

Semester 1 Placement Review Answers

Simplify.

1. -5^2

-25

2. -8^2

-64

3. $(-5)^2$

25

4. $(-8)^2$

64

5. 5^2

25

6. 8^2

64

Rewrite using exponents.

7. $7 \cdot 7 \cdot 7 \cdot 7 \cdot 7 \cdot 7$
 7^6

8. $3 \cdot 3 \cdot 3 \cdot 7 \cdot 7 \cdot 7 \cdot 7$
 $3^3 7^4$

9. $3 \cdot 11 \cdot 3 \cdot 11 \cdot 11 \cdot 3$
 $3^3 11^3$

Write in expanded form.

10. 5^3
 $5 \cdot 5 \cdot 5$

11. π^5
 $\pi \cdot \pi \cdot \pi \cdot \pi \cdot \pi$

Simplify.

12. $6 \div 3 \cdot 2$
 $2 \cdot 2$
 4

13. $6 \cdot 2 \div 4$
 $12 \div 4$
 3

14. $5 \div 10 \cdot 2$
 $\frac{1}{2} \cdot 2$
 1

15. $6 \div 3 + 2 \cdot 7$

$2 + 2 \cdot 7$
 $2 + 14$
 16

16. $10 \div 5 + 5 \cdot 2$

$2 + 5 \cdot 2$
 $2 + 10$
 12

17. $6 \div 2 + 4 \cdot 3$

$3 + 4 \cdot 3$
 $3 + 12$
 15

18. $5 + 3(2^2 + 4) \div 2$

$5 + 3(4 + 4) \div 2$
 $5 + 3(8) \div 2$
 $5 + 24 \div 2$
 $5 + 12$
 17

19. $4 - 2(3^2 - 1) \div 2$

$4 - 2(9 - 1) \div 2$
 $4 - 2(8) \div 2$
 $4 - 16 \div 2$
 $4 - 8$
 -4

20. $1 + 3(2^3 + 4) \div 4$

$1 + 3(8 + 4) \div 4$
 $1 + 3(12) \div 4$
 $1 + 36 \div 4$
 $1 + 9$
 10

21. $2 + 2^2 \cdot 5$

$2 + 4 \cdot 5$
 $2 + 20$
 22

22. $1 + 3^2 \div 9$

$1 + 9 \div 9$
 $1 + 1$
 2

Simplify the Expression.

23. $3x - 4y + 2x - 2y$
 $5x - 6y$

24. $6x - 9y + 3x - 3y$
 $9x - 12y$

25. $10x - 15y - 10x - 5y$
 $-20y$

$$26. -8x + 12y + 8x + 4y$$

$$16y$$

$$27. 4f^2g + 6f^2g$$

$$10f^2g$$

$$28. 5y^3z^2 - 2y^3z^2$$

$$3y^3z^2$$

$$29. x^3y + xy^3$$

$$x^3y + xy^3$$

Not like terms

$$30. a^7b^5 + a^5b^7$$

$$a^7b^5 + a^5b^7$$

Not like terms

$$31. 3x - (x + 4)$$

$$3x - x - 4$$

$$2x - 4$$

$$32. a - (5a + 1)$$

$$a - 5a - 1$$

$$-4a - 1$$

$$33. 2x - (x - 4)$$

$$2x - x + 4$$

$$x + 4$$

$$34. 10x - (x - 10)$$

$$10x - x + 10$$

$$9x + 10$$

Solve.

