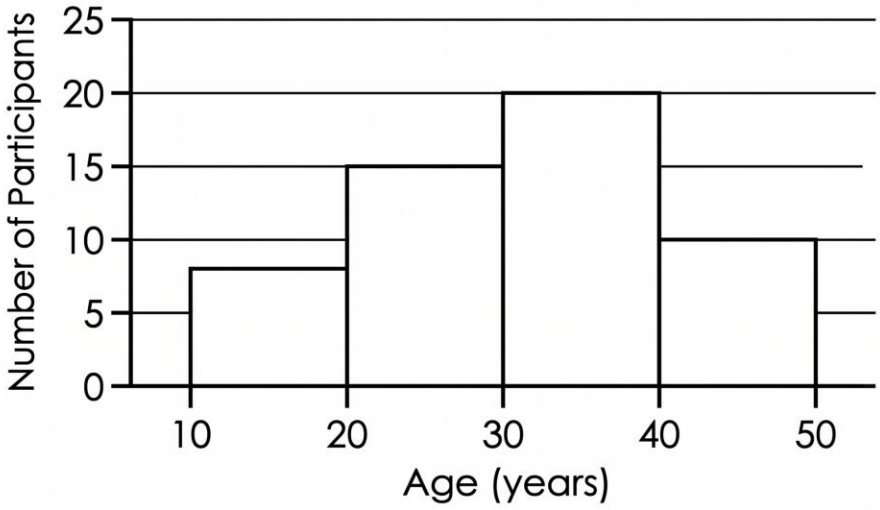
B. 4

C. 1/2

D. −2

11. The histogram below shows the ages of participants in a study. How many participants are aged 20–29?

Figure PQ-1:



