

PRACTICE EXAM 15: 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 $3x + 11 = 5x - 3$.

- A. 4
- B. 7
- C. 5
- D. 9

2. What is the value of 4^3 ?

- A. 12
- B. 16
- C. 81
- D. 64

3. A right triangle has legs measuring 6 cm and 8 cm. What is the length of the hypotenuse?

- A. 14 cm
- B. 12 cm
- C. 10 cm

D. 7 cm

4. Find the mean of the data set 22, 26, 30, 18, 24.

A. 24

B. 26

C. 22

D. 28

5. Solve for x in the equation $(4x)/3 = 12$.

A. 4

B. 16

C. 36

D. 9

6. A \$200 bicycle is 25% off. How much money is saved?

A. \$25

B. \$50

C. \$150

D. \$175

7. Given the relation $f(x) = x^2 + 2x - 1$, what is the value of $f(4)$?

A. 23

B. 15

C. 7

D. 25

8. What is the value of 3^{-2} ?

A. -9

B. -6

C. $1/9$

D. 9

9. A triangle has a base of 10 cm and a height of 7 cm. What is its area?

A. 70 cm^2

B. 17 cm^2

C. 35 cm^2

D. 48 cm^2

10. What is the slope of the line passing through the points (2, 3) and (6, 11)?

A. $1/2$

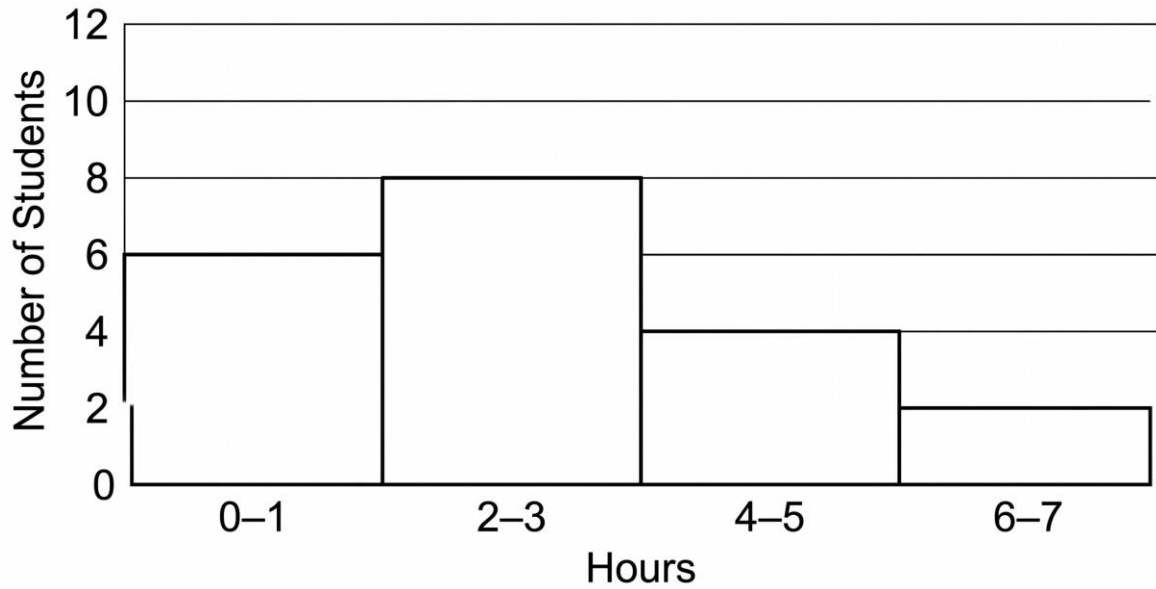
B. 2

C. 4

D. 8

11. Look at the histogram below showing the number of hours students studied. How many students studied fewer than 4 hours?

