PRACTICE EXAM 9: PERT MATH SIMULATION

1. A car uses 12 gallons of gas to travel 336 miles. How many miles per gallon does it get?

A. 25 mpg

B. 26 mpg

C. 27 mpg

D. 28 mpg

2. Solve: $4x - 11 = 5$.

A. 3

B. 4

C. 5

D. 6

3. What is 3/8 expressed as a decimal?

A. 0.375

B. 0.38

C. 0.4

D. 0.625

4. A store sold 240 items on Monday and 180 items on Tuesday. What percent of Monday's sales were Tuesday's sales?

A. 60%

B. 70%

C. 75%

D. 80%

5. Factor completely: $2x^2 - 8$.

A. $2(x^2 - 4)$

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

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

D. $2x(x - 4)$

6. The area of a triangle with base 12 and height 7 is:

A. 19

B. 84

C. 24

D. 42

7. Which number is equal to $2^3 \times 5$?

A. 40

B. 30

C. 35

D. 45

8. A recipe calls for 2 cups of milk for every 3 cups of flour. How much milk is needed for 12 cups of flour?

A. 6 cups

B. 7 cups

C. 8 cups

D. 9 cups

9. Solve for x: $3x + 2 = 2x + 9$.

A. 5

B. 7

C. 9

D. 11

10. Simplify: $7 - 3(x - 2)$.

A. $-3x + 13$

B. $-3x + 1$

C. $-3x - 13$

D. $4x - 2$

11. A bicycle is on sale for 25% off its original price of $240. What is the sale price?

A. $60

B. $180

C. $200

D. $210

12. The slope of a line parallel to $y = 5x + 3$ is:

A. -5

B. $1/5$

C. $-1/5$

D. 5

13. Solve the inequality: $4x + 7 \leq 19$.

A. $x \leq 3$

B. $x \geq 3$

C. $x \leq 4$

D. $x \geq 4$

14. Simplify: $(2x + 3) + (x - 5)$.

A. $3x - 8$

B. $3x + 8$

C. $3x - 2$

D. $2x - 2$

15. Which of the following has the greatest value?

A. 0.6

B. 5/9

C. 2/3

D. 0.7

16. A box holds 36 cans. How many cans are in 15 boxes?

A. 510

B. 540

C. 570

D. 600

17. The mode of {5, 7, 9, 9, 11, 13, 13, 13} is:

A. 13

B. 9

C. 11

D. 7

18. Solve: $x^2 - 16 = 0$.

A. $x = 16$

B. $x = 4$ only

C. $x = -4$ only

D. $x = 4$ or $x = -4$

19. A square has an area of 64 square meters. What is the length of one side?

A. 4 m

B. 16 m

C. 8 m

D. 32 m

20. Simplify: $6x^2y \cdot 2xy^3$.

A. $12x^2y^3$

B. $12x^3y^4$

C. $8x^3y^4$

D. $12xy^4$

21. The range of the data set {4, 9, 13, 18, 22} is:

A. 13

B. 14

C. 17

D. 18

22. What is the y-intercept of the line $2x + 3y = 12$?

A. 4

B. 6

C. 2

D. 3

23. A rectangle has length 10 and width 5. What is its perimeter?

A. 15

B. 25

C. 30

D. 50

24. Solve: $5(2x - 1) = 25$.

A. 2

B. 3

C. 4

D. 5

25. A class of 30 students has 12 who play soccer. What percent play soccer?

A. 30%

B. 35%

C. 38%

D. 40%

26. What is $4^2 + 3^2$?

A. 25

B. 49

C. 7

D. 14

27. The expression $(x + 1)(x - 3)$ equals:

A. $x^2 - 3$

B. $x^2 + 4x - 3$

C. $x^2 - 2x - 3$

D. $x^2 + 2x - 3$

28. A pair of pants regularly costs $45, and now costs $36. What is the percent decrease?

A. 15%

B. 20%

C. 25%

D. 30%

29. Solve: $6 - 2x = 14$.

A. 4

B. 10

C. 5

D. -4

30. A scale drawing uses 1 inch to represent 8 feet. If a wall is 5 inches long on the drawing, how long is the actual wall?

A. 40 feet

B. 32 feet

C. 45 feet

D. 35 feet

PRACTICE EXAM 9: ANSWER KEY AND EXPLANATIONS

1. D — 28 mpg. Dividing total miles by total gallons gives 336 ÷ 12 = 28 miles per gallon. Fuel efficiency is always calculated as distance divided by fuel consumed, producing a unit rate in miles per gallon.

2. B — 4. Adding 11 to both sides gives $4x = 16$, and dividing by 4 gives $x = 4$. Two-step linear equations are solved by reversing the operations applied to the variable in the opposite order.

3. A — 0.375. Dividing 3 by 8 gives exactly 0.375. Fraction-to-decimal conversions always use division of the numerator by the denominator to find the equivalent decimal value.

4. C — 75%. The percent is calculated as 180/240 = 0.75, which converts to 75%. Percent comparisons always divide the part by the whole and then multiply by 100 to express the result as a percent.

