PRACTICE EXAM 12: 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 $4(x - 2) = 2x + 6$.

A. 7

B. 5

C. 4

D. 9

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

A. $6x^3$

B. $8x^3$

C. $2x^3$

D. $8x$

3. A right triangle has a hypotenuse of 17 cm and one leg of 8 cm. What is the length of the other leg?

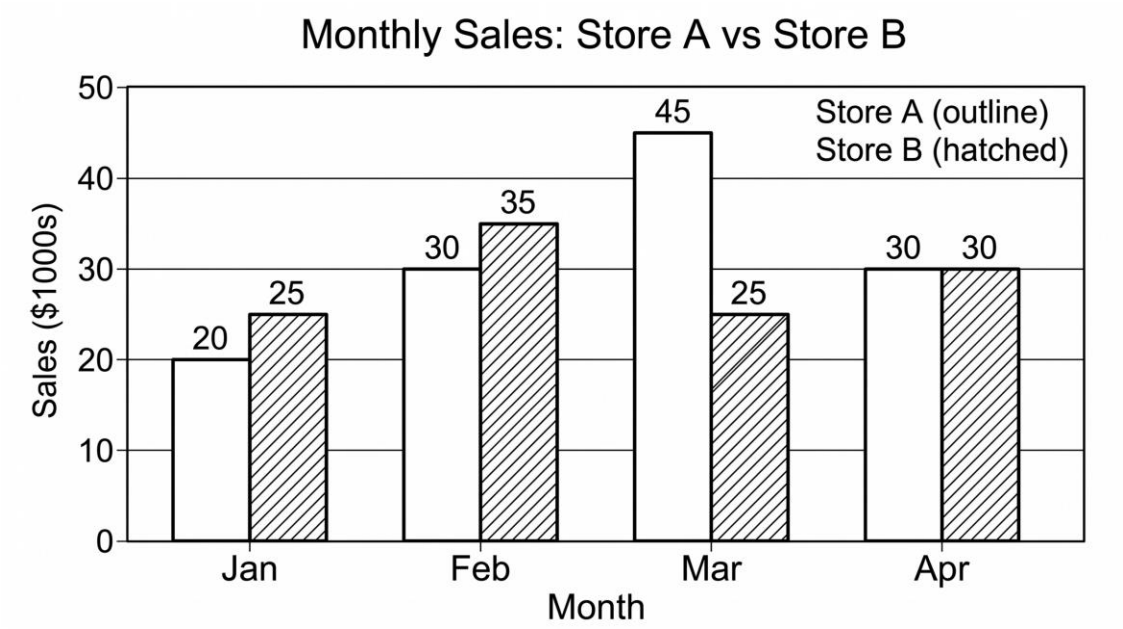
A. 9 cm

B. 25 cm

C. 12 cm

D. 15 cm

4. Look at the double bar graph below comparing two stores' monthly sales. In which month was the difference between the two stores greatest?



A. January

B. February

C. March

D. April

5. Solve for x in the equation (x)/3 + 1 = (x)/2 − 2.

A. 6

B. 9

C. 12

D. 18

6. A $120 jacket is 35% off. What is the sale price?

A. $78

B. $42

C. $85

D. $162

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

A. 2

B. 0

C. −4

D. 6

8. Evaluate the expression $3/4 - 1/3 + 1/6$.

A. 5/12

B. 7/12

C. 1/2

D. 11/12

9. A circle has a radius of 10 cm. What is its area, to the nearest whole number? ($A = \pi r^2$, use $\pi \approx 3.14$.)

A. 314 cm^2

B. 628 cm^2

C. 100 cm^2

D. 31.4 cm^2

10. Sara is 3 times as old as Tom. The sum of their ages is 32. How old is Sara?

A. 8

B. 12

C. 16

D. 24

11. A jar has 4 red, 6 green, and 10 blue marbles. What is the probability of drawing a green marble?

A. 6/10

B. 3/10

C. 1/3

D. 6/14

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

A. $5x + 3$

B. $7x + 13$

C. $5x + 13$

D. $5x - 1$

13. What is 60% of 250?

A. 100

B. 125

C. 200

D. 150

14. Solve the inequality $4x + 1 \geq 2x + 9$ for x.

A. $x \leq 4$

B. $x \geq 4$

C. $x \geq 5$

D. $x \leq 5$

15. A cylinder has a radius of 4 cm and a height of 6 cm. What is its volume, to the nearest whole number? ($V = \pi r^2 h$, use $\pi \approx 3.14$.)

