



Placement Test – Level I – Answer Key

Directions: Each problem is worth one point. When you are done grading, add the points for the number of correct answers together. If you scored from 0 – 39, then you placed into Prealgebra. If you scored from 40 – 60, then you placed into Elementary Algebra.

1. Multiply.

$$(x+7)(x+3) = x^2 + 3x + 7x + 21$$

$$= \boxed{x^2 + 10x + 21}$$

2. Write a numerical expression for the verbal phrase.

"fifteen minus the quotient of eleven and two"

a) $15 - 11 \div 2$

b) $11 \div 2 - 15$

c) $15 \div 11 - 2$

d) $15 - 2 \div 11$

$$15 - 11 \div 2$$

3. Evaluate the following expression for the given values.

$$5a + 3b - 7c + 9, \text{ if } a = 2, b = 4 \text{ and } c = -1.$$

a) 24

b) 38

c) 36

d) 20

$$= 5(2) + 3(4) - 7(-1) + 9$$

$$= 10 + 12 + 7 + 9$$

$$= \boxed{38}$$



4. Rewrite the expression $(7 \cdot x) \cdot 13$ using the Associative Property.

$$(7 \cdot x) \cdot 13 = \boxed{7 \cdot (x \cdot 13)}$$

5. Simplify the following expression using order of operations.

$$\begin{aligned} & 6(14 + 2) - 8 \cdot 3 + 5 \\ & = 6(16) - 24 + 5 \\ & = 96 - 24 + 5 \\ & = \boxed{77} \end{aligned}$$

a) 125

b) 103

c) 269

d) 77

6. Put the following integers in order from greatest to least.

-5, 17, 2, -1, 16

$$\boxed{17, 16, 2, -1, -5}$$

7. Evaluate the following expression.

$$\begin{aligned} & |-6| + |13| - |-7| \\ & = 6 + 13 - 7 \\ & = \boxed{12} \end{aligned}$$

a) 0

b) 26

c) 14

d) 12



8. Simplify the following expression.

$$4(2x) - 5y + 9z + 10(4x) - 3y$$

a) $32x - 8y + 9z$

b) $22x + 8y + 9z$

c) $48x - 8y + 9z$

d) cannot be simplified

$$= \underline{8x} - \underline{5y} + \underline{9z} + \underline{40x} - \underline{3y}$$

$$= \boxed{48x - 8y + 9z}$$

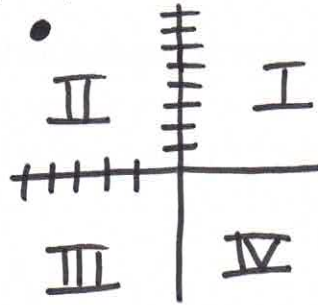
9. In which quadrant would the point $(-5, 8)$ be located?

a) Quadrant 1

b) Quadrant 2

c) Quadrant 3

d) Quadrant 4



10. Simplify the following expression.

$$7(x + 2) - 5(3x - 1) + 12x$$

a) $4x + 9$

b) $11x + 19$

c) $4x + 19$

d) $4x - 12$

$$= \underline{7x} + \underline{14} - \underline{15x} + \underline{5} + \underline{12x}$$

$$= \boxed{4x + 19}$$



11. Translate the sentence to an equation and solve the equation to find the value of x.

"The difference of x and eight is negative seven."

a) $x - 8 = -7$; $x = 1$

b) $8 - x = -7$; $x = 15$

c) $x + 8 = -7$; $x = -15$

d) $x - 8 = -7$; $x = -15$

$$x - 8 = -7$$

$$\begin{array}{r} x - 8 = -7 \\ +8 \quad +8 \\ \hline \end{array}$$

$$x = 1$$

12. Translate the sentence to an equation and solve the equation to find the value of x.

"The quotient of negative thirty and x is two."

$$\frac{-30}{x} = 2$$

$$\frac{-30}{x} \times \frac{2}{1}$$

$$\frac{-30}{2} = \frac{2x}{2}$$

$$x = -15$$

13. Translate the sentence to an equation and solve the equation to find the value of n.

"If nine is decreased by four times n, the result is thirteen."

