

# PRACTICE EXAM 16: SIMULATION (50 QUESTIONS)

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**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  $4x + 6 = x + 21$ .

- A. 5
- B. 7
- C. 3
- D. 9

2. What is the value of  $5^3$ ?

- A. 15
- B. 25
- C. 125
- D. 75

3. A right triangle has a hypotenuse of 15 cm and one leg of 9 cm. What is the length of the other leg?

- A. 6 cm
- B. 18 cm
- C. 24 cm
- D. 12 cm

4. The probability of selecting a defective item is 0.05. What is the probability of selecting a non-defective item?

A. 0.05

B. 0.95

C. 0.50

D. 1.05

5. Solve for x in the equation  $(2x)/7 = 4$ .

A. 2

B. 7

C. 14

D. 28

6. A \$250 jacket is 20% off. What is the sale price?

A. \$200

B. \$50

C. \$230

D. \$300

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

A. 14

B. 6

C. 10

D. 18

8. What is the value of  $6^{-2}$ ?

- A.  $-36$
- B.  $-12$
- C.  $36$
- D.  $1/36$

9. A circle has a radius of 5 cm. What is its area, to the nearest whole number? ( $A = \pi r^2$ , use  $\pi \approx 3.14$ .)

- A.  $79 \text{ cm}^2$
- B.  $31 \text{ cm}^2$
- C.  $157 \text{ cm}^2$
- D.  $25 \text{ cm}^2$

10. What is the slope of the line passing through the points  $(1, -3)$  and  $(5, 9)$ ?

- A.  $1/3$
- B.  $12$
- C.  $-3$
- D.  $3$

11. Look at the line graph below showing a car's distance over time. What was the car's speed during the trip?



- A. 300 km/h
- B. 60 km/h
- C. 5 km/h
- D. 120 km/h

12. Simplify the expression  $3(2x - 5) + 4(x + 1)$ .

- A.  $10x + 11$
- B.  $6x - 11$
- C.  $10x - 11$
- D.  $10x - 19$

13. Evaluate the expression  $40 - 3^2 \times 2 + 5$ .

- A. 35
- B. 17
- C. 67
- D. 27

14. Solve for  $x$  in the proportion  $x/10 = 6/15$ .

- A. 4
- B. 9
- C. 25
- D. 2.5

15. A cylinder has a radius of 3 cm and a height of 7 cm. What is its volume, to the nearest whole number? ( $V = \pi r^2 h$ , use  $\pi \approx 3.14$ .)

- A.  $66 \text{ cm}^3$
- B.  $132 \text{ cm}^3$
- C.  $198 \text{ cm}^3$
- D.  $396 \text{ cm}^3$

16. What is the simple interest on \$5,000 at 3% per year for 4 years? ( $I = \text{Prt}$ .)

- A. \$150
- B. \$600
- C. \$1,200
- D. \$450

17. Expand and simplify the product  $(x - 2)(x + 8)$ .

- A.  $x^2 - 16$
- B.  $x^2 + 6x - 16$
- C.  $x^2 - 6x - 16$
- D.  $x^2 + 10x - 16$

18. Find the median of the data set 24, 18, 31, 27, 20.

- A. 27
- B. 20
- C. 24
- D. 24.4

19. Express the number 93,000 in scientific notation.

- A.  $93 \times 10^3$
- B.  $9.3 \times 10^3$
- C.  $9.3 \times 10^5$
- D.  $9.3 \times 10^4$