A. 20

B. 8

C. 15

D. 10

12. Simplify the expression $5(2x - 3) - 4(x - 2)$.

A. $6x - 23$

B. $6x + 7$

C. $14x - 7$

D. $6x - 7$

13. Evaluate the expression $7 + 3^2 \times 2 - 5$.

A. 15

B. 45

C. 20

D. 25

14. Solve for x in the proportion $x/15 = 8/12$.

A. 10

B. 12

C. 8

D. 6

15. A fish tank measures 30 cm by 20 cm by 25 cm. What is its volume?

A. 75 cm^3

B. 15,000 cm^3

C. 1,500 cm^3

D. 150 cm^3

16. What is the simple interest on $4,500 at 4% per year for 5 years? (I = Prt.)

A. $180

B. $225

C. $4,500

D. $900

17. Expand and simplify the product $(x + 9)(x + 2)$.

A. $x^2 + 11x + 18$

B. $x^2 + 18x + 11$

C. $x^2 - 11x + 18$

D. $x^2 + 18$

18. Find the median of the data set 8, 14, 20, 26, 32, 38.

A. 20

B. 26

C. 23

D. 22.7

19. Express the number 0.00072 in scientific notation.

A. 72×10^{-5}

B. 7.2×10^{-3}

C. 7.2×10^{4}

D. 7.2×10^{-4}

20. Solve the inequality $5x - 3 \geq 2x + 12$ for x.

A. $x \leq 5$

B. $x \geq 5$

C. $x \geq -5$

D. $x \leq -5$

21. Two angles are supplementary. One of them measures 115°. What is the measure of the other angle?

A. 75°

B. 65°

C. 55°

D. 85°

22. The formula for distance is d = rt. Rearranged to solve for t, the formula becomes:

A. t = dr

B. t = r/d

C. t = d − r

D. t = d/r

23. The probability that it rains tomorrow is 0.35. What is the probability that it does not rain?

A. 0.35

B. 0.45

C. 0.65

D. 1.35

24. What is 12% of 350?

A. 42

B. 36

C. 48

D. 35

25. Solve the system 3x + y = 17 and 2x − y = 8. What is the value of x?

A. 3

B. 4

C. 5

D. 7

26. A sum of $2,500 is invested at 4% interest compounded annually. What is its value after 2 years?

A. $2,600.00

B. $2,704.00

C. $2,700.00

D. $2,800.00

27. Seven less than four times a number is 25. What is the number?

A. 4

B. 5

C. 6

D. 8

28. Two angles of a triangle measure 52° and 73°. What is the measure of the third angle?

A. 55°

B. 65°

C. 45°

D. 125°

29. What is the greatest common factor of 36 and 48?

A. 6

B. 144

C. 12

D. 4

30. Solve for x in the equation $x/4 - 3 = 2$.

A. 8

B. 5

C. −4

D. 20

31. The mean of five numbers is 30. Four of them are 25, 32, 28, and 35. What is the fifth number?

A. 30

B. 28

C. 32

D. 35

32. Factor the trinomial $x^2 - 5x + 6$.

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

B. $(x - 2)(x - 3)$

C. $(x - 1)(x - 6)$

D. $(x + 1)(x - 6)$

33. Express the fraction 9/20 as a percentage.

A. 9%

B. 20%

C. 90%

D. 45%

34. An arithmetic sequence has a first term of 4 and a common difference of 6. What is the 7th term?

A. 40

B. 42

C. 46

D. 36

35. A cone has a radius of 6 cm and a height of 9 cm. What is its volume, expressed in terms of π? ($V = (1/3)\pi r^2 h$.)