A. 96 cm^3

B. 150 cm^3

C. 301 cm^3

D. 603 cm^3

16. A $5,000 investment earns 3% interest compounded annually. What is its value after 2 years?

A. $5,304.50

B. $5,300.00

C. $5,150.00

D. $5,309.00

17. Expand and simplify the product $(x + 2)(x + 7)$.

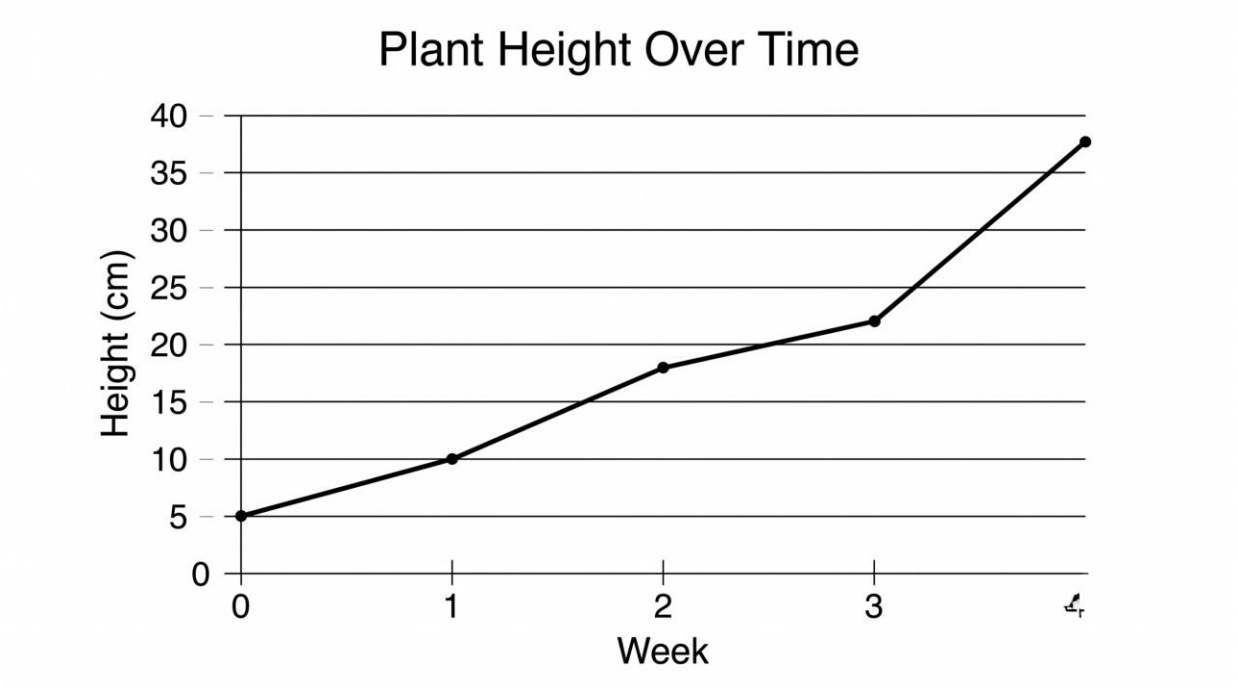
A. $x^2 + 14$

B. $x^2 + 9x + 14$

C. $x^2 + 5x + 14$

D. $x^2 + 9x + 9$

18. Look at the line graph below showing a plant's height over time. During which week did the plant grow the most?



A. Week 1

B. Week 2

C. Week 3

D. Week 4

19. Simplify the expression $(x^5 \cdot x^2) \div x^3$.

A. x^{10}

B. x^3

C. x^4

D. x^7

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

A. 2

B. 1/2

C. −2

D. 4

21. A cube has an edge length of 6 cm. What is its total surface area?

A. 216 cm^2

B. 36 cm^2

C. 144 cm^2

D. 432 cm^2

22. The area of a rectangle is given by A = lw. Rearranged to solve for w, the formula becomes:

A. w = Al

B. w = l/A

C. w = A − l

D. w = A/l

23. Find the median of the data set 32, 18, 27, 41, 15, 22, 30.

A. 30

B. 22

C. 27

D. 26.4

24. A blueprint uses a scale of 1 cm : 4 m. A wall is 6 cm long on the blueprint. What is the actual length of the wall?

A. 10 m

B. 24 m

C. 1.5 m

D. 18 m

25. Solve the system $2x + 3y = 18$ and $2x - y = 2$. What is the value of y?

A. 1

B. 2

C. 3

D. 4

26. A retailer buys a chair for $80 and applies a 45% markup. What is the selling price?

A. $116

B. $36

C. $125

D. $44

27. The length of a rectangle is twice its width, and the perimeter is 36 cm. What is the width?

A. 12 cm

B. 6 cm

C. 9 cm

D. 4 cm

28. Two supplementary angles are in the ratio 2 : 7. What is the measure of the larger angle?

A. 40°

B. 70°

C. 140°

D. 160°

29. What is the greatest common factor of 24 and 36?

A. 6

B. 4

C. 72

D. 12

30. Solve for x in the equation $3(2x - 1) = 5x + 4$.

A. 5

B. 7

C. −7

D. 1

31. The mean of six numbers is 15. Five of them are 10, 18, 12, 20, and 14. What is the sixth number?

A. 16

B. 14

C. 18

D. 15

32. Factor the trinomial $x^2 + 6x + 8$ completely.

A. $(x + 1)(x + 8)$

B. $(x - 2)(x - 4)$

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

D. $(x + 3)(x + 5)$

33. Express the number 56,000 in scientific notation.

A. 56×10^3

B. 5.6×10^3

C. 5.6×10^4

D. 5.6×10^5

34. A relation has the y-values 0, 3, 8, 15, 24 for x = 1, 2, 3, 4, 5. What is the value of y when x = 6?