Study Hours



- A. 14
- B. 6
- C. 8
- D. 20

12. Simplify the expression $6(x + 2) - 3(x - 1)$.

- A. $3x + 9$
- B. $9x + 15$
- C. $3x - 15$
- D. $3x + 15$

13. Evaluate the expression $5^2 - 4 \times 3 + 6$.

- A. 27
- B. 33
- C. 19

D. 13

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

A. 6

B. 9

C. 12

D. 5.3

15. A box measures 6 cm by 5 cm by 4 cm. What is its volume?

A. 15 cm^3

B. 60 cm^3

C. 90 cm^3

D. 120 cm^3

16. What is the simple interest on \$3,000 at 6% per year for 2 years? ($I = \text{Pr}t$)

A. \$180

B. \$360

C. \$720

D. \$300

17. Expand and simplify the product $(x + 5)(x + 3)$.

A. $x^2 + 8x + 15$

B. $x^2 + 15$

C. $x^2 + 2x + 15$

D. $x^2 + 8x + 8$

18. Find the median of the data set 12, 19, 15, 23, 28, 16.

A. 16

B. 19

C. 18.8

D. 17.5

19. Express the number 0.00031 in scientific notation.

A. 3.1×10^4

B. 3.1×10^{-4}

C. 31×10^{-5}

D. 3.1×10^{-3}

20. Solve the inequality $8x - 3 > 5x + 9$ for x .

A. $x < 4$

B. $x < -4$

C. $x > 4$

D. $x > -4$

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

A. 28 cm

B. 254 cm

C. 18 cm

D. 57 cm

22. The area of a triangle is given by $A = (1/2)bh$. Rearranged to solve for b , the formula becomes:

A. $b = A/(2h)$

B. $b = 2A/h$

C. $b = Ah/2$

D. $b = 2Ah$

23. A data set is 33, 17, 42, 25, 50, 28. What is the range of the data set?

A. 25

B. 42

C. 33

D. 30.8

24. What is 18% of 350?

A. 63

B. 70

C. 54

D. 49

25. Solve the system $5x + 2y = 24$ and $5x - 2y = 16$. What is the value of x ?

A. 4

B. 2

C. 6

D. 8

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

A. \$2,240.00

B. \$2,120.00

C. \$2,247.20

D. \$2,260.00

27. Six more than four times a number is 38. What is the number?

A. 6

B. 8

C. 10

D. 11

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

A. 125°

B. 35°

C. 65°

D. 55°

29. What is the greatest common factor of 28 and 42?

A. 14

B. 7

C. 84

D. 2

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

A. 8

B. 12

C. 20

D. 5

31. The probability of rain is 0.4. What is the probability of no rain?

A. 0.4

B. 0.5

C. 1.4

D. 0.6

32. Factor the expression $20x^2 + 15x$ completely.

A. $5(4x^2 + 3x)$

B. $5x(4x + 3)$

C. $5x^2(4 + 3x)$

D. $4x(5x + 3)$

33. Express $13/20$ as a percentage.

A. 13%

B. 26%

C. 65%

D. 52%

34. An arithmetic sequence has a first term of 4 and a common difference of 5. What is the 9th term?

A. 40

B. 44

C. 45

D. 49

35. A cone has a radius of 3 cm and a height of 8 cm. What is its volume, expressed in terms of π ? ($V = (1/3)\pi r^2 h$.)