$$9 - 4n = 13$$

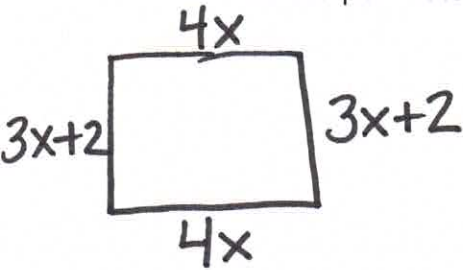
$$\begin{array}{r} 9 - 4n = 13 \\ -9 \quad -9 \\ \hline -4n = 4 \end{array}$$

$$\begin{array}{r} -4n = 4 \\ \hline -4 \quad -4 \\ \hline \end{array}$$

$$n = -1$$



14. Find the perimeter of a rectangle with a width of $(3x + 2)$ and a length of $4x$.



$$P = 4x + 3x + 2 + 4x + 3x + 2$$

$$P = 14x + 4$$

15. Simplify the following expression.

$$x^7 \cdot x^2 \cdot x$$

a) x^{15}

b) x^9

c) x^{14}

d) x^{10}

$$= x^{7+2+1}$$

$$= x^{10}$$

16. Write the expression using exponents. Then evaluate the expression using $x = 4$ and $y = -3$.

$$3 \cdot 3 \cdot y \cdot y \cdot y \cdot x \cdot x$$

a) $3^2 x^2 y^3$; -3888

b) $3^2 x^3 y^2$; 5184

c) $3^3 x^2 y^2$; -5184

d) $3^2 x^2 y^3$; 3888

$$= 3^2 y^3 x^2$$

$$(x=4, y=-3)$$

$$= 3^2 (-3)^3 (4)^2$$

$$= 9(-27)(16)$$

$$= -3888$$



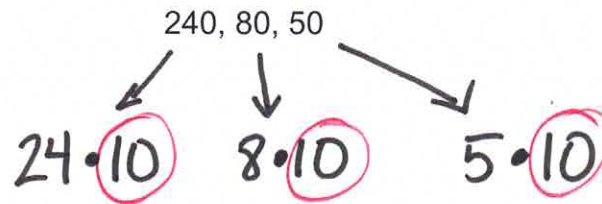
17. Find the Greatest Common Factor (GCF) of the following set of numbers.

a) 10

b) 5

c) 2

d) 15



18. Which of the following numbers is divisible by 3 and 9?

a) 231

b) 729

c) 654

d) 691

19. Write the following expression using negative exponents.

$$\frac{1}{x^7} = x^{-7}$$

20. Write the following number in scientific notation.

.00000743

$$= 7.43 \times 10^{-6}$$

21. Find the product and write it in simplest form.

$$\frac{4}{7} \times 5\frac{1}{3}$$

$$5\frac{1}{3} = \frac{16}{3}$$

a) $2\frac{18}{21}$

b) $3\frac{5}{21}$

c) $3\frac{1}{21}$

d) $5\frac{4}{21}$

$$\frac{4}{7} \cdot \frac{16}{3} = \frac{64}{21}$$

$$= 3\frac{1}{21}$$

$$\begin{array}{r} 3 \\ 21 \overline{) 64} \\ \underline{-63} \\ 1 \end{array}$$

22. Find the quotient and write it in simplest form.

$$4\frac{3}{8} \div \frac{1}{4}$$

$$4\frac{3}{8} = \frac{35}{8}$$

a) $17\frac{1}{2}$

b) $16\frac{3}{8}$

c) $5\frac{1}{2}$

d) $\frac{35}{32}$

$$\frac{35}{8} \div \frac{1}{4} = \frac{35}{8} \cdot \frac{4}{1} = \frac{35}{2}$$

$$\begin{array}{r} 17 \\ 2 \overline{) 35} \\ \underline{-2} \\ 15 \\ \underline{-14} \\ 1 \end{array} = 17\frac{1}{2}$$



23. Solve the formula for y.

$$\begin{aligned} 3x + 5y &= -6 \\ \underline{-3x} \quad \quad \underline{-3x} \\ 5y &= -3x - 6 \\ \underline{\frac{5y}{5}} \quad \quad \underline{\frac{-3x}{5}} \quad \quad \underline{\frac{-6}{5}} \\ y &= \frac{-3}{5}x - \frac{6}{5} \end{aligned}$$