$$35. \frac{3}{4}x = 7$$

$$x = 7 \bullet \frac{4}{3}$$

$$x = \frac{28}{3}$$

$$36. \frac{4}{5}x = 9$$

$$x = 9 \bullet \frac{5}{4}$$

$$x = \frac{45}{4}$$

$$37. \frac{x}{7} = -3$$

$$x = -3 \bullet 7$$

$$x = -21$$

$$38. \frac{x}{4} = -5$$

$$x = -5 \bullet 4$$

$$x = -20$$

$$39. \text{Given } -4 + x = -4, \text{ find } x + 2$$

$$x = 0, \text{ so } x + 2 = 0 + 2 = 2$$

$$40. \text{Given } -10 + x = -8, \text{ find } x + 1$$

$$x = 2, \text{ so } x + 1 = 2 + 1 = 3$$

$$41. x + 5 = -7$$

$$x = -12$$

$$42. x + 3 = -4$$

$$x = -7$$

$$43. -3x = 7$$

$$x = \frac{7}{-3}$$

$$44. -5x = 9$$

$$x = \frac{9}{-5}$$

$$45. -x = -9$$

$$x = 9$$

$$46. -x = -4$$

$$x = 4$$

$$47. 5 - 4x = 10$$

$$-4x = 5$$

$$x = \frac{5}{-4}$$

$$48. -4 - y = 18$$

$$-y = 22$$

$$y = -22$$

$$49. 7 + 9x = 12$$

$$9x = 5$$

$$x = \frac{5}{9}$$

$$50. -3 + 10y = -4$$

$$10y = -1$$

$$y = \frac{-1}{10}$$

$$51. 6 = 4 - 2x$$

$$2 = -2x$$

$$-1 = x$$

$$52. 10 = 5y + 25$$

$$-15 = 5y$$

$$-3 = y$$

$$53. \begin{aligned} 4x - 2 &= 7x + 11 \\ -13 &= 3x \\ \frac{-13}{3} &= x \end{aligned}$$

$$54. \begin{aligned} 19y + 11 &= 10y + 38 \\ 9y &= 27 \\ y &= 3 \end{aligned}$$

$$55. \begin{aligned} 7x - 3 - 4x &= 9 \\ 3x - 3 &= 9 \\ 3x &= 12 \\ x &= 4 \end{aligned}$$

$$56. \begin{aligned} -2 + 2y + 5 - y &= -1 \\ 3 + y &= -1 \\ y &= -4 \end{aligned}$$

$$57. \begin{aligned} 9x - (4 + 3x) &= 9 \\ 9x - 4 - 3x &= 9 \\ 6x - 4 &= 9 \\ 6x &= 13 \\ x &= \frac{13}{6} \end{aligned}$$

$$58. \begin{aligned} 4y - (7 - 8y) &= 17 \\ 4y - 7 + 8y &= 17 \\ 12y - 7 &= 17 \\ 12y &= 24 \\ y &= 2 \end{aligned}$$

Translate the verbal expression into an algebraic expression or equation.

59. Four less than a number is 12.

$$x - 4 = 12$$

60. 15 is 3 less than a number.

$$15 = x - 3$$

61. Six more than two-thirds of a number

$$\frac{2}{3}x + 6$$

62. Ten more than triple a number

$$3x + 10$$

63. The sum of a number and seven

$$x + 7$$

64. The sum of nineteen and a number

$$19 + x$$

65. Twenty is the product of 4 and a number

$$20 = 4x$$

66. Fifty-six is the product of eight and a number

$$56 = 8x$$

67. Eighty-one is the product of three and a number

$$81 = 3x$$

68. The difference between twice a number and 5

$$2x - 5$$

69. The difference between half a number and sixteen

$$\frac{1}{2}x - 16$$

70. The difference between quadruple a number and three

$$4x - 3$$

71. You have \$75 to buy pizza for a party. Each slice of pizza costs \$1.25. Write an equation to determine how many slices of pizza you can buy.

$$1.25x = 75$$

72. You have \$50 to buy candy for a Halloween party. Each bag of candy costs \$2.50. Write an equation to determine how many bags of candy you can buy

$$2.50x = 50$$

73. You have \$60 to buy pencils to give away as party favors. Each pencil costs \$0.75. Write an equation to determine how many pencils you can buy.

$$0.75x = 60$$

74. A basketball team finished its 60 games with no ties. The team won 4 times as many games as it lost. How many games did the team win?

$$4x + x = 60$$

$$5x = 60$$

$$x = 12$$

$$\text{Wins} = 4x = 4(12) = 48 \text{ wins}$$

75. The school sold 150 cookies in two days. Three times as many cookies were sold on the second day as the first. How many cookies were sold the first day?

