PRACTICE EXAM 13: 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 $2(x + 5) - 3 = 17$.

A. 3

B. 4

C. 5

D. 7

2. What is the value of 2^5?

A. 10

B. 25

C. 16

D. 32

3. A right triangle has legs measuring 9 cm and 12 cm. What is the length of the hypotenuse?

A. 21 cm

B. 15 cm

C. 13 cm

D. 11 cm

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

A. 18

B. 21

C. 15

D. 20

5. Solve for x in the equation $(3x)/4 = 9$.

A. 6.75

B. 3

C. 27

D. 12

6. What is the simple interest on $6,000 at 5% per year for 2 years? (I = Prt.)

A. $300

B. $600

C. $1,200

D. $660

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

A. 4

B. 10

C. 16

D. 22

8. What is the value of 10^{-3}?

A. 0.001

B. −1000

C. −30

D. 1000

9. A triangle has a base of 16 cm and a height of 5 cm. What is its area?

A. 80 cm^2

B. 40 cm^2

C. 21 cm^2

D. 48 cm^2

10. What is the slope of the line passing through the points (3, 2) and (7, 14)?

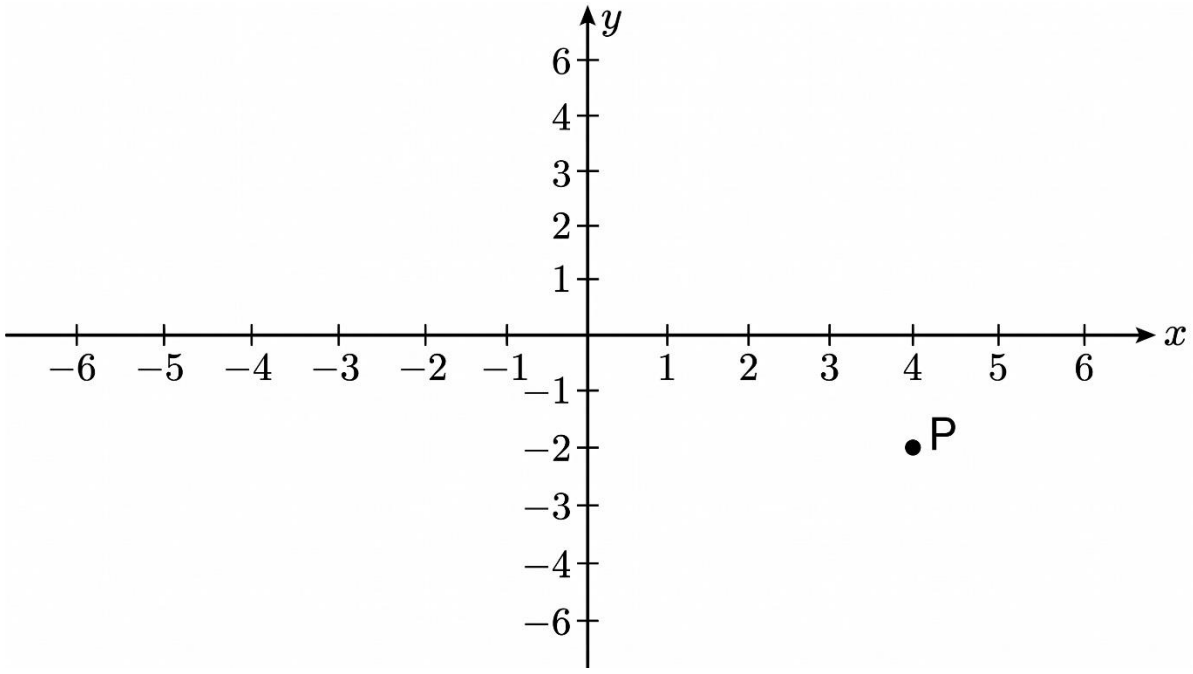
A. 3

B. 1/3

C. 4

D. 12

11. Look at the coordinate plane below. What are the coordinates of point P?



A. (−4, 3)

B. (3, −4)

C. (−3, 4)

D. (4, −3)

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

A. $11x + 6$

B. $5x - 6$

C. $11x - 6$

D. $11x - 18$

13. Evaluate the expression $18 - 4 \times 3 + 2^2$.

A. 10

B. 46

C. 6

D. 14

14. Solve for x in the proportion $8/x = 12/9$.

A. 13.5

B. 10.7

C. 4

D. 6

15. A box measures 7 cm by 4 cm by 5 cm. What is its volume?

A. 16 cm^3

B. 140 cm^3

C. 35 cm^3

D. 280 cm^3

16. A restaurant bill is $80. With a 20% tip added, what is the total amount paid?

A. $16

B. $84

C. $96

D. $100

17. Expand and simplify the product $(x + 3)(x - 6)$.

A. $x^2 - 18$

B. $x^2 + 3x - 18$

C. $x^2 - 9x - 18$

D. $x^2 - 3x - 18$

18. Find the median of the data set 14, 8, 22, 17, 11.

A. 14

B. 17

C. 11

D. 14.4

19. Express the number 0.00082 in scientific notation.