A. $72\pi \text{ cm}^3$

B. $12\pi \text{ cm}^3$

C. $48\pi \text{ cm}^3$

D. $24\pi \text{ cm}^3$

36. A data set is 3, 5, 5, 7, 9, 9, 11. What are the modes of this data set?

A. both 5 and 9

B. only the value 5

C. only the value 9

D. there is no mode

37. Solve for x in the equation $2(x + 4) + x = 20$.

A. 2

B. 3

C. 4

D. 6

38. A \$700 television has 13% HST added. What is the total cost?

A. \$713.00

B. \$700.13

C. \$810.00

D. \$791.00

39. Evaluate the expression $|-8| + |-5| - |6|$.

A. 7

B. 19

C. 9

D. -3

40. A relation has the y-values 3, 6, 11, 18, 27 for $x = 1, 2, 3, 4, 5$. What is the value of y when $x = 6$?

A. 36

B. 38

C. 40

D. 42

41. A bag has 6 red, 2 blue, and 4 yellow marbles. What is the probability of drawing a red marble?

A. $\frac{1}{4}$

B. $\frac{1}{3}$

C. $\frac{6}{24}$

D. $\frac{1}{2}$

42. Expand the product $(3x - 4)(3x + 4)$.

A. $9x^2 + 16$

B. $9x^2 - 24x - 16$

C. $9x^2 - 16$

D. $3x^2 - 16$

43. A cube has an edge length of 2 cm. What is its total surface area?

A. 24 cm^2

B. 8 cm^2

C. 12 cm^2

D. 16 cm^2

44. A sum of \$540 is shared in the ratio 5 : 4. What is the larger share?

A. \$240

B. \$300

C. \$270

D. \$216

45. The parabola $y = (x - 2)^2 - 7$ has its vertex at which point?

A. $(-2, -7)$

B. $(2, -7)$

C. $(2, 7)$

D. $(-2, 7)$

46. A data set is 200, 195, 198, 12, 202, 199. Which value is an outlier?

A. 12

B. 200

C. 195

D. 202

47. A 10-pack of pens costs \$4.50 and a 25-pack costs \$10.00. Which is the better value, and what is its unit price?

A. 10-pack, at \$0.45 each

B. 10-pack, at \$0.40 each

C. 25-pack, at \$0.40 each

D. 25-pack, at \$0.45 each

48. A rectangular field measures 40 m by 30 m. What is the length of the diagonal across the field?

A. 70 m

B. 35 m

C. 100 m

D. 50 m

49. A monthly income of \$5,000 allocates 30% to rent, 25% to food, 30% to other expenses, and the rest to savings. How much is saved?

A. \$500

B. \$750

- C. \$1,000
- D. \$600

50. Evaluate the expression $48 \div (4 + 2) + 3^2$.

- A. 11
- B. 13
- C. 17
- D. 25

Practice Exam 15: Answer Key and Full Explanations

- 1. B** — Collect variables on one side: subtracting $3x$ and adding 3 gives $14 = 2x$, so $x = 7$. Moving terms across the equals sign reverses their operation.
- 2. D** — A power means repeated multiplication: $4^3 = 4 \times 4 \times 4 = 64$. The exponent counts how many times the base is multiplied.
- 3. C** — The hypotenuse is found with the Pythagorean theorem: $\sqrt{(6^2 + 8^2)} = \sqrt{(36 + 64)} = \sqrt{100} = 10$ cm. This is the 6-8-10 right-triangle relationship.
- 4. A** — The mean is the sum divided by the count: $(22 + 26 + 30 + 18 + 24) \div 5 = 120 \div 5 = 24$. Adding all values before dividing gives the average.
- 5. D** — Multiply both sides by 3 : $4x = 36$. Dividing by 4 gives $x = 9$. Clearing the denominator first simplifies the equation.
- 6. B** — The saving is the discount percentage of the price: $0.25 \times 200 = \$50$. The question asks for the amount saved, not the final price.
- 7. A** — Substitute $x = 4$ into $f(x) = x^2 + 2x - 1$: $16 + 8 - 1 = 23$. The squared term is evaluated before the other operations.
- 8. C** — A negative exponent gives the reciprocal of the positive power: $3^{-2} = 1/3^2 = 1/9$. The result is a positive fraction, not a negative number.
- 9. C** — Area of a triangle is one-half base times height: $(1/2)(10)(7) = (1/2)(70) = 35$ cm². The one-half factor distinguishes a triangle from a rectangle of the same base and height.