A. 324π cm^3

B. 54π cm^3

C. 108π cm^3

D. 162π cm^3

36. A number is chosen at random from the integers 1 to 20. What is the probability that it is a multiple of 4?

A. 1/5

B. 1/4

C. 1/2

D. 5/4

37. Solve for x in the equation $4(x - 3) + 6 = 2x$.

A. 9

B. 6

C. 1

D. 3

38. A $250 appliance has 13% HST added. What is the total cost?

A. $263.00

B. $282.50

C. $290.00

D. $325.00

39. Evaluate the expression $|-12| - |8| + |-5|$.

A. 9

B. 25

C. 1

D. 15

40. A relation gives the y-values 4, 7, 12, 19, 28 for x = 1, 2, 3, 4, 5. What is the value of y when x = 6?

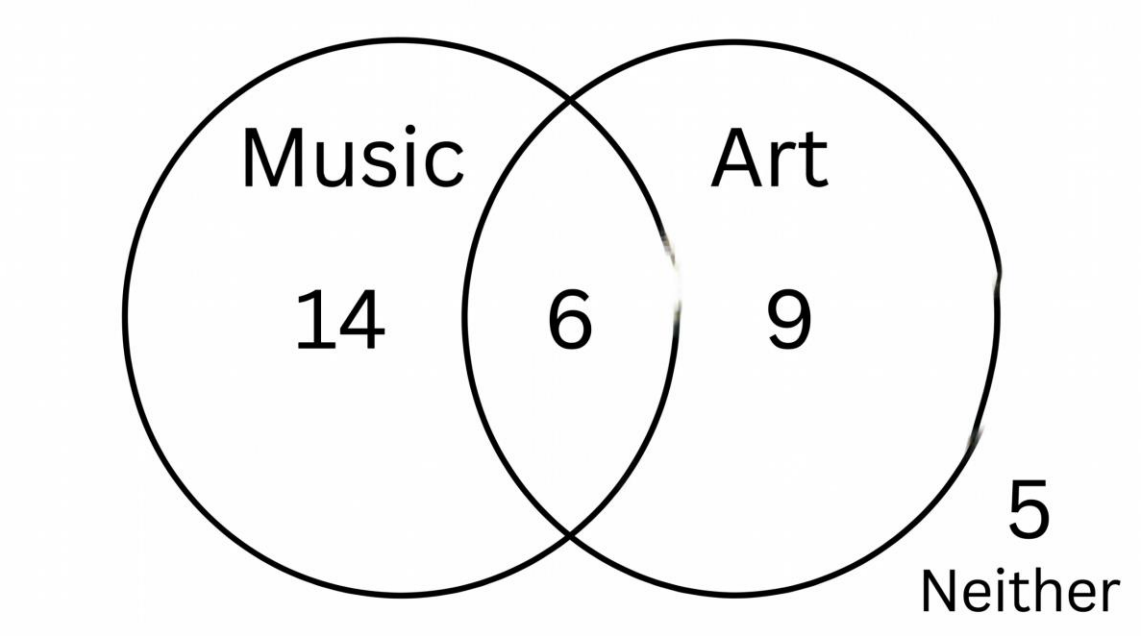
A. 35

B. 37

C. 39

D. 42

41. The Venn diagram below shows the number of students taking Music and Art. How many students take only Music?



A. 20

B. 6

C. 14

D. 9

42. Expand the product $(x + 10)(x - 10)$.

A. $x^2 + 100$

B. $x^2 - 100$

C. $x^2 - 20x - 100$

D. $x^2 + 20x + 100$

43. A cube has an edge length of 7 cm. What is its total surface area?

A. 294 cm^2

B. 343 cm^2

C. 49 cm^2

D. 147 cm²

44. A sum of $360 is shared in the ratio 7 : 2. What is the smaller share?

A. $40

B. $180

C. $280

D. $80

45. The parabola $y = (x - 3)^2 + 5$ has its vertex at which point?

A. $(-3, 5)$

B. $(3, 5)$

C. $(3, -5)$

D. $(-3, -5)$

46. A data set is 22, 47, 31, 19, 50, 28. What is the range of the data set?

A. 31

B. 28

C. 22

D. 33

47. A 6-pack of juice costs $4.80 and a 10-pack costs $7.50. Which is the better value per unit?

A. 6-pack, at $0.75 each

B. both cost the same per unit

C. 6-pack, at $0.80 each

D. 10-pack, at $0.75 each

48. A monthly income of $5,000 allocates 40% to rent, 25% to food, and 20% to transport, with the rest to savings. How much is saved?

A. $1,000

B. $500

C. $750

D. $600

49. What is the distance between the points $(-1, 3)$ and $(2, 7)$? (Use $d = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$.)

A. 7

B. 25

C. 4

D. 5

50. Evaluate the expression $3 \times (12 - 8)^2 \div 4 + 1$.

A. 49

B. 13

C. 25

D. 9

Practice Exam 19: Answer Key and Full Explanations

1. C — Subtract 2x from both sides: $2x + 9 = 23$. Subtracting 9 gives $2x = 14$, so $x = 7$. Collecting variables on one side reduces the equation to a single step.

2. A — The square root asks which number multiplied by itself gives 196: $14 \times 14 = 196$, so $\sqrt{196} = 14$. A square root undoes a square.

3. D — Apply the Pythagorean theorem: $c = \sqrt{(9^2 + 40^2)} = \sqrt{(81 + 1{,}600)} = \sqrt{1{,}681} = 41$ cm. The hypotenuse is the square root of the sum of the squared legs.

4. B — Add the values and divide by the count: $(12 + 15 + 18 + 21 + 24) \div 5 = 90 \div 5 = 18$. The mean is the total divided by the number of values.

5. D — Multiply both sides by 4: $5x = 60$. Dividing by 5 gives $x = 12$. Clearing the denominator first turns the equation into a one-step solve.

6. C — The amount saved is the discount percentage of the price: $90 \times 0.20 = \$18$. Multiplying by the discount rate gives the savings directly, not the sale price.

7. A — Substitute $x = 2$ into $f(x) = 3x^2 - 2x + 1$: $3(2^2) - 2(2) + 1 = 12 - 4 + 1 = 9$. The squared term is evaluated before the multiplication and addition.