A. 8.2×10^4

B. 82×10^{-5}

C. 8.2×10^{-4}

D. 8.2×10^{-3}

20. Solve the inequality $6x - 5 < 4x + 7$ for x.

A. $x > 6$

B. $x < 6$

C. $x < -6$

D. $x > -6$

21. A circle has a radius of 7 cm. What is its circumference, to the nearest whole number? ($C = 2\pi r$, use $\pi \approx 3.14$.)

A. 22 cm

B. 44 cm

C. 154 cm

D. 14 cm

22. The formula $v = u + at$ gives final velocity. Rearranged to solve for t, the formula becomes:

A. $t = v - u + a$

B. $t = (v + u)/a$

C. $t = (v - u)/a$

D. $t = a(v - u)$

23. A data set is 45, 12, 38, 27, 50, 19. What is the range of the data set?

A. 38

B. 50

C. 31.8

D. 31

24. What is 15% of 320?

A. 32

B. 64

C. 56

D. 48

25. Solve the system $3x + y = 17$ and $x + y = 7$. What is the value of x?

A. 4

B. 5

C. 6

D. 7

26. A $4,000 investment earns 5% interest compounded annually. What is its value after 2 years?

A. $4,400.00

B. $4,200.00

C. $4,420.00

D. $4,410.00

27. Seven more than three times a number is 28. What is the number?

A. 7

B. 9

C. 5

D. 12

28. Two angles of a triangle measure 38° and 77°. What is the measure of the third angle?

A. 115°

B. 45°

C. 65°

D. 75°

29. What is the least common multiple of 6 and 9?

A. 3

B. 54

C. 15

D. 18

30. Solve for x in the equation $x/5 - 1 = 3$.

A. 10

B. 16

C. 20

D. 4

31. The mean of five values is 24. Four of them are 20, 28, 26, and 22. What is the fifth value?

A. 24

B. 22

C. 26

D. 20

32. Factor the expression $12x^2 + 8x$ completely.

A. $4(3x^2 + 2x)$

B. $4x(3x + 2)$

C. $2x(6x + 4)$

D. $4x^2(3 + 2)$

33. Express 9/25 as a percentage.

A. 9%

B. 25%

C. 36%

D. 18%

34. An arithmetic sequence has a first term of 7 and a common difference of 3. What is the 6th term?

A. 18

B. 22

C. 25

D. 21

35. A cone has a radius of 6 cm and a height of 5 cm. What is its volume, expressed in terms of π? ($V = (1/3)\pi r^2 h$.)