24. Simplify.

$$\begin{aligned} \frac{12}{12} \cdot \frac{2}{7} - \frac{9}{12} \cdot \frac{7}{7} \quad \quad \text{LCD: } 84 \\ = \frac{24}{84} - \frac{63}{84} \\ = \frac{-39}{84} = \frac{-13}{28} \end{aligned}$$

25. A jaguar can run up to 50 miles per hour. How many feet per second is this?

a) 70 feet per second

b) 65.67 feet per second

c) 60 feet per second

d) 73.33 feet per second

$$\begin{aligned} & \left(\frac{50 \cancel{\text{mi.}}}{\cancel{\text{hr.}}} \right) \left(\frac{5280 \cancel{\text{ft.}}}{1 \cancel{\text{mi.}}} \right) \left(\frac{1 \cancel{\text{hr.}}}{60 \cancel{\text{min.}}} \right) \left(\frac{1 \cancel{\text{min.}}}{60 \cancel{\text{sec.}}} \right) \\ &= \frac{264,000 \text{ ft.}}{3600 \text{ sec.}} \\ &= 73.33 \text{ ft. per second} \end{aligned}$$

26. Solve for x.

$$\frac{4}{5} \neq \frac{16}{x-7}$$

a) $x = 12$

b) $x = 16$

c) $x = 23$

d) $x = 27$

$$4(x-7) = (16)(5)$$

$$4x - 28 = 80$$

$$\begin{array}{r} + 28 \\ \hline \end{array}$$

$$\frac{4x}{4} = \frac{108}{4}$$

$$x = 27$$

27. In a lake containing 180 fish, 60% are trout. How many of the fish are trout?

a) 60

b) 108

c) 72

d) 44

$$(180)(0.60) = 108$$

28. A pair of shorts is on sale at a 20% discount. The original price of the shorts was \$24.90. What is the sale price?

a) \$19.92

b) \$5.99

c) \$29.88

d) \$4.98

let x = the sale price

$$x = \$24.90 - \$24.90(0.20)$$

$$x = \$24.90 - \$4.98$$

$$x = \$19.92$$

29. Find the slope of the line containing the points $(-1, 3)$ and $(4, -7)$.

a) $m = 1$

b) $m = \frac{7}{3}$

c) $m = -2$

d) $m = \frac{-1}{2}$

$$m = \frac{y_2 - y_1}{x_2 - x_1}$$

$$m = \frac{-7 - 3}{4 - (-1)}$$

$$m = \frac{-10}{4 + 1}$$

$$m = \frac{-10}{5}$$

$$5(4 + x) - 7 = 9x + 12$$

$$20 + 5x - 7 = 9x + 12$$

$$5x + 13 = 9x + 12$$

$$\begin{array}{r} 5x + 13 = 9x + 12 \\ -5x \quad -5x \end{array}$$

$$\begin{array}{r} 13 = 4x + 12 \\ -12 \quad -12 \end{array}$$

$$\frac{1}{4} = \frac{4x}{4}$$

$$m = -2$$

$$x = \frac{1}{4}$$

31. Factor.

$$5x + 35$$

$$= 5(x + 7)$$

32. Solve the inequality.

$$\begin{aligned} \frac{4}{5}x + 7 &< -3 \\ \underline{-7} \quad \underline{-7} \\ \frac{4}{5}x &< -10 \\ \frac{5}{4} \left(\frac{4}{5}x \right) &< (-10) \left(\frac{5}{4} \right) \\ x &< \frac{-50}{4} \\ x &< -\frac{25}{2} \end{aligned}$$