$$3x + x = 150$$

$$4x = 150$$

$$x = 37.5 \text{ cookies}$$

76. A football team gained 28 yards on one play. After the play, the team was given a 5 yard penalty. However, the next play, they gained 3 yards. How many total yards did they gain on the two plays?

$$\text{Total yards} = 28 - 5 + 3 = 26 \text{ yards}$$

77. If four times a number is increased by 3, the result is 51. Find the number.

$$4x + 3 = 51$$

$$x = 12$$

78. If six times a number is decreased by 7, the result is 41. Find the number.

$$6x - 7 = 41$$

$$x = 8$$

79. An elevator left the 12th floor, went up 5 floors, then down 7, and back up 2. On what floor is the elevator on now?

$$\text{Elevator now} = 12 + 5 - 7 + 2 = 12^{\text{th}} \text{ floor}$$

80. A submarine was 3000 feet below sea level. It rose 640 feet, went back down 1000 feet, and rose 1300 feet. Where is the submarine now?

$$\text{Submarine now} = -3000 + 640 - 1000 + 1300 = -2060 \text{ feet below sea level}$$

Translate the verbal expression into an algebraic expression or equation. Then solve.

81. Find a number whose product with 7 is the same as its sum with 24.

$$7x = x + 24$$

$$6x = 24$$

$$x = 4$$

82. One fourth of a number is 123. Find the number.

$$\frac{1}{4}x = 123$$

$$x = 492$$

83. Find the number whose product with 11 is the same as its difference with 20.

$$11x = x - 20$$

$$10x = -20$$

$$x = -2$$

84. One fifth of a number is 76. Find the number.

$$\left(\frac{1}{5}\right)x = 76$$

$$x = 380$$

85. The perimeter of a rectangle is 168 inches. The width is 54 inches. Find the length.

$$\text{Perimeter} = 2(\text{length}) + 2(\text{width})$$

$$168 = 2x + 2(54)$$

$$x = 30 \text{ inches}$$

86. One summer day, the temperature in RSM reached 33 degrees Celsius. That was 15 degrees higher than the average temperature for that day. Find the average temperature.

$$\text{Average temperature high} + 15 = 33$$

$$\text{Average} = 18 \text{ degree Celsius}$$

Translate the verbal expression into an algebraic expression or equation. Then simplify.

87. Three times a number less than 5, subtracted from twice the sum of six times the number and 2.

$$2(6x + 2) - (5 - 3x)$$

$$12x + 4 - 5 + 3x$$

$$15x - 1$$

88. Five times a number less than 9, subtracted from triple the difference of four times the number and 7.

$$3(4x - 7) - (9 - 5x)$$

$$12x - 21 - 9 + 5x$$

$$17x - 30$$

Simplify.