A. 30

B. 32

C. 40

D. 35

35. A cone has a radius of 5 cm and a height of 9 cm. What is its volume, expressed in terms of π? ($V = (1/3)\pi r^2 h$.)

A. 225π cm³

B. 75π cm³

C. 45π cm³

D. 150π cm³

36. The probability of winning a game is 2/5. What is the probability of not winning?

A. 3/5

B. 2/5

C. 1/2

D. 5/2

37. Solve for x in the equation $5x - 2(x + 4) = 7$.

A. 1

B. 3

C. 2.5

D. 5

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

A. $263.00

B. $250.13

C. $282.50

D. $325.00

39. Evaluate the expression $|-9| - |4| + |-3|$.

A. 2

B. 8

C. 16

D. −2

40. The variable y varies directly with x. When x = 5, y = 35. What is the value of y when x = 8?

A. 56

B. 48

C. 40

D. 63

41. A data set is 50, 52, 48, 51, 5, 49. Which value is an outlier?

A. 50

B. 52

C. 5

D. 48

42. Expand the product $(x - 8)(x + 8)$.

A. $x^2 + 64$

B. $x^2 - 64$

C. $x^2 - 16x - 64$

D. $x^2 + 16x + 64$

43. An L-shaped figure is made by removing a 3 cm by 4 cm rectangle from the corner of a 10 cm by 8 cm rectangle. What is the area of the L-shape?

A. 92 cm^2

B. 80 cm^2

C. 12 cm^2

D. 68 cm^2

44. A price rises from $40 to $52. What is the percent increase?

A. 30%

B. 12%

C. 23%

D. 25%

45. What is the x-intercept of the line $y = 3x - 12$?

A. (4, 0)

B. (0, −12)

C. (−4, 0)

D. (12, 0)

46. A data set of house prices includes one mansion priced far above all the others. Which measure best represents a typical house price?

A. The mean

B. The range

C. The median

D. The maximum

47. Plan X charges a flat $40. Plan Y charges $10 plus $0.50 per GB. At how many GB do the two plans cost the same?

A. 20 GB

B. 30 GB

C. 80 GB

D. 60 GB

48. A 13 m wire runs from the top of a pole to a point 5 m from the base of the pole. How tall is the pole?

A. 8 m

B. 12 m

C. 18 m

D. 14 m

49. A $40,000 truck depreciates 25% in the first year and then 25% of the remaining value in the second year. What is its value at the end of 2 years?

A. $22,500

B. $20,000

C. $30,000

D. $10,000

50. Evaluate the expression $36 \div (2 + 4) \times 3 - 5$.

A. 7

B. 1

C. 13

D. 23

Practice Exam 12: Answer Key and Full Explanations

1. A — Distribute: $4(x - 2) = 4x - 8$, so $4x - 8 = 2x + 6$. Subtracting 2x and adding 8 gives $2x = 14$, so $x = 7$. Expanding the bracket before collecting terms keeps the work clear.