33. Name the complementary angle to 54° .

a) 46°

b) 126°

c) 36°

d) 136°

$$90^\circ - 54^\circ = 36^\circ$$

34. If two angles of a triangle are 28° and 117° , what is the third angle?

a) 45°

b) 35°

c) 55°

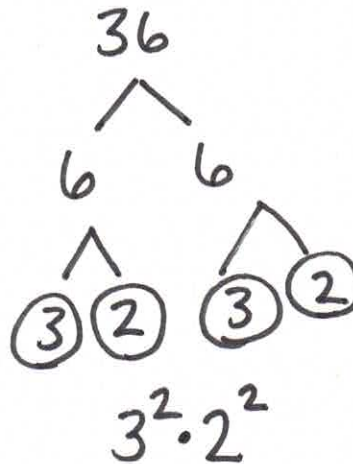
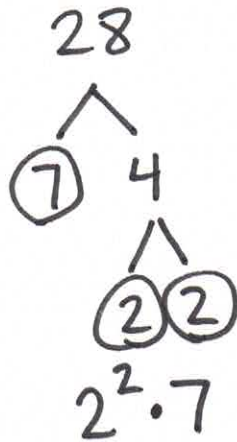
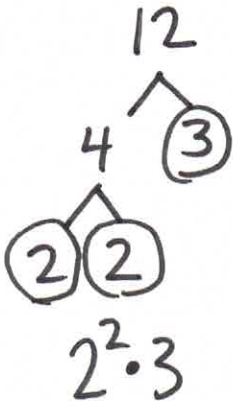
d) 110°

let x = measure of the third angle

$$\begin{aligned} 28^\circ + 117^\circ + x &= 180^\circ \\ 145^\circ + x &= 180^\circ \\ \underline{-145^\circ} \quad \underline{-145^\circ} \\ x &= 35^\circ \end{aligned}$$

35. Find the LCM of the following numbers.

12, 28, 36



$$\text{LCM: } 2^2 \cdot 3^2 \cdot 7 = 4 \cdot 9 \cdot 7 = \boxed{252}$$

36. Write the following phrase in decimal form.

"five hundred and thirty-four thousandths"

$\boxed{0.534}$

37. Write the following number in words.

6,485,920,001

Six billion, four hundred eighty-five million,
nine hundred twenty thousand, and one

38. Simplify.

a) 243

b) -81

c) 81

d) -243

$$(-3)^5 = (-3)(-3)(-3)(-3)(-3)$$

$$= \boxed{-243}$$

39. Write the following number in standard notation.

a) 0.00009623

b) 962,000

c) 0.0009623

d) 96,200

$$9.623 \times 10^{-5}$$

$$\underbrace{0000009.623}_{10^{-5}}$$

$$= \boxed{0.00009623}$$

40. Simplify the following. Write the final answer in scientific notation.

a) 3.956×10^4

b) 13.5×10^3

c) 3.956×10^{-18}

d) 1.35×10^4

$$(4.3 \times 10^6)(9.2 \times 10^{-3})$$

$$= (4.3)(9.2) \times 10^{6+(-3)}$$

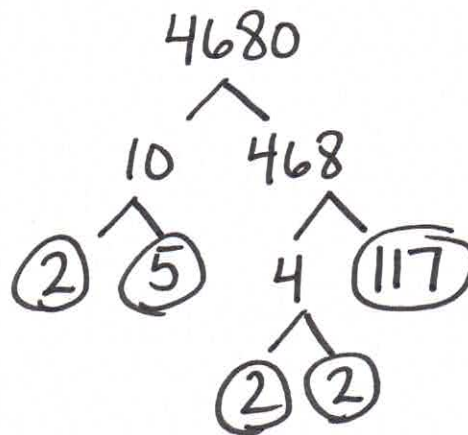
$$= 39.56 \times 10^3$$

$$= \boxed{3.956 \times 10^4}$$

41. Find the prime factorization of 4680.

Prime Factorization:

