PRACTICE EXAM 11: PERT MATH SIMULATION

1. A box contains 72 crayons. If they are divided equally among 8 students, how many crayons does each student receive?

A. 9 crayons each

B. 10 crayons each

C. 8 crayons each

D. 12 crayons each

2. Solve: $5x + 3 = 28$.

A. 3

B. 4

C. 6

D. 5

3. What is 7/10 written as a percent?

A. 7%

B. 70%

C. 0.7%

D. 17%

4. The area of a square with side length 11 is:

A. 44

B. 22

C. 121

D. 110

5. Simplify: $3x + 5 - x + 2$.

A. $2x + 7$

B. $4x - 7$

C. $2x - 7$

D. $3x + 7$

6. A car costs $24,000 and depreciates by 10% in the first year. Its value after one year is:

A. $2,400

B. $14,000

C. $23,990

D. $21,600

7. Factor: $x^2 - 4$.

A. $(x - 2)^2$

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

C. $(x - 4)(x + 1)$

D. $(x + 2)^2$

8. Solve for x: $2x - 9 = x + 6$.

A. 9

B. 12

C. 15

D. 18

9. The slope of the line $y = -2x + 7$ is:

A. 2

B. 7

C. −7

D. −2

10. A map scale shows 1 cm = 50 km. If two cities are 6 cm apart on the map, how far are they in reality?

A. 250 km

B. 300 km

C. 56 km

D. 350 km

11. Simplify: $(3x^2)^3$.

A. $9x^5$

B. $9x^6$

C. $27x^6$

D. $27x^5$

12. A cylindrical tank has a radius of 4 feet and a height of 10 feet. Its volume is:

A. 160π ft³

B. 40π ft³

C. 80π ft³

D. 320π ft³

13. Solve: $3(x - 4) = 15$.

A. 1

B. 5

C. 7

D. 9

14. A student's scores are 72, 85, 90, and 93. The mean is:

A. 82

B. 85

C. 88

D. 90

15. Which point lies on the line $y = x - 4$?

A. (6, 2)

B. (4, 4)

C. (0, 4)

D. (−2, 6)

16. Simplify: $4^2 - 2 \times 5$.

A. 12

B. 14

C. 4

D. 6

17. A rectangle has an area of 72 and a length of 12. Its width is:

A. 60

B. 6

C. 8

D. 9

18. The probability of rolling an odd number on a fair die is:

A. 1/6

B. 1/3

C. 1/2

D. 2/3

19. Simplify: $(x + 3)(x + 4)$.

A. $x^2 + 7$

B. $x^2 + 12$

C. $x^2 + 4x + 12$

D. $x^2 + 7x + 12$

20. A train travels at 75 mph for 4 hours. How far does it travel?

A. 300 miles

B. 250 miles

C. 275 miles

D. 350 miles

21. What is 1/4 of 80?

A. 20

B. 16

C. 25

D. 30

22. Solve for y: $y + 6 = 2y - 3$.

A. 3

B. 6

C. 9

D. 12

23. Simplify: $\sqrt{49} + \sqrt{25}$.

A. 74

B. 37

C. 18

D. 12

24. Which number is greater than 0.45?

A. 4/10

B. 1/2

C. 2/5

D. 0.425

25. A trapezoid has parallel sides of 6 and 10 cm and height of 4 cm. Its area is:

A. 32 cm^2

B. 40 cm^2

C. 24 cm^2

D. 60 cm^2

26. Solve the inequality: $-2x + 5 < 11$.

A. $x < -3$

B. $x < 3$

C. $x > 3$

D. $x > -3$

27. The median of {3, 5, 8, 10, 15} is:

A. 5

B. 10

C. 8

D. 7

28. A coat priced at $120 is marked down by 35%. The sale price is:

A. $78

B. $72

C. $85

D. $90

29. Which expression represents "twice a number increased by 7"?

A. 2 + x + 7

B. 2x + 7

C. 2(x + 7)

D. 7x + 2

30. A fair coin is flipped twice. The probability of getting two heads is:

A. 1/2

B. 1/3

C. 2/3

D. ¼

PRACTICE EXAM 11: ANSWER KEY AND EXPLANATIONS

1. A — 9 crayons each. Dividing the total number of crayons by the number of students gives $72 \div 8 = 9$ crayons per student. Division problems that split a total evenly among a group always divide the total by the number of recipients.

2. D — 5. Subtracting 3 from both sides gives $5x = 25$, and dividing by 5 gives $x = 5$. Two-step linear equations are solved by reversing the operations in the opposite order they were applied.

3. B — 70%. Dividing 7 by 10 gives 0.7, and converting to a percent by moving the decimal two places right produces 70%. Fraction-to-percent conversions always go through the decimal form first.

4. C — 121. The area of a square is calculated as side squared, so $A = 11^2 = 121$. Every square's area equals the length of one side multiplied by itself.

5. A — $2x + 7$. Combining like terms, $3x - x = 2x$ for the variables, and $5 + 2 = 7$ for the constants. The simplified expression is $2x + 7$.