89. $5^6 \cdot 5^8$

5^{6+8}

5^{14}

90. $9^2 \cdot 9^8$

9^{2+8}

9^{10}

91. $x^6 \cdot x^8$

x^{6+8}

x^{14}

92. $y^2 \cdot y^8$

y^{2+8}

y^{10}

93. $(x^6)^8$

$x^{6 \cdot 8}$

x^{48}

94. $(y^2)^8$

$y^{2 \cdot 8}$

y^{16}

95. $(xy^6)^8$

$x^8 y^{6 \cdot 8}$

$x^8 y^{48}$

96. $(x^2 y)^8$

$x^{2 \cdot 8} y^8$

$x^{16} y^8$

97. $(-5x^6 y)^4$

$(-5)^4 x^{6 \cdot 4} y^4$

$(-5)^4 x^{24} y^4$

98. $(-4x^2 y)^3$

$(-4)^3 x^{2 \cdot 3} y^3$

$-64x^6 y^3$

99. $5x^6 \cdot 4x^8$

$5 \cdot 4x^{6+8}$

$20x^{14}$

100. $9y^2 \cdot 2y$

$9 \cdot 2y^{2+1}$

$18y^3$

101. $5x^6 (4x)^3$

$5x^6 \cdot 4^3 x^3$

$5 \cdot 64x^{6+3}$

$320x^9$

102. $9y^2 (9y)^4$

$9y^2 \cdot 9^4 y^4$

$9 \cdot 9^4 y^{2+4}$

$9^5 y^6$

103. $\left(\frac{3}{4}x^5\right)^3$

$\frac{3^3}{4^3} x^{5 \cdot 3}$

$\frac{27}{64} x^{15}$

104. $\left(\frac{1}{5}y^2\right)^3$

105. $(5x^6 y^8)^2$

106. $(-9x^2 y^5)^2$

$$\frac{1^3}{5^3} y^{2 \cdot 3}$$

$$\frac{1}{125} y^6$$

$$25x^{12}y^{16}$$

$$81x^4y^{10}$$

107. $y^2 \cdot y^8$

$$y^{2+8}$$

$$y^{10}$$

108. $\frac{x^6}{x^8}$

$$x^{6-8}$$

$$x^{-2}$$

$$\frac{1}{x^2}$$

109. $\frac{y^2}{y^8}$

$$y^{2-8}$$

$$y^{-6}$$

$$\frac{1}{y^6}$$

110. $\frac{5^6}{5^8}$

$$5^{6-8} = 5^{-2}$$

$$\frac{1}{5^2}$$

$$\frac{1}{25}$$

111. $\frac{9^2}{9^8}$

$$9^{2-8}$$

$$9^{-6}$$

$$\frac{1}{9^6}$$

Simplify.

112. $5x(3x + 5)$

$$15x^2 + 25x$$

113. $9x(4 + 3x)$

$$36x + 27x^2$$

114. $-7y(10y - 7)$

115. $-10x(3x + 3)$

$$-70y^2 + 49y$$

$$-30x^2 - 30x$$

$$116. \quad (x^2 - 4x + 5) + (4x^2 + 6x - 3)$$

$$117. \quad (5x^2 + 4x - 1) + (2x^2 - 6x - 3)$$

$$5x^2 + 2x + 2$$

$$7x^2 - 2x - 4$$

$$118. \quad (7x^3 + 5) + (4x^3 + 2x - 1)$$

$$11x^3 + 2x + 4$$

Distribute.

$$119. \quad (n + 2)(n - 3)$$

$$120. \quad (x - 6)(x + 7)$$

$$121. \quad (b + 4)(b - 4)$$

$$n^2 - 3n + 2n - 6$$

$$x^2 + 7x - 6x - 42$$

$$b^2 - 4b + 4b - 16$$

$$n^2 - n - 6$$

$$x^2 + x - 42$$

$$b^2 - 16$$

$$122. \quad (y + 2)(y - 2)$$

$$123. \quad (q + 6)^2$$

$$124. \quad (z + 9)^2$$

$$y^2 - 2y + 2y - 4$$

$$(q + 6)(q + 6)$$

$$(z + 9)(z + 9)$$

$$y^2 - 4$$

$$q^2 + 12q + 36$$

$$z^2 + 18z + 81$$

$$125. \quad (w - 8)^2$$

$$126. \quad (p - 5)^2$$

$$127. \quad (3x + 1)(x - 4)$$

$$(w - 8)(w - 8)$$

$$(p - 5)(p - 5)$$

$$3x^2 - 12x + x - 4$$

$$w^2 - 16w + 64$$

$$p^2 - 10p + 25$$

$$3x^2 - 11x - 4$$

$$128. \quad (3y + 6)(2y + 5)$$

$$129. \quad (x - 4)(x - 5)$$

$$130. \quad (6z - 4)(3z - 7)$$

$$6y^2 + 15y + 12y + 30$$

$$x^2 - 5x - 4x + 20$$

$$18z^2 - 42z - 12z + 28$$

$$6y^2 + 27y + 30$$

$$x^2 - 9x + 20$$

$$18z^2 - 54z + 28$$

131. Given that the area of a triangle is one-half the base times the height, find the area of the triangle with a base of $(2x+4)$ and a height of $(x-3)$.

$$\frac{1}{2}(2x+4)(x-3)$$

$$\frac{1}{2}(2x^2 - 2x - 12)$$

$$x^2 - x - 6$$

Find the solution to the given equation.