20. Solve the inequality  $9x - 4 < 6x + 11$  for  $x$ .

- A.  $x < 5$
- B.  $x > 5$
- C.  $x < -5$
- D.  $x > -5$

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

- A. 19 cm
- B. 113 cm
- C. 12 cm
- D. 38 cm

22. The formula  $d = rt$  gives distance in terms of rate and time. Rearranged to solve for  $r$ , the formula becomes:

- A.  $r = dt$
- B.  $r = d/t$
- C.  $r = t/d$
- D.  $r = d - t$

23. A data set is 14, 38, 22, 9, 45, 30. What is the range of the data set?

- A. 36
- B. 45
- C. 26.3
- D. 31

24. What is 22% of 400?

- A. 44
- B. 80
- C. 88
- D. 92

25. Solve the system  $3x + 2y = 19$  and  $3x - 2y = 5$ . What is the value of  $x$ ?

- A. 2
- B. 4
- C. 6
- D. 8

26. An \$8,000 investment earns 5% interest compounded annually. What is its value after 2 years?

- A. \$8,820.00
- B. \$8,800.00
- C. \$8,400.00
- D. \$8,840.00

27. Three more than five times a number is 43. What is the number?

- A. 6
- B. 7
- C. 8
- D. 9

28. Two angles are supplementary, and one measures  $108^\circ$ . What is the measure of the other angle?

- A.  $82^\circ$
- B.  $92^\circ$
- C.  $62^\circ$
- D.  $72^\circ$

29. What is the greatest common factor of 32 and 48?

- A. 8
- B. 96
- C. 16
- D. 4

30. Solve for  $x$  in the equation  $x/2 + 5 = 11$ .

- A. 8
- B. 12
- C. 3
- D. 32

31. The mean of five numbers is 18. Four of them are 12, 20, 15, and 22. What is the fifth number?

- A. 18
- B. 15
- C. 24
- D. 21

32. Solve for  $x$  in the equation  $3(x - 1) + 2(x + 2) = 16$ .

- A. 3
- B. 5
- C. 2
- D. 4

33. Express  $7/8$  as a percentage.

- A. 87.5%
- B. 78%
- C. 70%
- D. 88%

34. An arithmetic sequence has a first term of 1 and a common difference of 4. What is the 10th term?

- A. 36
- B. 37
- C. 40
- D. 41

35. A cone has a radius of 4 cm and a height of 6 cm. What is its volume, expressed in terms of  $\pi$ ? ( $V = (1/3)\pi r^2 h$ .)

- A.  $96\pi \text{ cm}^3$
- B.  $16\pi \text{ cm}^3$
- C.  $48\pi \text{ cm}^3$
- D.  $32\pi \text{ cm}^3$

36. A number is chosen at random from the integers 1 to 12. What is the probability that it is a multiple of 4?

- A.  $1/12$
- B.  $1/3$
- C.  $1/4$
- D.  $3/4$

37. If  $a = 5$  and  $b = 2$ , what is the value of the expression  $a^2 - b^3$ ?

- A. 17
- B. 21
- C. 33
- D. 23

38. A \$900 sofa has 13% HST added. What is the total cost?

- A. \$913.00
- B. \$900.13
- C. \$1,170.00
- D. \$1,017.00

39. Evaluate the expression  $|-11| - |-4| + |-1|$ .

- A. 6
- B. 14
- C. 8
- D. 16

40. A relation has the y-values 5, 8, 13, 20, 29 for  $x = 1, 2, 3, 4, 5$ . What is the value of y when  $x = 6$ ?

- A. 38
- B. 40
- C. 42
- D. 44

41. A data set is 60, 58, 62, 59, 5, 61. Which value is an outlier?

- A. 60
- B. 58
- C. 62
- D. 5

42. Expand the product  $(x - 9)(x + 9)$ .

- A.  $x^2 + 81$
- B.  $x^2 - 81$
- C.  $x^2 - 18x - 81$
- D.  $x^2 + 18x + 81$

43. A cube has an edge length of 5 cm. What is its total surface area?

- A.  $25 \text{ cm}^2$
- B.  $125 \text{ cm}^2$
- C.  $150 \text{ cm}^2$
- D.  $100 \text{ cm}^2$

44. A sum of \$450 is shared in the ratio 4 : 5. What is the smaller share?

- A. \$200
- B. \$250
- C. \$180
- D. \$225

45. The parabola  $y = (x + 1)^2 - 6$  has its vertex at which point?

- A. (1, -6)
- B. (-1, -6)
- C. (1, 6)
- D. (-1, 6)

46. A coin is flipped and a six-sided die is rolled. What is the probability of getting heads and a 3?

- A.  $\frac{1}{2}$
- B.  $\frac{1}{6}$
- C.  $\frac{1}{3}$
- D.  $\frac{1}{12}$

47. A 4-pack of soap costs \$6.00 and a 9-pack costs \$11.70. Which is the better value, and what is its unit price?

- A. 4-pack, at \$1.30 each
- B. 9-pack, at \$1.50 each
- C. 9-pack, at \$1.30 each
- D. both cost the same per unit

48. A kite string is 17 m long, and the kite is 8 m horizontally from the person flying it. How high is the kite? (Use the Pythagorean theorem.)

- A. 15 m
- B. 9 m
- C. 25 m
- D. 12 m

49. A monthly income of \$3,600 allocates 40% to rent, 20% to food, 25% to other expenses, and the rest to savings. How much is saved?

- A. \$540
- B. \$720
- C. \$360

D. \$900

50. Evaluate the expression  $5 \times (8 - 3) - 4^2$ .

A. 21

B. 41

C. 1

D. 9

## Practice Exam 16: Answer Key and Full Explanations

**1. A** — Collect variables on one side: subtracting  $x$  and 6 gives  $3x = 15$ , so  $x = 5$ . Moving terms across the equals sign reverses their operation.

**2. C** — A power means repeated multiplication:  $5^3 = 5 \times 5 \times 5 = 125$ . The exponent counts how many times the base is multiplied.