A. 180π cm^3

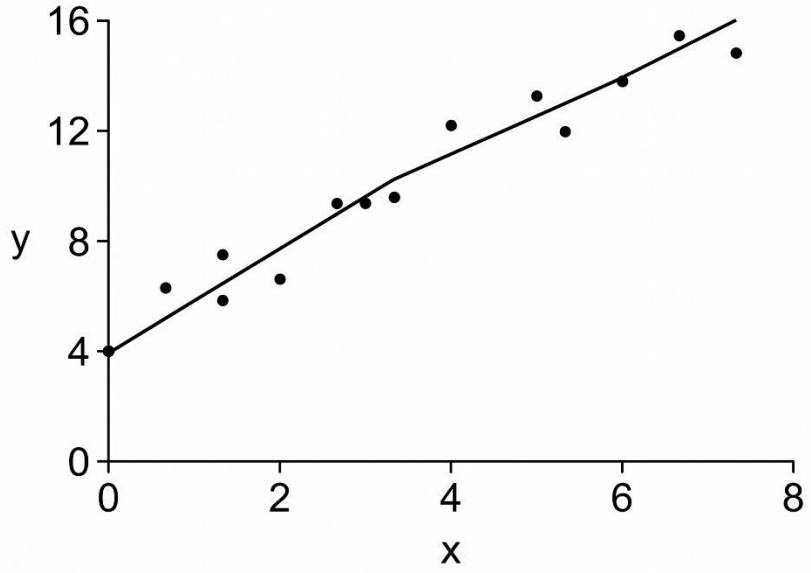
B. 30π cm^3

C. 90π cm^3

D. 60π cm^3

36. Look at the scatter plot below with its line of best fit. What is the equation of the line?

[Figure PQ-2] [Figure PQ-2]



A. y = 2x + 4

B. y = 4x + 2

C. y = x + 4

D. y = 2x − 4

37. Solve for x in the equation 3(x − 2) + 2x = 19.

A. 5

B. 3

C. 6

D. 2.6

38. A $400 appliance has 13% HST added. What is the total cost?

A. $413.00

B. $400.13

C. $452.00

D. $520.00

39. Evaluate the expression $|-6| + |-10| - |8|$.

A. 4

B. 8

C. 24

D. −4

40. A relation has 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. 33

B. 36

C. 42

D. 39

41. A bag has 5 red, 4 blue, and 3 green marbles. What is the probability of drawing a blue marble?

A. 4/8

B. 1/3

C. 1/4

D. 4/15

42. Expand the product $(2x - 5)(2x + 5)$.

A. $4x^2 + 25$

B. $4x^2 - 20x - 25$

C. $4x^2 - 25$

D. $2x^2 - 25$

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

A. 49 cm^2

B. 343 cm^2

C. 196 cm^2

D. 294 cm^2

44. A sum of $420 is shared in the ratio 3 : 4. What is the larger share?

A. $240

B. $180

C. $300

D. $210

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

A. $(-4, -2)$

B. $(4, 2)$

C. $(-4, 2)$

D. $(4, -2)$

46. The probability of an event occurring is 0.7. What is the probability that it does not occur?

A. 0.7

B. 0.3

C. 0.5

D. 1.7

47. A 6-pack of water costs $3.60 and a 24-pack costs $12.00. Which is the better value, and what is its unit price?

A. 24-pack, at $0.50 each

B. 6-pack, at $0.60 each

C. 24-pack, at $0.60 each

D. both cost the same per unit

48. A ramp rises 5 m over a horizontal distance of 12 m. What is the length of the ramp surface?

A. 7 m

B. 17 m

C. 13 m

D. 60 m

49. A monthly income of $3,000 allocates 45% to rent, 25% to food, 20% to other expenses, and the rest to savings. How much is saved?

A. $450

B. $600

C. $300

D. $150

50. Evaluate the expression $(15 - 3) \div 4 + 2 \times 5$.

A. 7

B. 13

C. 18

D. 11

Practice Exam 13: Answer Key and Full Explanations

1. C — Distribute: $2(x + 5) = 2x + 10$, so $2x + 10 - 3 = 17$, or $2x + 7 = 17$. Subtracting 7 and dividing by 2 gives $x = 5$. Expanding the bracket before collecting terms keeps the steps clear.

2. D — A power means repeated multiplication: $2^5 = 2 \times 2 \times 2 \times 2 \times 2 = 32$. The exponent counts how many times the base is multiplied.

3. B — The hypotenuse is found with the Pythagorean theorem: $\sqrt{(9^2 + 12^2)} = \sqrt{(81 + 144)} = \sqrt{225} = 15$ cm. This is the 9-12-15 right-triangle relationship.