6. D — \$21,600. A 10% depreciation means the car retains 90% of its value, so $0.90 \times \$24{,}000 = \$21{,}600$. Depreciation problems multiply the original value by the percentage that remains.

7. B — $(x - 2)(x + 2)$. The expression $x^2 - 4$ is a difference of squares following the pattern $a^2 - b^2 = (a + b)(a - b)$. Since $4 = 2^2$, the factored form is $(x - 2)(x + 2)$.

8. C — 15. Subtracting x from both sides gives $x - 9 = 6$, then adding 9 gives $x = 15$. Equations with variables on both sides are solved by collecting variables on one side.

9. D — -2. In slope-intercept form $y = mx + b$, the coefficient of x is the slope. For $y = -2x + 7$, the slope is -2, indicating the line falls from left to right.

10. B — 300 km. Multiplying the map distance by the scale factor gives $6 \times 50 = 300$ km. Scale drawings convert model measurements to actual distances through direct multiplication.

11. C — $27x^6$. The power-to-a-power rule squares the coefficient and multiplies the exponents: $3^3 = 27$ and $(x^2)^3 = x^6$. The result is $27x^6$.

12. A — 160π ft³. The volume formula for a cylinder is $V = \pi r^2 h$, so $V = \pi(4^2)(10) = \pi(16)(10) = 160\pi$ ft³. Cylinder volume multiplies the base area by the height.

13. D — 9. Distributing the 3 gives $3x - 12 = 15$, then adding 12 gives $3x = 27$, so $x = 9$. Equations with parentheses are solved by distributing first before isolating the variable.

14. B — 85. Adding the four scores gives $72 + 85 + 90 + 93 = 340$, and dividing by 4 gives 85. The mean is always the sum of values divided by the count.

15. A — (6, 2). Substituting $x = 6$ into $y = x - 4$ gives $y = 6 - 4 = 2$, which matches the point. A point lies on a line only when its coordinates satisfy the equation.

16. D — 6. Order of operations evaluates the exponent first ($4^2 = 16$), then the multiplication ($2 \times 5 = 10$), and finally the subtraction ($16 - 10 = 6$). PEMDAS always handles exponents and multiplication before subtraction.

17. B — 6. The area formula $A = lw$ gives $72 = 12w$, and dividing by 12 gives $w = 6$. Rectangle problems solve for the unknown dimension using the area formula rearranged.

18. C — 1/2. A standard die has six faces, and three of them show odd numbers (1, 3, 5). The probability is $3/6 = 1/2$. Three favorable outcomes out of six total outcomes reduces to one-half.

19. D — $x^2 + 7x + 12$. Using FOIL: $x \cdot x = x^2$, $x \cdot 4 = 4x$, $3 \cdot x = 3x$, $3 \cdot 4 = 12$. Combining gives $x^2 + 4x + 3x + 12 = x^2 + 7x + 12$.

20. A — 300 miles. Multiplying rate by time gives $75 \times 4 = 300$ miles. Distance is always calculated using the formula $d = rt$ when rate and time are known.

21. A — 20. Calculating 1/4 of 80 means multiplying $(1/4) \times 80 = 20$. Fraction-of calculations convert "of" into multiplication between the fraction and the whole.

22. C — 9. Subtracting y from both sides gives $6 = y - 3$, then adding 3 gives $y = 9$. Linear equations with variables on both sides are solved through inverse operations.

23. D — 12. Evaluating each radical gives $\sqrt{49} = 7$ and $\sqrt{25} = 5$, and adding produces $7 + 5 = 12$. Square roots are simplified individually before combining through addition.

24. B — 1/2. Converting each option to a decimal gives 0.4, 0.5, 0.4, and 0.425. Only 0.5 is greater than 0.45, so 1/2 is the correct answer.

25. A — 32 cm^2. The trapezoid area formula is $A = \frac{1}{2}(b_1 + b_2)h$, so $A = \frac{1}{2}(6 + 10)(4) = \frac{1}{2}(16)(4) = 32$ cm^2. The formula averages the parallel sides and multiplies by the height.

26. D — $x > -3$. Subtracting 5 from both sides gives $-2x < 6$. Dividing by -2 flips the inequality sign, producing $x > -3$. Division by a negative always reverses inequality direction.

27. C — 8. For an odd number of values arranged in order, the median is the single middle value. With five values, the third value is in the middle position, which is 8 in the set {3, 5, 8, 10, 15}.

28. A — \$78. A 35% discount means paying 65% of the original price, so $0.65 \times \$120 = \$78$. The shortcut method multiplies the original by the remaining percentage.

29. B — 2x + 7. "Twice a number" translates to 2x, and "increased by 7" means adding 7. The result is 2x + 7. Word-to-algebra translations combine multiplication and addition in the order described.

30. D — 1/4. Each flip has a probability of 1/2 for heads, and two independent flips multiply: (1/2)(1/2) = 1/4. Independent events combine through multiplication because one outcome does not affect the other.