**3. D** — Rearrange the Pythagorean theorem for a leg:  $\sqrt{(15^2 - 9^2)} = \sqrt{(225 - 81)} = \sqrt{144} = 12$  cm. Subtracting before the square root is required when solving for a leg.

**4. B** — The probabilities of an event and its complement sum to 1:  $1 - 0.05 = 0.95$ . The two cases cover every possibility, so they total 1.

**5. C** — Multiply both sides by 7:  $2x = 28$ . Dividing by 2 gives  $x = 14$ . Clearing the denominator first simplifies the equation.

**6. A** — A 20% discount means paying 80% of the price:  $250 \times 0.80 = \$200$ . Multiplying by the retained percentage gives the sale price directly.

**7. B** — Substitute  $x = 2$  into  $f(x) = 2x^2 - 3x + 4$ :  $2(4) - 6 + 4 = 8 - 6 + 4 = 6$ . The squared term is evaluated before the other operations.

**8. D** — A negative exponent gives the reciprocal of the positive power:  $6^{-2} = 1/6^2 = 1/36$ . The result is a positive fraction, not a negative number.

**9. A** — Substitute into  $A = \pi r^2$ :  $3.14 \times 5^2 = 3.14 \times 25 = 78.5 \approx 79$  cm<sup>2</sup>. The radius is squared before multiplying by  $\pi$ .

**10. D** — Slope is the change in  $y$  over the change in  $x$ :  $(9 - (-3))/(5 - 1) = 12/4 = 3$ . The numerator subtracts a negative, becoming addition.

**11. B** — On a distance-time graph, speed is the slope. The line rises 300 km over 5 hours, so the speed is  $300 \div 5 = 60$  km/h. A straight line means a constant speed throughout.

**12. C** — Distribute both brackets:  $3(2x - 5) = 6x - 15$  and  $4(x + 1) = 4x + 4$ . Combining:  $6x + 4x - 15 + 4 = 10x - 11$ . Like terms are gathered after expanding.

**13. D** — Apply order of operations:  $3^2 = 9$ , then  $9 \times 2 = 18$ . Working left to right:  $40 - 18 + 5 = 27$ . The exponent and multiplication come before the addition and subtraction.

**14. A** — Cross-multiply the proportion:  $15x = 10 \times 6 = 60$ , so  $x = 4$ . Cross-multiplication converts the proportion into a solvable equation.

**15. C** — Substitute into  $V = \pi r^2 h$ :  $3.14 \times 3^2 \times 7 = 3.14 \times 9 \times 7 = 197.82 \approx 198$  cm<sup>3</sup>. The radius is squared before multiplying by the height.

**16. B** — Simple interest is  $I = Prt = 5,000 \times 0.03 \times 4 = \$600$ . Each factor multiplies directly, with no compounding.

**17. B** — Apply FOIL:  $x \cdot x = x^2$ ,  $x \cdot 8 = 8x$ ,  $-2 \cdot x = -2x$ ,  $-2 \cdot 8 = -16$ . Combining:  $x^2 + 8x - 2x - 16 = x^2 + 6x - 16$ .

**18. C** — Order the values: 18, 20, 24, 27, 31. With five values, the median is the middle (third) value, 24. The data must be sorted before locating the centre.

**19. D** — Scientific notation needs a value between 1 and 10 times a power of ten. Moving the decimal four places left gives  $9.3 \times 10^4$ . The exponent equals the number of places moved.

**20. A** — Subtract  $6x$  from both sides:  $3x - 4 < 11$ . Adding 4 gives  $3x < 15$ , so  $x < 5$ . No division by a negative occurs, so the inequality direction stays the same.

**21. D** — Substitute into  $C = 2\pi r$ :  $2 \times 3.14 \times 6 = 37.68 \approx 38$  cm. The circumference uses the radius doubled and multiplied by  $\pi$ .

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

**23. A** — The range is the maximum minus the minimum:  $45 - 9 = 36$ . The range measures the full spread of the data.

**24. C** — Convert the percent to a decimal and multiply:  $0.22 \times 400 = 88$ . Finding a percent of a number is a single multiplication.

**25. B** — Adding the two equations eliminates  $y$ :  $(3x + 2y) + (3x - 2y) = 19 + 5$ , giving  $6x = 24$ , so  $x = 4$ . The opposite  $y$ -terms cancel when added.

**26. A** — Compound interest uses  $A = P(1 + r)^n$ :  $8,000(1.05)^2 = 8,000 \times 1.1025 = \$8,820.00$ . The exponent of 2 reflects interest compounding in each of the two years.