- 10. B** — Slope is the change in y over the change in x : $(11 - 3)/(6 - 2) = 8/4 = 2$. The rise divided by the run gives the constant rate.
- 11. A** — Studying fewer than 4 hours covers the 0–1 interval (6 students) and the 2–3 interval (8 students). Adding: $6 + 8 = 14$ students. Histogram frequencies can be summed across intervals.
- 12. D** — Distribute, watching the negative: $6(x + 2) = 6x + 12$ and $-3(x - 1) = -3x + 3$. Combining: $6x - 3x + 12 + 3 = 3x + 15$. The subtraction sign changes both interior terms.
- 13. C** — Apply order of operations: $5^2 = 25$ and $4 \times 3 = 12$. Working left to right: $25 - 12 + 6 = 19$. The exponent and multiplication come before the addition and subtraction.
- 14. A** — Cross-multiply the proportion: $12x = 8 \times 9 = 72$, so $x = 6$. Cross-multiplication converts the proportion into a solvable equation.
- 15. D** — Volume of a box is length \times width \times height: $6 \times 5 \times 4 = 120 \text{ cm}^3$. All three dimensions multiply together.
- 16. B** — Simple interest is $I = Prt = 3,000 \times 0.06 \times 2 = \360 . Each factor multiplies directly, with no compounding.
- 17. A** — Apply FOIL: $x \cdot x = x^2$, $x \cdot 3 = 3x$, $5 \cdot x = 5x$, $5 \cdot 3 = 15$. Combining: $x^2 + 3x + 5x + 15 = x^2 + 8x + 15$.
- 18. D** — Order the values: 12, 15, 16, 19, 23, 28. With six values, the median is the average of the two middle values: $(16 + 19)/2 = 17.5$. An even-sized set has no single centre value.
- 19. B** — Scientific notation needs a value between 1 and 10 times a power of ten. Moving the decimal four places right to reach 3.1 means the exponent is -4 , giving 3.1×10^{-4} . Small numbers take a negative exponent.
- 20. C** — Subtract $5x$ from both sides: $3x - 3 > 9$. Adding 3 gives $3x > 12$, so $x > 4$. No division by a negative occurs, so the inequality direction stays the same.
- 21. D** — Substitute into $C = 2\pi r$: $2 \times 3.14 \times 9 = 56.52 \approx 57 \text{ cm}$. The circumference uses the radius doubled and multiplied by π .
- 22. B** — Multiply both sides of $A = (1/2)bh$ by 2: $2A = bh$. Dividing by h isolates b : $b = 2A/h$. Each step undoes an operation applied to b .
- 23. C** — The range is the maximum minus the minimum: $50 - 17 = 33$. The range measures the full spread of the data.
- 24. A** — Convert the percent to a decimal and multiply: $0.18 \times 350 = 63$. Finding a percent of a number is a single multiplication.