8. B — A negative exponent gives the reciprocal of the positive power: $5^{-2} = 1/5^2 = 1/25$. The result is a positive fraction, not a negative number.

9. B — Substitute into $A = \pi r^2$: $3.14 \times 6^2 = 3.14 \times 36 = 113.04 \approx 113$ cm². The radius is squared before multiplying by π.

10. A — Slope is the change in y over the change in x: $(9 - 1)/(2 - (-2)) = 8/4 = 2$. Subtracting a negative in the denominator becomes addition.

11. C — Read the height of the 20–29 bar, which reaches 15 on the vertical scale. Each bar's height gives the frequency for that age interval.

12. D — Distribute both brackets: $5(2x - 3) = 10x - 15$ and $-4(x - 2) = -4x + 8$. Combining like terms gives $10x - 4x - 15 + 8 = 6x - 7$. The negative sign must multiply both terms in the second bracket.

13. C — Apply order of operations: $3^2 = 9$, then $9 \times 2 = 18$. Working left to right: $7 + 18 - 5 = 20$. The exponent and multiplication come before the addition and subtraction.

14. A — Cross-multiply the proportion: $12x = 15 \times 8 = 120$, so $x = 10$. Cross-multiplication converts the proportion into a one-step equation.

15. B — Volume of a rectangular prism is length × width × height: $30 \times 20 \times 25 = 15{,}000$ cm³. The three dimensions multiply together regardless of order.

16. D — Simple interest is $I = Prt = 4{,}500 \times 0.04 \times 5 = \$900$. Each factor multiplies directly, with no compounding involved.

17. A — Apply FOIL: $x \cdot x = x^2$, $x \cdot 2 = 2x$, $9 \cdot x = 9x$, $9 \cdot 2 = 18$. Combining the middle terms gives $x^2 + 11x + 18$.

18. C — With six values already in order, the median is the average of the third and fourth: $(20 + 26) \div 2 = 23$. An even-sized set has no single middle value, so the two central values are averaged.

19. D — Scientific notation needs a value between 1 and 10 times a power of ten. Moving the decimal four places right gives 7.2, so the exponent is -4: 7.2×10^{-4}. A small number produces a negative exponent.

20. B — Subtract $2x$ from both sides: $3x - 3 \geq 12$. Adding 3 gives $3x \geq 15$, so $x \geq 5$. No division by a negative occurs, so the inequality sign stays the same.

21. B — Supplementary angles sum to 180°. Subtracting the known angle: $180 - 115 = 65°$. The two angles together form a straight line.

22. D — Divide both sides of $d = rt$ by r to isolate t: $t = d/r$. Dividing by the rate reverses the multiplication.

23. C — The probabilities of an event and its complement sum to 1: $1 - 0.35 = 0.65$. The "does not rain" case covers everything left over.

24. A — Convert the percent to a decimal and multiply: $0.12 \times 350 = 42$. Finding a percent of a number is a single multiplication.

25. C — Adding the two equations eliminates y: $(3x + y) + (2x - y) = 17 + 8$, giving $5x = 25$, so $x = 5$. The opposite y-terms cancel when the equations are added.

26. B — 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 earned in each of the two years, including interest on interest.

27. D — Translate into $4n - 7 = 25$. Adding 7 gives $4n = 32$, so $n = 8$. "Seven less than four times" means the subtraction follows the multiplication.

28. A — The angles of a triangle sum to 180°. Subtracting the two known angles: $180 - (52 + 73) = 180 - 125 = 55°$. The three interior angles always total 180 degrees.

29. C — Factor into primes: $36 = 2^2 \times 3^2$ and $48 = 2^4 \times 3$. 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 — Add 3 to both sides: $x/4 = 5$. Multiplying by 4 gives $x = 20$. The constant is removed before clearing the denominator.

31. A — The five numbers sum to $5 \times 30 = 150$. The four known values total $25 + 32 + 28 + 35 = 120$, so the fifth is $150 - 120 = 30$. Recovering the total from the mean is the key step.