$$2^3 \cdot 5 \cdot 117$$



42. Approximate $\sqrt{33}$ to the nearest tenth.

a) 11.3

b) 6.1

c) 5.7

d) 3.4

$$\sqrt{33} \approx 5.74456$$

$$\approx 5.7$$

43. Simplify the following.

$$\frac{\sqrt{25}}{4\sqrt{81}} = \frac{5}{4(9)}$$

$$= \frac{5}{36}$$

44. Find the rate if a principal of \$3700 earned \$814 in interest in 4 years. Simple Interest formula is $I = Prt$.

$$I = \$814$$

$$P = \$3700$$

$$r = ?$$

$$t = 4$$

$$I = Prt$$

$$814 = (3700)(r)(4)$$

$$\frac{814}{14,800} = \frac{14,800r}{14,800}$$

$$r = 0.055$$

$$r = 5.5\%$$

45. Three angles of a triangle are $4x$, $5x$, and $6x + 15$. Find the measure, in degrees, of each angle.

$$4x + 5x + 6x + 15 = 180$$

$$\begin{array}{r} 15x + 15 = 180 \\ -15 \quad -15 \\ \hline \end{array}$$

$$\begin{array}{r} 15x = 165 \\ \hline 15 \quad 15 \end{array}$$

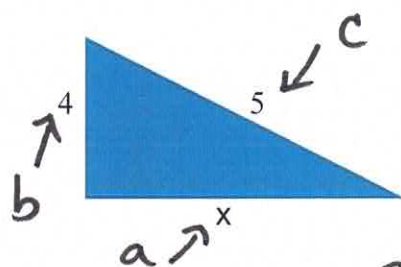
$$x = 11$$

$$\text{First angle: } 4x = 4(11) = \boxed{44^\circ}$$

$$\text{Second angle: } 5x = 5(11) = \boxed{55^\circ}$$

$$\begin{aligned} \text{Third angle: } 6x + 15 \\ = 6(11) + 15 \\ = 66 + 15 \\ = \boxed{81^\circ} \end{aligned}$$

46. Find the length of side x .



The Pythagorean Theorem $a^2 + b^2 = c^2$

$$x^2 + 4^2 = 5^2$$

$$\begin{array}{r} x^2 + 16 = 25 \\ -16 \quad -16 \\ \hline \end{array}$$

$$\sqrt{x^2} = \sqrt{9}$$

$$\boxed{x = 3}$$

47. Solve for y.

$$\begin{aligned}
 & \overset{\curvearrowright}{-2(y+8)} - 6y = -(9y+1) - 12 \\
 & -2y - 16 - 6y = -9y - 1 - 12 \\
 & -8y - 16 = -9y - 13 \\
 & \begin{array}{r} +9y \\ \hline \end{array} \quad \begin{array}{r} +9y \\ \hline \end{array} \\
 & y - 16 = -13 \\
 & \begin{array}{r} +16 \\ \hline \end{array} \quad \begin{array}{r} +16 \\ \hline \end{array} \\
 & \boxed{y = 3}
 \end{aligned}$$

48. Solve. Write the answer in simplest form.

$$\begin{aligned}
 & \frac{1}{3} \cdot \frac{2}{5} \left(\frac{1}{2} + \frac{15}{2} \right) - \frac{1}{4} \\
 & = \frac{1}{3} \cdot \frac{2}{5} \left(\frac{16}{2} \right) - \frac{1}{4} \\
 & = \frac{1}{3} \cdot \frac{2}{5} (8) - \frac{1}{4} \\
 & = \frac{1}{3} \cdot \frac{16}{5} - \frac{1}{4} \\
 & = \frac{16}{15} - \frac{1}{4} \\
 & = \frac{16}{15} \cdot \frac{4}{4} - \frac{1}{4} \cdot \frac{15}{15} \\
 & = \frac{64}{60} - \frac{15}{60} \\
 & = \boxed{\frac{49}{60}}
 \end{aligned}$$

49. Angle 1 and Angle 2 are supplementary angles. Find the degree measurement of each angle if Angle 1 is $(3x + 2)$ and Angle 2 is $(7x + 8)$.

a) 17° and 163°

b) 29° and 61°

c) 29° and 151°

d) 53° and 127°

$$3x + 2 + 7x + 8 = 180^\circ$$

$$10x + 10 = 180^\circ$$

$$\begin{array}{r} -10 \quad -10 \\ \hline \end{array}$$

$$\begin{array}{r} 10x = 170^\circ \\ \hline 10 \quad 10 \end{array}$$

$$x = 17^\circ$$

Angle 1:

$$3x + 2 = 3(17) + 2$$

$$= 51 + 2$$

$$= \boxed{53^\circ}$$

Angle 2:

$$= 7(17) + 8 = \boxed{127^\circ}$$

50. Find the area of a triangle with a base of 8m and a height of 14m. The area formula for a triangle is $A = \frac{1}{2}bh$.

a) 22 m^2

b) 112 m^2

c) 56 m^2

d) 224 m^2

$$A = \frac{1}{2}bh$$

$$A = \frac{1}{2}(8\text{m})(14\text{m})$$

$$A = 56\text{m}^2$$

51. The area of a circle is 100 in^2 . Find the circumference. Round to the nearest tenth if necessary. (Use 3.14 for π). The area of a circle is $A = \pi r^2$ and the circumference of a circle is $C = \pi d$.