4. A — The mean is the sum divided by the count: $(12 + 15 + 18 + 21 + 24) \div 5 = 90 \div 5 = 18$. Adding all values before dividing gives the average.

5. D — Multiply both sides by 4: $3x = 36$. Dividing by 3 gives $x = 12$. Clearing the denominator first simplifies the equation.

6. B — Simple interest is $I = Prt = 6{,}000 \times 0.05 \times 2 = \$600$. Each factor multiplies directly, with no compounding.

7. C — Substitute $x = 3$ into $f(x) = 2x^2 + x - 5$: $2(9) + 3 - 5 = 18 + 3 - 5 = 16$. The squared term is evaluated before adding the others.

8. A — A negative exponent gives the reciprocal of the positive power: $10^{-3} = 1/10^3 = 1/1000 = 0.001$. The result is a small positive value, not a negative one.

9. B — Area of a triangle is one-half base times height: $(1/2)(16)(5) = (1/2)(80) = 40$ cm². The one-half factor distinguishes a triangle from a rectangle of the same base and height.

10. A — Slope is the change in y over the change in x: $(14 - 2)/(7 - 3) = 12/4 = 3$. The rise divided by the run gives the constant rate.

11. D — The point sits 4 units right of the origin (positive x) and 3 units below it (negative y), so its coordinates are $(4, -3)$. The x-coordinate is read first, then the y-coordinate.

12. C — Distribute both brackets: $4(2x - 3) = 8x - 12$ and $3(x + 2) = 3x + 6$. Combining: $8x + 3x - 12 + 6 = 11x - 6$. Like terms are gathered after expanding.

13. A — Apply order of operations: $4 \times 3 = 12$ and $2^2 = 4$. Working left to right: $18 - 12 + 4 = 10$. Multiplication and the exponent come before the addition and subtraction.

14. D — Cross-multiply the proportion: $12x = 8 \times 9 = 72$, so $x = 6$. Cross-multiplication converts the proportion into a solvable equation.

15. B — Volume of a box is length × width × height: $7 \times 4 \times 5 = 140$ cm³. All three dimensions multiply together.

16. C — Adding a 20% tip means paying 120% of the bill: $80 \times 1.20 = \$96$. Multiplying by 1 plus the tip rate combines the bill and tip in one step.

17. D — Apply FOIL: $x \cdot x = x^2$, $x \cdot (-6) = -6x$, $3 \cdot x = 3x$, $3 \cdot (-6) = -18$. Combining: $x^2 - 6x + 3x - 18 = x^2 - 3x - 18$.

18. A — Order the values: 8, 11, 14, 17, 22. With five values, the median is the middle (third) value, 14. The data must be sorted before locating the centre.

19. C — Scientific notation needs a value between 1 and 10 times a power of ten. Moving the decimal four places right to reach 8.2 means the exponent is −4, giving 8.2×10^{-4}. Small numbers take a negative exponent.

20. B — Subtract 4x from both sides: $2x - 5 < 7$. Adding 5 gives $2x < 12$, so $x < 6$. No division by a negative occurs, so the inequality direction stays the same.

21. B — Substitute into $C = 2\pi r$: $2 \times 3.14 \times 7 = 43.96 \approx 44$ cm. The circumference uses the radius doubled and multiplied by π.

22. C — Subtract u from both sides: $v - u = at$. Dividing by a isolates t: $t = (v - u)/a$. Each step undoes an operation applied to t.

23. A — The range is the maximum minus the minimum: $50 - 12 = 38$. The range measures the full spread of the data.

24. D — Convert the percent to a decimal and multiply: $0.15 \times 320 = 48$. Finding a percent of a number is a single multiplication.

25. B — Subtracting the second equation from the first eliminates y: $(3x + y) - (x + y) = 17 - 7$, giving $2x = 10$, so $x = 5$. The matching y-terms cancel.

26. D — Compound interest uses $A = P(1 + r)^n$: $4{,}000(1.05)^2 = 4{,}000 \times 1.1025 = \$4{,}410.00$. The exponent of 2 reflects interest compounding in each of the two years.