- 27. C** — Translate into  $5n + 3 = 43$ . Subtracting 3 gives  $5n = 40$ , so  $n = 8$ . "Three more than five times" means the addition follows the multiplication.
- 28. D** — Supplementary angles sum to  $180^\circ$ . Subtracting the known angle:  $180 - 108 = 72^\circ$ . The two angles together form a straight line.
- 29. C** — Factor into primes:  $32 = 2^5$  and  $48 = 2^4 \times 3$ . The GCF takes the lowest power of the shared prime:  $2^4 = 16$ . Using the smaller exponent of each common factor gives the greatest common factor.
- 30. B** — Subtract 5 from both sides:  $x/2 = 6$ . Multiplying by 2 gives  $x = 12$ . The constant is removed before clearing the denominator.
- 31. D** — The five numbers sum to  $5 \times 18 = 90$ . The four known values total  $12 + 20 + 15 + 22 = 69$ , so the fifth is  $90 - 69 = 21$ . Finding the total from the mean is the key step.
- 32. A** — Distribute and combine:  $3(x - 1) + 2(x + 2) = 3x - 3 + 2x + 4 = 5x + 1$ . Setting  $5x + 1 = 16$  gives  $5x = 15$ , so  $x = 3$ . Like terms are collected before solving.
- 33. A** — Convert the fraction to a decimal then a percent:  $7 \div 8 = 0.875 = 87.5\%$ . Dividing the numerator by the denominator gives the decimal form.
- 34. B** — The  $n$ th term is  $t_n = t_1 + (n - 1)d$ :  $1 + (10 - 1)(4) = 1 + 36 = 37$ . The common difference is added nine times to reach the tenth term.
- 35. D** — Substitute into  $V = (1/3)\pi r^2 h$ :  $(1/3)\pi(4^2)(6) = (1/3)\pi(96) = 32\pi \text{ cm}^3$ . The radius is squared before applying the one-third factor.
- 36. C** — Multiples of 4 from 1 to 12 are 4, 8, and 12 — three favourable outcomes out of 12, giving  $3/12 = 1/4$ . The fraction is reduced to lowest terms.
- 37. A** — Substitute  $a = 5$  and  $b = 2$ :  $5^2 - 2^3 = 25 - 8 = 17$ . Both powers are evaluated before subtracting.
- 38. D** — Adding 13% tax means paying 113% of the price:  $900 \times 1.13 = \$1,017$ . Multiplying by 1 plus the tax rate combines the price and tax in one step.
- 39. C** — Absolute value gives distance from zero:  $|-11| = 11$ ,  $|-4| = 4$ ,  $|-1| = 1$ . Then  $11 - 4 + 1 = 8$ . 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  $29 + 11 = 40$ . The pattern follows  $y = x^2 + 4$ .
- 41. D** — An outlier is a value far from the rest of the data. The values cluster near 60, 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:  $(x - 9)(x + 9) = x^2 - 9^2 = x^2 - 81$ . The middle terms cancel because they are opposites.

- 43. C** — A cube has six identical square faces, so  $SA = 6s^2 = 6(5^2) = 6(25) = 150 \text{ cm}^2$ . Each face area is squared before multiplying by 6.
- 44. A** — The ratio 4 : 5 has  $4 + 5 = 9$  parts. The smaller share is  $\frac{4}{9}$  of \$450:  $(\frac{4}{9}) \times 450 = \$200$ . 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  $(x + 1)$ , so  $h = -1$ , and  $k = -6$ , giving the vertex  $(-1, -6)$ . The sign inside the bracket is reversed when reading  $h$ .
- 46. D** — The flip and the roll are independent, so their probabilities multiply:  $(\frac{1}{2})(\frac{1}{6}) = \frac{1}{12}$ . Independent events combine by multiplication, not addition.
- 47. C** — Compare unit prices. The 4-pack:  $\$6.00 \div 4 = \$1.50$  each. The 9-pack:  $\$11.70 \div 9 = \$1.30$  each. The 9-pack is cheaper per unit, making it the better value.
- 48. A** — The kite height is found with the Pythagorean theorem, the string as hypotenuse:  $\sqrt{(17^2 - 8^2)} = \sqrt{(289 - 64)} = \sqrt{225} = 15 \text{ m}$ . Subtracting before the square root solves for the vertical leg.
- 49. A** — Rent, food, and other expenses total  $40\% + 20\% + 25\% = 85\%$ , leaving 15% for savings. Calculating 15% of \$3,600:  $0.15 \times 3,600 = \$540$ . Finding the leftover percentage first is the efficient route.
- 50. D** — Apply order of operations: the bracket first,  $(8 - 3) = 5$ , then the exponent  $4^2 = 16$  and the multiplication  $5 \times 5 = 25$ . Finally  $25 - 16 = 9$ . Brackets and exponents come before the multiplication and subtraction.