5. B — $2(x - 2)(x + 2)$. Factoring out the GCF of 2 gives $2(x^2 - 4)$, and $x^2 - 4$ is a difference of squares that factors further into $(x - 2)(x + 2)$. Complete factoring requires applying every factoring technique until no more is possible.

6. D — 42. The area formula for a triangle is $A = \frac{1}{2}bh$, so $A = \frac{1}{2}(12)(7) = 42$. Half the product of base and height always produces triangle area.

7. A — 40. Calculating 2^3 gives 8, and multiplying by 5 gives $8 \times 5 = 40$. Order of operations handles the exponent before the multiplication.

8. C — 8 cups. Setting up the proportion $2/3 = x/12$ and cross-multiplying gives $3x = 24$, so $x = 8$ cups. Ratio problems scale proportionally when both quantities increase by the same factor.

9. B — 7. Subtracting $2x$ from both sides gives $x + 2 = 9$, and subtracting 2 gives $x = 7$. Equations with variables on both sides are solved by first collecting variable terms on one side.

10. A — $-3x + 13$. Distributing the -3 gives $7 - 3x + 6$, and combining the constants produces $-3x + 13$. Always distribute the negative sign across every term inside the parentheses.

11. B — $180. A 25% discount means paying 75% of the original: $0.75 \times 240 = \$180$. Discount problems multiply the original price by the remaining percentage rather than subtracting the discount amount separately.

12. D — 5. Parallel lines have identical slopes, and the slope of $y = 5x + 3$ is 5. Any line parallel to this one must also have a slope of 5. This relationship holds regardless of the y-intercepts.

13. A — $x \leq 3$. Subtracting 7 from both sides gives $4x \leq 12$, then dividing by 4 gives $x \leq 3$. The inequality sign does not flip because division is by a positive number.

14. C — $3x - 2$. Combining like terms gives $2x + x = 3x$ for the variable terms, and $3 + (-5) = -2$ for the constants. The simplified expression is $3x - 2$.

15. D — 0.7. Converting each option to a decimal gives 0.6, 0.555, 0.666, and 0.7. The largest value is 0.7, which corresponds to option D.

16. B — 540. Multiplying 36 cans per box by 15 boxes gives $36 \times 15 = 540$ cans total. This is a straightforward multiplication problem solved by applying the unit rate to the number of units.

17. A — 13. The mode is the value that appears most frequently, and 13 appears three times in the data set while all other values appear at most twice. The mode captures the most common observation.

18. D — $x = 4$ or $x = -4$. Adding 16 to both sides gives $x^2 = 16$, and taking the square root produces $x = \pm 4$. Every positive square number has both a positive and a negative square root.

19. C — 8 m. The area of a square is $A = s^2$, so $s^2 = 64$, and taking the square root gives $s = 8$ m. Square side length is always the positive square root of the area.

20. B — $12x^3y^4$. Multiplying coefficients gives $6 \times 2 = 12$, and applying exponent rules gives $x^2 \cdot x = x^3$ and $y \cdot y^3 = y^4$. The product is $12x^3y^4$.

21. D — 18. The range is the maximum minus the minimum: $22 - 4 = 18$. Range measures the total spread between the largest and smallest values in a data set.

22. A — 4. Setting $x = 0$ in $2x + 3y = 12$ gives $3y = 12$, so $y = 4$. The y-intercept is the value of y when x equals zero.

23. C — 30. The perimeter of a rectangle is $P = 2l + 2w$, so $P = 2(10) + 2(5) = 20 + 10 = 30$. Perimeter adds the lengths of all four sides.

24. B — 3. Distributing gives $10x - 5 = 25$, then adding 5 gives $10x = 30$, and dividing by 10 gives $x = 3$. Equations with parentheses are solved by distributing first, then isolating the variable.

25. D — 40%. Dividing 12/30 gives 0.4, which converts to 40%. Percentage problems always divide the part by the whole before converting to a percent.

26. A — 25. Calculating $4^2 = 16$ and $3^2 = 9$, then adding gives $16 + 9 = 25$. Order of operations evaluates the exponents before the addition.

27. C — $x^2 - 2x - 3$. Using FOIL: $x \cdot x = x^2$, $x \cdot (-3) = -3x$, $1 \cdot x = x$, and $1 \cdot (-3) = -3$. Combining gives $x^2 - 3x + x - 3 = x^2 - 2x - 3$. The middle terms combine through addition of their coefficients.

28. B — 20%. The decrease is $\$45 - \$36 = \$9$, and dividing by the original price gives $9/45 = 0.20 = 20\%$. Percent decrease is always calculated using the original value as the denominator.

29. D — −4. Subtracting 6 from both sides gives $-2x = 8$, then dividing by −2 gives $x = -4$. Dividing by a negative number does not flip an equation (only inequalities require flipping).

30. A — 40 feet. Multiplying the drawing length by the scale factor gives $5 \times 8 = 40$ feet. Scale drawing problems multiply the model distance by the scale to find the actual distance.