

PRACTICE EXAM 14: 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 $5x - 8 = 2x + 13$.

- A. 3
- B. 4
- C. 5
- D. 7

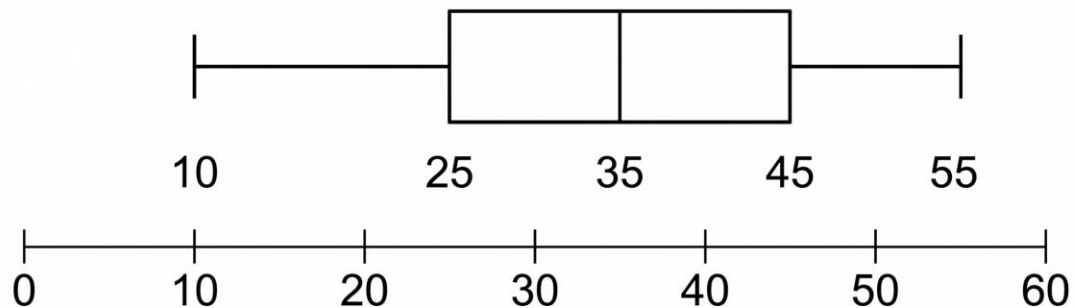
2. Simplify the expression $(m^3)^4$.

- A. m^{12}
- B. m^7
- C. m^{64}
- D. m^1

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. 24 cm
- C. 28 cm
- D. 36 cm

4. Look at the box-and-whisker plot below. What is the interquartile range (IQR) of the data?



- A. 35
- B. 45
- C. 20
- D. 30

5. Solve for x in the equation $(5x)/6 = 10$.

- A. 12
- B. 2
- C. 60
- D. 8.3

6. A \$150 coat is 40% off. What is the sale price?

- A. \$60
- B. \$110
- C. \$90
- D. \$210

7. Given the relation $f(x) = x^2 - 4x + 3$, what is the value of $f(5)$?

- A. 3
- B. 12
- C. 48
- D. 8

8. What is the value of 2^{-4} ?

- A. -16
- B. 1/16
- C. -8
- D. 1/8

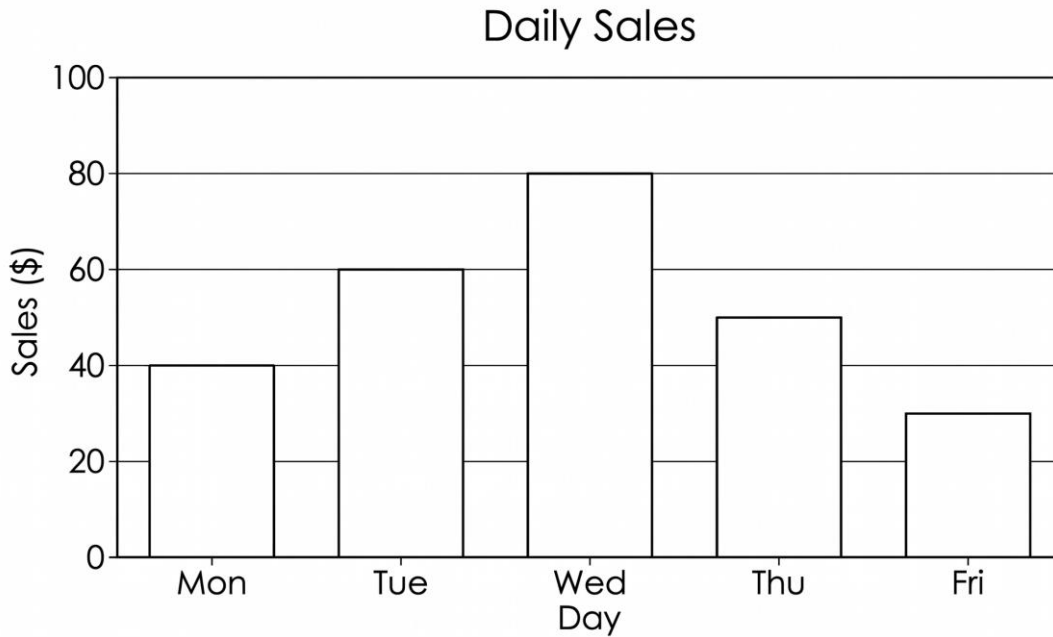
9. A circle has a radius of 8 cm. What is its area, to the nearest whole number? ($A = \pi r^2$, use $\pi \approx 3.14$.)