a) 35.2 in

b) 11.2 in

c) 32.0 in

d) 314 in

$$A = \pi r^2$$

$$\frac{100}{\pi} = \frac{\pi r^2}{\pi}$$

$$\sqrt{\frac{100}{\pi}} = \sqrt{r^2}$$

$$\sqrt{\frac{100}{\pi}} = r$$

$$r \approx \sqrt{\frac{100}{3.14}}$$

$$r \approx 5.6$$

$$d = 2r$$

$$d = 2(5.6)$$

$$d = 11.2$$

$$C = \pi d$$

$$C = \pi(11.2)$$

$$C = (3.14)(11.2)$$

$$C \approx 35.2 \text{ in.}$$

52. Find the volume of a cylinder if the radius is 20 ft and the height is 120 ft. (Use 3.14 for π). The volume of a cylinder is $V = \pi r^2 h$.

a) $150,720 \text{ ft}^3$

b) $7,536 \text{ ft}^3$

c) $37,680 \text{ ft}^3$

d) $602,880 \text{ ft}^3$

$$V = \pi (20\text{ft.})^2 (120\text{ft.})$$

$$V = (3.14) (20\text{ft.})^2 (120\text{ft.})$$

$$V = (3.14) (400\text{ft}^2) (120\text{ft.})$$

$$V = 150,720 \text{ ft.}^3$$

53. Find the x- and y-intercepts of the given line.

$$3x + 4y = 12$$

x-intercept:

$$3x + 4(0) = 12$$

$$\frac{3x}{3} = \frac{12}{3}$$

$$x = 4$$

$$\boxed{(4, 0)}$$

y-intercept:

$$3(0) + 4y = 12$$

$$\frac{4y}{4} = \frac{12}{4}$$

$$y = 3$$

$$\boxed{(0, 3)}$$

54. Simplify.

$$(-5x^4y^7)^3$$

$$= (-5)^3 (x^4)^3 (y^7)^3$$

$$= -125 x^{4 \cdot 3} y^{7 \cdot 3}$$

$$= \boxed{-125 x^{12} y^{21}}$$

55. Evaluate the polynomial for the given value of x.

$$8x^2 - 7x + 4 \quad \text{when } x = -2$$

$$= 8(-2)^2 - 7(-2) + 4$$

$$= 8(4) + 14 + 4$$

$$= 32 + 14 + 4$$

$$= \boxed{50}$$

56. Simplify.

$$\left(\frac{z^5}{z^9}\right)^2 = \frac{z^{5 \cdot 2}}{z^{9 \cdot 2}} = \frac{z^{10}}{z^{18}} = z^{10-18} = z^{-8} = \boxed{\frac{1}{z^8}}$$

57. Joseph has \$1.55 in nickels and dimes in his pocket. He has seven more nickels than dimes. How many of each type of coin does he have?

let x = number of dimes

$x+7$ = number of nickels

$$.10x + .05(x+7) = 1.55$$

$$.10x + .05x + 0.35 = 1.55$$

$$\begin{array}{r} .15x + 0.35 = 1.55 \\ -0.35 \quad -0.35 \\ \hline .15x = 1.20 \end{array}$$

$$.15x = 1.20$$

$$\begin{array}{r} .15x = 1.20 \\ \hline .15 \quad .15 \end{array}$$

$$\boxed{x = 8 \text{ dimes}}$$

$$x+7 = 8+7 = \boxed{15 \text{ nickels}}$$

58. Write the fraction $\frac{-5}{8}$ as a decimal without using a calculator.

$$\begin{array}{r} 0.625 \\ 8 \overline{) 5.000} \\ \underline{-48} \\ 20 \\ \underline{-16} \\ 40 \\ \underline{-40} \\ 0 \end{array}$$

$$= \boxed{-0.625}$$

59. Subtract.

$$(6x^2 - 4y - 9) - (7x^2 + 5y - 2)$$

$$= 6x^2 - 4y - 9 - 7x^2 - 5y + 2$$

$$= \boxed{-x^2 - 9y - 7}$$

60. What percent of 135 is 64.8?

a) 42%

b) 48%

c) 60%

d) 70%

$$(x)(135) = 64.8$$

$$\frac{135x}{135} = \frac{64.8}{135}$$

$$x = 0.48$$

$$\boxed{x = 48\%}$$