2. B — Raise both the coefficient and the variable to the power: $(2x)^3 = 2^3x^3 = 8x^3$. The exponent applies to everything inside the brackets, not just the variable.

3. D — Rearrange the Pythagorean theorem for a leg: $\sqrt{(17^2 - 8^2)} = \sqrt{(289 - 64)} = \sqrt{225} = 15$ cm. Subtracting before the square root is required when solving for a leg.

4. C — Compare each month's gap: Jan and Feb differ by 5, April by 0, but March shows 45 versus 25, a difference of 20. March has the greatest difference. Reading both bar heights per month gives the comparison.

5. D — Multiply every term by 6 to clear fractions: $2x + 6 = 3x - 12$. Subtracting 2x and adding 12 gives $18 = x$. The common denominator removes both fractions at once.

6. A — A 35% discount means paying 65% of the price: $120 \times 0.65 = \$78$. Multiplying by the retained percentage gives the sale price directly.

7. C — Substitute $x = -1$: $(-1)^2 + 3(-1) - 2 = 1 - 3 - 2 = -4$. The square of the negative is positive, but the middle term subtracts.

8. B — Use the common denominator 12: $9/12 - 4/12 + 2/12 = 7/12$. Converting all fractions to twelfths allows direct addition and subtraction.

9. A — Substitute into $A = \pi r^2$: $3.14 \times 10^2 = 3.14 \times 100 = 314$ cm². The radius is squared before multiplying by π.

10. D — Let Tom be t, so Sara is 3t. Their sum is $t + 3t = 32$, giving $4t = 32$ and $t = 8$. Sara is $3 \times 8 = 24$. Both ages are written in terms of one variable.

11. B — There are 6 green marbles out of $4 + 6 + 10 = 20$ total, giving $6/20 = 3/10$. The total must include marbles of all colours.

12. C — Distribute, watching the negative: $2(3x + 4) = 6x + 8$ and $-(x - 5) = -x + 5$. Combining: $6x - x + 8 + 5 = 5x + 13$. The subtraction sign changes both interior terms.

13. D — Convert the percent to a decimal and multiply: $0.60 \times 250 = 150$. Finding a percent of a number is a single multiplication.

14. B — Subtract 2x from both sides: $2x + 1 \geq 9$. Subtracting 1 and dividing by 2 gives $x \geq 4$. No division by a negative occurs, so the inequality direction stays the same.

15. C — Substitute into $V = \pi r^2 h$: $3.14 \times 4^2 \times 6 = 3.14 \times 16 \times 6 = 301.44 \approx 301$ cm³. The radius is squared before multiplying by the height.

16. A — Compound interest uses $A = P(1 + r)^n$: $5{,}000(1.03)^2 = 5{,}000 \times 1.0609 = \$5{,}304.50$. The exponent of 2 reflects interest compounding in each of the two years.

17. B — Apply FOIL: $x \cdot x = x^2$, $x \cdot 7 = 7x$, $2 \cdot x = 2x$, $2 \cdot 7 = 14$. Combining: $x^2 + 7x + 2x + 14 = x^2 + 9x + 14$.

18. D — Calculate each week's growth: Week 1 gains 5, Week 2 gains 8, Week 3 gains 4, and Week 4 jumps from 22 to 38, a gain of 16. Week 4 shows the most growth — the steepest rise on the graph.

19. C — Apply the product rule first: $x^5 \cdot x^2 = x^7$, then the quotient rule: $x^7 \div x^3 = x^4$. Multiplying adds exponents while dividing subtracts.

20. A — Slope is the change in y over the change in x: $(9 - 1)/(2 - (-2)) = 8/4 = 2$. The denominator subtracts a negative, becoming addition.

21. A — A cube has six identical square faces, so $SA = 6s^2 = 6(6^2) = 6(36) = 216$ cm². Each face area is squared before multiplying by 6.

22. D — Divide both sides of $A = lw$ by l to isolate w: $w = A/l$. Dividing by the length reverses the multiplication.

23. C — Order the values: 15, 18, 22, 27, 30, 32, 41. With seven values, the median is the middle (fourth) value, 27. The data must be sorted before locating the centre.

24. B — Each centimetre represents 4 m, so multiply the blueprint length by the scale: $6 \times 4 = 24$ m. The scale factor converts drawing distance to real distance.