- A. 50 cm²
- B. 100 cm²
- C. 201 cm²
- D. 402 cm²

10. What is the slope of the line passing through the points $(-1, 6)$ and $(3, -2)$?

- A. 2
- B. -2
- C. $-1/2$
- D. 4

11. Look at the bar graph below showing daily sales. What were the total sales for Monday and Friday combined?



- A. \$40
- B. \$30
- C. \$100
- D. \$70

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

- A. $x - 4$

- B. $x + 4$
- C. $9x - 16$
- D. $x - 16$

13. Evaluate the expression $30 \div 5 + 2 \times 3^2$.

- A. 36
- B. 12
- C. 54
- D. 24

14. Solve for x in the proportion $6/9 = x/15$.

- A. 6
- B. 9
- C. 10
- D. 12

15. A box measures 9 cm by 3 cm by 6 cm. What is its volume?

- A. 162 cm^3
- B. 18 cm^3
- C. 54 cm^3
- D. 108 cm^3

16. What is the simple interest on \$8,000 at 4% per year for 3 years? ($I = \text{Prt.}$)

- A. \$320

- B. \$960
- C. \$1,280
- D. \$640

17. Expand and simplify the product $(x - 4)(x + 9)$.

- A. $x^2 - 36$
- B. $x^2 - 5x - 36$
- C. $x^2 + 5x - 36$
- D. $x^2 + 13x - 36$

18. A data set is 5, 8, 8, 12, 15, 8, 20. What is the mode?

- A. 8
- B. 12
- C. 11
- D. 15

19. Express the number 720,000 in scientific notation.

- A. 72×10^4
- B. 7.2×10^5
- C. 7.2×10^4
- D. 7.2×10^6

20. Solve the inequality $7x + 2 \leq 4x + 17$ for x .

- A. $x \geq 5$

- B. $x \geq 6$
- C. $x \leq 6$
- D. $x \leq 5$

21. A cube has an edge length of 3 cm. What is its total surface area?

- A. 54 cm^2
- B. 27 cm^2
- C. 36 cm^2
- D. 18 cm^2

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

- A. $w = P - 2l$
- B. $w = 2P - l$
- C. $w = P/2 + l$
- D. $w = P/2 - l$

23. Find the median of the data set 19, 7, 25, 13, 30, 22, 16.

- A. 22
- B. 19
- C. 16
- D. 18.9

24. What is 24% of 150?

- A. 24

- B. 30
- C. 36
- D. 42

25. Solve the system $4x + y = 22$ and $2x + y = 12$. What is the value of x ?

- A. 3
- B. 4
- C. 5
- D. 6

26. A \$6,000 investment earns 4% interest compounded annually. What is its value after 2 years?

- A. \$6,480.00
- B. \$6,240.00
- C. \$6,500.00
- D. \$6,489.60

27. Four less than twice a number is 18. What is the number?

- A. 7
- B. 11
- C. 9
- D. 14

28. Two angles are supplementary, and one measures 125° . What is the measure of the other angle?

- A. 55°

- B. 65°
- C. 45°
- D. 35°

29. What is the greatest common factor of 30 and 45?

- A. 5
- B. 90
- C. 3
- D. 15

30. Solve for x in the equation $x/3 + 4 = 10$.

- A. 18
- B. 6
- C. 2
- D. 42

31. The mean of four numbers is 30. Three of them are 25, 35, and 28. What is the fourth number?

- A. 28
- B. 30
- C. 32
- D. 35

32. Factor the expression $18x^3 - 12x^2$ completely.

- A. $6x(3x^2 - 2x)$

B. $6x^2(3x - 2)$

C. $6x^3(3 - 2x)$

D. $3x^2(6x - 4)$

33. Express $\frac{3}{8}$ as a percentage.

A. 30%

B. 37.5%

C. 24%

D. 38%

34. An arithmetic sequence has a first term of 2 and a common difference of 6. What is the 7th term?

A. 36

B. 42

C. 38

D. 44

35. A cylinder has a radius of 2 cm and a height of 10 cm. What is its volume, to the nearest whole number?
($V = \pi r^2 h$, use $\pi \approx 3.14$.)