- 25. A** — Adding the two equations eliminates y : $(5x + 2y) + (5x - 2y) = 24 + 16$, giving $10x = 40$, so $x = 4$. The opposite y -terms cancel when added.
- 26. C** — Compound interest uses $A = P(1 + r)^n$: $2,000(1.06)^2 = 2,000 \times 1.1236 = \$2,247.20$. The exponent of 2 reflects interest compounding in each of the two years.
- 27. B** — Translate into $4n + 6 = 38$. Subtracting 6 gives $4n = 32$, so $n = 8$. "Six more than four times" means the addition follows the multiplication.
- 28. D** — The three interior angles of a triangle sum to 180° . Subtracting the two known angles: $180 - 52 - 73 = 55^\circ$. This angle-sum property holds for every triangle.
- 29. A** — Factor into primes: $28 = 2^2 \times 7$ and $42 = 2 \times 3 \times 7$. The GCF takes the lowest power of each shared prime: $2 \times 7 = 14$. Using the smaller exponent of each common factor gives the greatest common factor.
- 30. C** — Add 3 to both sides: $x/4 = 5$. Multiplying by 4 gives $x = 20$. The constant is removed before clearing the denominator.
- 31. D** — The probabilities of an event and its complement sum to 1: $1 - 0.4 = 0.6$. The two cases cover every possibility, so they total 1.
- 32. B** — The greatest common factor of $20x^2$ and $15x$ is $5x$. Dividing each term by $5x$ gives $5x(4x + 3)$. Factoring out the highest common factor yields the complete factorisation.
- 33. C** — Convert the fraction to a decimal then a percent: $13 \div 20 = 0.65 = 65\%$. Dividing the numerator by the denominator gives the decimal form.
- 34. B** — The n th term is $t_n = t_1 + (n - 1)d$: $4 + (9 - 1)(5) = 4 + 40 = 44$. The common difference is added eight times to reach the ninth term.
- 35. D** — Substitute into $V = (1/3)\pi r^2 h$: $(1/3)\pi(3^2)(8) = (1/3)\pi(72) = 24\pi \text{ cm}^3$. The radius is squared before applying the one-third factor.
- 36. A** — The mode is the most frequent value, and both 5 and 9 appear twice while all others appear once. A data set with two values tied for most frequent is bimodal, so the modes are 5 and 9.
- 37. C** — Distribute and combine: $2(x + 4) + x = 2x + 8 + x = 3x + 8$. Setting $3x + 8 = 20$ gives $3x = 12$, so $x = 4$. Like terms are collected before solving.
- 38. D** — Adding 13% tax means paying 113% of the price: $700 \times 1.13 = \$791$. Multiplying by 1 plus the tax rate combines the price and tax in one step.
- 39. A** — Absolute value gives distance from zero: $|-8| = 8$, $|-5| = 5$, $|6| = 6$. Then $8 + 5 - 6 = 7$. The bars are evaluated before the addition and subtraction.

- 40. B** — 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 $27 + 11 = 38$. The pattern follows $y = x^2 + 2$.
- 41. D** — There are 6 red marbles out of $6 + 2 + 4 = 12$ total, giving $6/12 = 1/2$. The total must include marbles of all colours, and the fraction is reduced.
- 42. C** — This is a difference of squares: $(3x - 4)(3x + 4) = (3x)^2 - 4^2 = 9x^2 - 16$. The middle terms cancel because they are opposites.
- 43. A** — A cube has six identical square faces, so $SA = 6s^2 = 6(2^2) = 6(4) = 24 \text{ cm}^2$. Each face area is squared before multiplying by 6.
- 44. B** — The ratio 5 : 4 has $5 + 4 = 9$ parts. The larger share is $5/9$ of \$540: $(5/9) \times 540 = \$300$. 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 $h = 2$ and $k = -7$, so the vertex is $(2, -7)$. The sign inside the bracket is reversed when reading h .
- 46. A** — An outlier is a value far from the rest of the data. The values cluster near 200, but 12 sits far below them, making it the outlier. Distance from the main group identifies an outlier.
- 47. C** — Compare unit prices. The 10-pack: $\$4.50 \div 10 = \0.45 each. The 25-pack: $\$10.00 \div 25 = \0.40 each. The 25-pack is cheaper per unit, making it the better value.
- 48. D** — The diagonal is the hypotenuse of a right triangle with legs 40 m and 30 m: $\sqrt{(40^2 + 30^2)} = \sqrt{(1,600 + 900)} = \sqrt{2,500} = 50 \text{ m}$. This is a scaled 3-4-5 right-triangle relationship.
- 49. B** — Rent, food, and other expenses total $30\% + 25\% + 30\% = 85\%$, leaving 15% for savings. Calculating 15% of \$5,000: $0.15 \times 5,000 = \$750$. Finding the leftover percentage first is the efficient route.
- 50. C** — Apply order of operations: the bracket first, $(4 + 2) = 6$, then $48 \div 6 = 8$ and the exponent $3^2 = 9$. Finally $8 + 9 = 17$. Brackets and division come before the addition.