25. D — Subtracting the second equation from the first eliminates x: $(2x + 3y) - (2x - y) = 18 - 2$, giving $4y = 16$, so $y = 4$. Equal x-coefficients allow elimination by subtraction.

26. A — A 45% markup means the price is 145% of cost: $80 \times 1.45 = \$116$. Multiplying by 1 plus the markup rate adds the profit in one step.

27. B — Let the width be w, so the length is 2w. The perimeter is $2(2w) + 2w = 6w = 36$, giving $w = 6$ cm. Both dimensions are written in terms of one variable.

28. C — Supplementary angles sum to 180°. With the ratio 2 : 7: $2x + 7x = 180$, so $9x = 180$ and $x = 20$. The larger angle is $7 \times 20 = 140°$.

29. D — Factor into primes: $24 = 2^3 \times 3$ and $36 = 2^2 \times 3^2$. The GCF takes the lowest power of each shared prime: $2^2 \times 3 = 12$. Using the smaller exponent of each common factor gives the greatest common factor.

30. B — Expand the left side: $3(2x - 1) = 6x - 3$. Setting $6x - 3 = 5x + 4$, subtract 5x and add 3 to get $x = 7$. Collecting variables on one side isolates the unknown.

31. A — The six numbers sum to $6 \times 15 = 90$. The five known values total $10 + 18 + 12 + 20 + 14 = 74$, so the sixth is $90 - 74 = 16$. Finding the total from the mean is the key step.

32. C — Find two numbers that multiply to 8 and add to 6: those are 2 and 4. The factored form is $(x + 2)(x + 4)$. Checking by expansion confirms the middle term 6x.

33. C — Scientific notation needs a value between 1 and 10 times a power of ten. Moving the decimal four places left gives 5.6×10^4. The exponent equals the number of places moved.

34. 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 24 + 11 = 35. The pattern follows $y = x^2 - 1$.

35. B — Substitute into $V = (1/3)\pi r^2 h$: $(1/3)\pi(5^2)(9) = (1/3)\pi(225) = 75\pi$ cm³. The radius is squared before applying the one-third factor.

36. A — The probabilities of an event and its complement sum to 1: 1 − 2/5 = 3/5. Not winning covers every outcome other than the 2/5 chance of winning.

37. D — Distribute and combine: 5x − 2(x + 4) = 5x − 2x − 8 = 3x − 8. Setting 3x − 8 = 7 gives 3x = 15, so x = 5. The negative multiplier changes both interior terms.

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

39. B — Absolute value gives distance from zero: |−9| = 9, |4| = 4, |−3| = 3. Then 9 − 4 + 3 = 8. The bars are evaluated before the addition and subtraction.

40. A — Direct variation means y = kx. Finding the constant: k = 35 ÷ 5 = 7. Then y = 7 × 8 = 56. The constant of proportionality stays fixed across all value pairs.

41. C — An outlier is a value far from the rest of the data. The values cluster near 50, but 5 sits far below them, making it the outlier. Distance from the main group identifies an outlier.

42. B — This is a difference of squares: $(x - 8)(x + 8) = x^2 - 8^2 = x^2 - 64$. The middle terms cancel because they are opposites.

43. D — The full rectangle has area 10 × 8 = 80 cm². The removed piece is 3 × 4 = 12 cm². The L-shape area is 80 − 12 = 68 cm². The cut-out is subtracted from the whole.

44. A — Percent increase compares the change to the original: the increase is 52 − 40 = 12, and 12 ÷ 40 = 0.30 = 30%. The original value, not the new value, is the base.

45. A — The x-intercept occurs where y = 0: 0 = 3x − 12, so 3x = 12 and x = 4, giving (4, 0). The x-intercept always has a y-coordinate of zero.

46. C — The median is resistant to extreme values, while the single very high mansion price inflates the mean far above a typical home. Because most prices cluster together, the median best represents a typical house. Skewed data with an outlier favours the median.

47. D — Set the plan costs equal: 40 = 10 + 0.50g. Subtracting 10 gives 30 = 0.50g, so g = 60 GB. At this usage the two plans charge the same total.

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

49. A — Each year the value retains 75% (losing 25%). Year 1: 40,000 × 0.75 = 30,000. Year 2: 30,000 × 0.75 = $22,500. The reduction is applied to the remaining value each year.

50. C — Apply order of operations: the bracket first, (2 + 4) = 6, then 36 ÷ 6 = 6 and 6 × 3 = 18. Finally 18 − 5 = 13. Division and multiplication are done left to right before the subtraction.