A. 126 cm^3

B. 63 cm^3

C. 251 cm^3

D. 40 cm^3

36. The probability of drawing a winning ticket is $\frac{1}{8}$. What is the probability of not drawing a winning ticket?

- A. $\frac{1}{8}$
- B. $\frac{1}{2}$
- C. $\frac{8}{7}$
- D. $\frac{7}{8}$

37. Solve for x in the equation $4x - 3(x - 2) = 11$.

- A. 5
- B. 3
- C. 17
- D. 2

38. A \$600 purchase has 13% HST added. What is the total cost?

- A. \$613.00
- B. \$678.00
- C. \$690.00
- D. \$780.00

39. Evaluate the expression $|-15| - |7| + |-2|$.

- A. 6
- B. 20
- C. 24
- D. 10

40. A relation has the y -values 2, 6, 12, 20, 30 for $x = 1, 2, 3, 4, 5$. What is the value of y when $x = 6$?

- A. 36
- B. 40
- C. 42
- D. 44

41. A spinner has 10 equal sections numbered 1 to 10. What is the probability of spinning a multiple of 3?

- A. $\frac{1}{3}$
- B. $\frac{3}{10}$
- C. $\frac{1}{10}$
- D. $\frac{4}{10}$

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

- A. $x^2 + 100$
- B. $x^2 - 20x - 100$
- C. $x^2 + 20x + 100$
- D. $x^2 - 100$

43. A ladder reaches 8 m up a wall with its base 6 m from the wall. How long is the ladder?

- A. 14 m
- B. 4 m
- C. 10 m
- D. 12 m

44. A sum of \$300 is shared in the ratio 2 : 3. What is the smaller share?

- A. \$120
- B. \$180
- C. \$100
- D. \$150

45. The parabola $y = (x + 5)^2 + 1$ has its vertex at which point?

- A. (5, 1)
- B. (-5, 1)
- C. (5, -1)
- D. (-5, -1)

46. A data set is 102, 98, 100, 5, 101, 99. Which value is an outlier?

- A. 102
- B. 98
- C. 5
- D. 100

47. An 8-pack of yogurt costs \$4.00 and a 12-pack costs \$5.40. Which is the better value, and what is its unit price?

- A. 8-pack, at \$0.50 each
- B. 8-pack, at \$0.45 each
- C. 12-pack, at \$0.50 each
- D. 12-pack, at \$0.45 each

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

- A. 50 cm^2
- B. 100 cm^2
- C. 60 cm^2
- D. 40 cm^2

49. A monthly income of \$2,500 allocates 50% to rent, 20% to food, 20% to transport, and the rest to savings. How much is saved?

- A. \$250
- B. \$500
- C. \$125
- D. \$375

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

- A. 24
- B. 16
- C. 20
- D. 8

Practice Exam 14: Answer Key and Full Explanations

1. D — Collect variables on one side: subtracting $2x$ and adding 8 gives $3x = 21$, so $x = 7$. Moving terms across the equals sign reverses their operation.

2. A — The power-of-a-power rule multiplies the exponents: $(m^3)^4 = m^{3 \times 4} = m^{12}$. Raising a power to a power multiplies, while multiplying like bases would add.

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

4. C — The interquartile range is the third quartile minus the first quartile: $45 - 25 = 20$. The IQR measures the spread of the middle half of the data, using only the box edges.