32. B — Find two numbers that multiply to 6 and add to −5: −2 and −3. So $x^2 - 5x + 6 = (x - 2)(x - 3)$. Both factors are negative because the product is positive and the sum is negative.

33. D — Convert the fraction to a decimal then a percent: $9 \div 20 = 0.45 = 45\%$. Dividing the numerator by the denominator gives the decimal form before scaling to a percent.

34. A — The nth term is $t_n = t_1 + (n - 1)d$: $4 + (7 - 1)(6) = 4 + 36 = 40$. The common difference is added six times to reach the seventh term.

35. C — Substitute into $V = (1/3)\pi r^2 h$: $(1/3)\pi(6^2)(9) = (1/3)\pi(324) = 108\pi$ cm³. The radius is squared before applying the one-third factor.

36. B — Multiples of 4 from 1 to 20 are 4, 8, 12, 16, and 20 — five favourable outcomes out of 20, giving $5/20 = 1/4$. The fraction is reduced to lowest terms.

37. D — Distribute first: $4(x - 3) = 4x - 12$, so $4x - 12 + 6 = 2x$, which simplifies to $4x - 6 = 2x$. Then $2x = 6$, so $x = 3$. Expanding the bracket before collecting like terms is the key step.

38. B — Adding 13% HST means paying 113% of the price: $250 \times 1.13 = \$282.50$. Multiplying by 1 plus the tax rate combines the price and tax in one step.

39. A — Absolute value gives distance from zero: $|-12| = 12$, $|8| = 8$, $|-5| = 5$. Then $12 - 8 + 5 = 9$. Each bar is evaluated before the subtraction and addition.

40. C — 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 $28 + 11 = 39$. The pattern follows $y = x^2 + 3$.

41. C — The "Music only" region is the part of the Music circle that does not overlap with Art, which contains 14. The overlap of 6 represents students taking both, so it is excluded from "only Music."

42. B — This is a difference of squares: $(x + 10)(x - 10) = x^2 - 10^2 = x^2 - 100$. The middle terms cancel because they are opposites.

43. A — A cube has six identical square faces, so $SA = 6s^2 = 6(7^2) = 6(49) = 294$ cm². Each face area is squared before multiplying by six.

44. D — The ratio 7 : 2 has $7 + 2 = 9$ parts. The smaller share is 2/9 of \$360: $(2/9) \times 360 = \$80$. Taking the fraction of the total finds the smaller portion.

45. B — In vertex form $y = (x - h)^2 + k$, the vertex is (h, k). The bracket $(x - 3)$ gives $h = 3$, and $k = 5$, so the vertex is (3, 5). The sign inside the bracket is reversed when reading h.

46. A — The range is the maximum minus the minimum: $50 - 19 = 31$. The range measures the full spread between the largest and smallest values.

47. D — Compare unit prices. The 6-pack: \$4.80 ÷ 6 = \$0.80 each. The 10-pack: \$7.50 ÷ 10 = \$0.75 each. The 10-pack is cheaper per unit, making it the better value at \$0.75 each.

48. C — Rent, food, and transport total 40% + 25% + 20% = 85%, leaving 15% for savings. Calculating 15% of \$5,000: 0.15 × 5,000 = \$750. Finding the leftover percentage first is the efficient route.

49. D — Apply the distance formula: $\sqrt{((2 - (-1))^2 + (7 - 3)^2)} = \sqrt{(3^2 + 4^2)} = \sqrt{(9 + 16)} = \sqrt{25} = 5$. The horizontal and vertical changes form the legs of a right triangle.

50. B — Apply order of operations: the bracket first, $(12 - 8) = 4$, then the exponent $4^2 = 16$. Multiply and divide left to right: $3 \times 16 = 48$, then $48 \div 4 = 12$. Finally $12 + 1 = 13$. Brackets and exponents come before the multiplication, division, and addition.