27. A — Translate into $3n + 7 = 28$. Subtracting 7 gives $3n = 21$, so $n = 7$. "Seven more than three times" means the addition follows the tripling.

28. C — The three interior angles of a triangle sum to 180°. Subtracting the two known angles: $180 - 38 - 77 = 65°$. This angle-sum property holds for every triangle.

29. D — The least common multiple is the smallest number divisible by both. Multiples of 9 are 9, 18, and 18 is the first also divisible by 6, so the LCM is 18. The LCM is at least as large as the bigger number.

30. C — Add 1 to both sides: $x/5 = 4$. Multiplying by 5 gives $x = 20$. The constant is removed before clearing the denominator.

31. A — The five values sum to $5 \times 24 = 120$. The four known values total $20 + 28 + 26 + 22 = 96$, so the fifth is $120 - 96 = 24$. Finding the total from the mean is the key step.

32. B — The greatest common factor of $12x^2$ and $8x$ is $4x$. Dividing each term by $4x$ gives $4x(3x + 2)$. Factoring out the highest common factor yields the complete factorisation.

33. C — Convert the fraction to a decimal then a percent: $9 \div 25 = 0.36 = 36\%$. Dividing the numerator by the denominator gives the decimal form.

34. B — The nth term is $t_n = t_1 + (n - 1)d$: $7 + (6 - 1)(3) = 7 + 15 = 22$. The common difference is added five times to reach the sixth term.

35. D — Substitute into $V = (1/3)\pi r^2 h$: $(1/3)\pi(6^2)(5) = (1/3)\pi(180) = 60\pi$ cm³. The radius is squared before applying the one-third factor.

36. A — The line passes through (0, 4), giving a y-intercept of 4, and the slope is $(12 - 4)/(4 - 0) = 2$. So the equation is $y = 2x + 4$. The intercept supplies b and the two points give the slope.

37. A — Distribute and combine: $3(x - 2) + 2x = 3x - 6 + 2x = 5x - 6$. Setting $5x - 6 = 19$ gives $5x = 25$, so $x = 5$. Like terms are collected before solving.

38. C — Adding 13% tax means paying 113% of the price: $400 \times 1.13 = \$452$. Multiplying by 1 plus the tax rate combines the price and tax in one step.

39. B — Absolute value gives distance from zero: $|-6| = 6$, $|-10| = 10$, $|8| = 8$. Then $6 + 10 - 8 = 8$. The bars are evaluated before the addition and subtraction.

40. D — 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. B — There are 4 blue marbles out of $5 + 4 + 3 = 12$ total, giving $4/12 = 1/3$. The total must include marbles of all colours.

42. C — This is a difference of squares: $(2x - 5)(2x + 5) = (2x)^2 - 5^2 = 4x^2 - 25$. The middle terms cancel because they are opposites.

43. D — 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 6.

44. A — The ratio 3 : 4 has 3 + 4 = 7 parts. The larger share is 4/7 of $420: (4/7) × 420 = $240. Finding the value of all parts is implicit in taking the fraction.

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

46. B — The probabilities of an event and its complement sum to 1: 1 − 0.7 = 0.3. The two cases cover every possibility, so they total 1.

47. A — Compare unit prices. The 6-pack: $3.60 ÷ 6 = $0.60 each. The 24-pack: $12.00 ÷ 24 = $0.50 each. The 24-pack is cheaper per unit, making it the better value.

48. C — The ramp surface is the hypotenuse of a right triangle with legs 5 m and 12 m: $\sqrt{(5^2 + 12^2)} = \sqrt{(25 + 144)} = \sqrt{169} = 13$ m. This is the 5-12-13 right-triangle relationship.

49. C — Rent, food, and other expenses total 45% + 25% + 20% = 90%, leaving 10% for savings. Calculating 10% of $3,000: 0.10 × 3,000 = $300. Finding the leftover percentage first is the efficient route.

50. B — Apply order of operations: the bracket first, (15 − 3) = 12, then 12 ÷ 4 = 3 and 2 × 5 = 10. Finally 3 + 10 = 13. Division and multiplication are completed before the addition.