- 5. A** — Multiply both sides by 6: $5x = 60$. Dividing by 5 gives $x = 12$. Clearing the denominator first simplifies the equation.
- 6. C** — A 40% discount means paying 60% of the price: $150 \times 0.60 = \$90$. Multiplying by the retained percentage gives the sale price directly.
- 7. D** — Substitute $x = 5$ into $f(x) = x^2 - 4x + 3$: $25 - 20 + 3 = 8$. The squared term is evaluated before the other operations.
- 8. B** — A negative exponent gives the reciprocal of the positive power: $2^{-4} = 1/2^4 = 1/16$. The result is a positive fraction, not a negative number.
- 9. C** — Substitute into $A = \pi r^2$: $3.14 \times 8^2 = 3.14 \times 64 = 200.96 \approx 201 \text{ cm}^2$. The radius is squared before multiplying by π .
- 10. B** — Slope is the change in y over the change in x : $(-2 - 6)/(3 - (-1)) = -8/4 = -2$. The negative result means the line falls from left to right.
- 11. D** — Read each bar: Monday is 40 and Friday is 30. Their combined total is $40 + 30 = \$70$. Summing the two bar heights gives the answer.
- 12. A** — Distribute, watching the negative: $5(x - 2) = 5x - 10$ and $-2(2x - 3) = -4x + 6$. Combining: $5x - 4x - 10 + 6 = x - 4$. The subtraction sign changes both interior terms.
- 13. D** — Apply order of operations: $3^2 = 9$, then $30 \div 5 = 6$ and $2 \times 9 = 18$. Adding: $6 + 18 = 24$. The exponent and the multiplication/division come before the addition.
- 14. C** — Cross-multiply the proportion: $9x = 6 \times 15 = 90$, so $x = 10$. Cross-multiplication converts the proportion into a solvable equation.
- 15. A** — Volume of a box is length \times width \times height: $9 \times 3 \times 6 = 162 \text{ cm}^3$. All three dimensions multiply together.
- 16. B** — Simple interest is $I = Prt = 8,000 \times 0.04 \times 3 = \960 . Each factor multiplies directly, with no compounding.
- 17. C** — Apply FOIL: $x \cdot x = x^2$, $x \cdot 9 = 9x$, $-4 \cdot x = -4x$, $-4 \cdot 9 = -36$. Combining: $x^2 + 9x - 4x - 36 = x^2 + 5x - 36$.
- 18. A** — The mode is the most frequent value. The number 8 appears three times, more than any other value, so the mode is 8. The mode counts frequency, not size.
- 19. B** — Scientific notation needs a value between 1 and 10 times a power of ten. Moving the decimal five places left gives 7.2×10^5 . The exponent equals the number of places moved.

- 20. D** — Subtract $4x$ from both sides: $3x + 2 \leq 17$. Subtracting 2 and dividing by 3 gives $x \leq 5$. No division by a negative occurs, so the inequality direction stays the same.
- 21. A** — A cube has six identical square faces, so $SA = 6s^2 = 6(3^2) = 6(9) = 54 \text{ cm}^2$. Each face area is squared before multiplying by 6.
- 22. D** — Divide both sides of $P = 2(1 + w)$ by 2: $P/2 = 1 + w$. Subtracting 1 isolates w : $w = P/2 - 1$. Each step undoes an operation applied to w .
- 23. B** — Order the values: 7, 13, 16, 19, 22, 25, 30. With seven values, the median is the middle (fourth) value, 19. The data must be sorted before locating the centre.
- 24. C** — Convert the percent to a decimal and multiply: $0.24 \times 150 = 36$. Finding a percent of a number is a single multiplication.
- 25. C** — Subtracting the second equation from the first eliminates y : $(4x + y) - (2x + y) = 22 - 12$, giving $2x = 10$, so $x = 5$. The matching y -terms cancel.
- 26. D** — Compound interest uses $A = P(1 + r)^n$: $6,000(1.04)^2 = 6,000 \times 1.0816 = \$6,489.60$. The exponent of 2 reflects interest compounding in each of the two years.
- 27. B** — Translate into $2n - 4 = 18$. Adding 4 gives $2n = 22$, so $n = 11$. "Four less than twice a number" means the subtraction follows the doubling.
- 28. A** — Supplementary angles sum to 180° . Subtracting the known angle: $180 - 125 = 55^\circ$. The two angles together form a straight line.
- 29. D** — Factor into primes: $30 = 2 \times 3 \times 5$ and $45 = 3^2 \times 5$. The GCF takes the lowest power of each shared prime: $3 \times 5 = 15$. Using the smaller exponent of each common factor gives the greatest common factor.
- 30. A** — Subtract 4 from both sides: $x/3 = 6$. Multiplying by 3 gives $x = 18$. The constant is removed before clearing the denominator.
- 31. C** — The four numbers sum to $4 \times 30 = 120$. The three known values total $25 + 35 + 28 = 88$, so the fourth is $120 - 88 = 32$. Finding the total from the mean is the key step.
- 32. B** — The greatest common factor of $18x^3$ and $12x^2$ is $6x^2$. Dividing each term by $6x^2$ gives $6x^2(3x - 2)$. Factoring out the highest common factor yields the complete factorisation.
- 33. B** — Convert the fraction to a decimal then a percent: $3 \div 8 = 0.375 = 37.5\%$. Dividing the numerator by the denominator gives the decimal form.
- 34. C** — The n th term is $t_n = t_1 + (n - 1)d$: $2 + (7 - 1)(6) = 2 + 36 = 38$. The common difference is added six times to reach the seventh term.

- 35. A** — Substitute into $V = \pi r^2 h$: $3.14 \times 2^2 \times 10 = 3.14 \times 4 \times 10 = 125.6 \approx 126 \text{ cm}^3$. The radius is squared before multiplying by the height.
- 36. D** — The probabilities of an event and its complement sum to 1: $1 - 1/8 = 7/8$. Not winning covers every outcome other than the $1/8$ chance of winning.
- 37. A** — Distribute and combine: $4x - 3(x - 2) = 4x - 3x + 6 = x + 6$. Setting $x + 6 = 11$ gives $x = 5$. The negative multiplier changes both interior terms.
- 38. B** — Adding 13% tax means paying 113% of the price: $600 \times 1.13 = \$678$. Multiplying by 1 plus the tax rate combines the price and tax in one step.
- 39. D** — Absolute value gives distance from zero: $|-15| = 15$, $|7| = 7$, $|-2| = 2$. Then $15 - 7 + 2 = 10$. The bars are evaluated before the addition and subtraction.
- 40. C** — The first differences are 4, 6, 8, 10, increasing by 2, which signals a quadratic relation. The next difference is 12, so the value at $x = 6$ is $30 + 12 = 42$. The pattern follows $y = x^2 + x$.
- 41. B** — Multiples of 3 from 1 to 10 are 3, 6, and 9 — three favourable outcomes out of 10, giving $3/10$. Counting the qualifying numbers over the total gives the probability.
- 42. D** — 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. C** — The ladder is the hypotenuse of a right triangle with legs 8 m and 6 m: $\sqrt{(8^2 + 6^2)} = \sqrt{(64 + 36)} = \sqrt{100} = 10$ m. This is the 6-8-10 right-triangle relationship.
- 44. A** — The ratio 2 : 3 has $2 + 3 = 5$ parts. The smaller share is $2/5$ of \$300: $(2/5) \times 300 = \$120$. Finding the value of all parts is implicit in taking the fraction.
- 45. B** — In vertex form $y = (x - h)^2 + k$, the vertex is (h, k) . Here the bracket is $(x + 5)$, so $h = -5$, and $k = 1$, giving the vertex $(-5, 1)$. The sign inside the bracket is reversed when reading h .
- 46. C** — An outlier is a value far from the rest of the data. The values cluster near 100, but 5 sits far below them, making it the outlier. Distance from the main group identifies an outlier.
- 47. D** — Compare unit prices. The 8-pack: $\$4.00 \div 8 = \0.50 each. The 12-pack: $\$5.40 \div 12 = \0.45 each. The 12-pack is cheaper per unit, making it the better value.
- 48. A** — Substitute into the trapezoid area formula $A = (1/2)(a + b)h$: $(1/2)(8 + 12)(5) = (1/2)(20)(5) = 50 \text{ cm}^2$. The two parallel sides are averaged before multiplying by the height.
- 49. A** — Rent, food, and transport total $50\% + 20\% + 20\% = 90\%$, leaving 10% for savings. Calculating 10% of \$2,500: $0.10 \times 2,500 = \$250$. Finding the leftover percentage first is the efficient route.

50. D — Apply order of operations: the bracket first, $(12 \div 3) = 4$, then the exponent $4^2 = 16$ and the multiplication $4 \times 2 = 8$. Finally $16 - 8 = 8$. Brackets and exponents come before the multiplication and subtraction.