132. $(5x+1)(x-3) = 0$

$$5x+1=0 \qquad x-3=0$$

$$x = \frac{-1}{5} \qquad x = 3$$

133. $(4x-2)(x+5) = 0$

$$4x-2=0 \qquad x+5=0$$

$$x = \frac{1}{2} \qquad x = -5$$

134. $(x+5)^2 = 0$

$$(x+5)(x+5) = 0$$

$$x+5=0 \text{ and } x+5=0$$

$$x = -5$$

135. $(x-7)^2 = 0$

$$(x-7)(x-7) = 0$$

$$x-7=0 \text{ and } x-7=0$$

$$x = 7$$

136. $x(x+2)(x-4) = 0$

$$x=0 \qquad x+2=0 \qquad x-4=0$$

$$x = -2 \qquad x = 4$$

137. $7(x+5)(x-3) = 0$

$$x+5=0 \qquad x-3=0$$

$$x = -5 \qquad x = 3$$

138. $a(a+5) = 0$

$$a=0 \qquad a+5=0$$

$$a = -5$$

139. $y(y-4) = 0$

$$y=0 \qquad y-4=0$$

$$y = 4$$

140. $(7x-3)(x-4)(3x-7)=0$

$7x-3=0$

$x=\frac{3}{7}$

$x-4=0$

$x=4$

$3x-7=0$

$x=\frac{7}{3}$

141. $(3x-5)(x-5)(4x-3)=0$

$3x-5=0$

$x=\frac{5}{3}$

$x-5=0$

$x=5$

$4x-3=0$

$x=\frac{3}{4}$

Find the greatest common factor.

142. $3x^2-6x$

$3x$

143. $7x^2-49x$

$7x$

144. $10y^4+6y^3+14y$

$2y$

145. $27x^4+9x^3+3x$

$3x$

Factor completely.

146. $3x^3-27x$

$3x(x^2-9)$

$3x(x+3)(x-3)$

147. $2x^2-50x$

$2x(x-25)$

148. $2y^4-2y^3-12y^2$

$2y^2(y^2-y-6)$

$2y^2(y-3)(y+2)$

149. $4y^4+12y^3-40y^2$

$4y^2(y^2+3y-10)$

$4y^2(y+5)(y-2)$

150. $2y^2-16y+32$

$2(y^2-8y+16)$

$2(y-4)(y-4)$

or $2(y-4)^2$

151. $3y^3-30y+75$

$3(y^3-10y+25)$

Solve.

152. $y^2 - y - 12 = 0$

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

$$y = 4, y = -3$$

153. $y^2 + 10y + 21 = 0$

$$(y+7)(y+3) = 0$$

$$y = -7, y = -3$$

154. $y^2 - 7y = -21$

$$y^2 - 7y + 21 = 0$$

$$y = \frac{7 \pm \sqrt{(-7)^2 - 4(1)(21)}}{2(1)}$$

$$= \frac{7 \pm \sqrt{49 - 84}}{2}$$

$$= \frac{7 \pm \sqrt{-35}}{2}$$

Does not factor. Non-real answer.

155. $y^2 - 13y = -40$

$$y^2 - 13y + 40 = 0$$

$$(y-8)(y-5) = 0$$

$$y = 8, y = 5$$

156. $y^2 - 6y = 0$

$$y(y-6) = 0$$

$$y = 0, y = 6$$

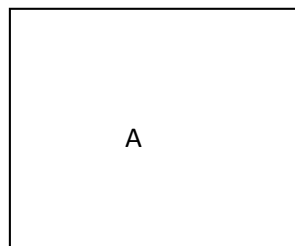
157. $y^2 - 8y = 0$

$$y(y-8) = 0$$

$$y = 0, y = 8$$

158. Use factoring to find the length of a side of the square below.

A = area



$$A = x^2 + 6x + 9$$

$$A = x^2 + 6x + 9$$

Factor: $A = (x+3)(x+3)$ so *side* = $(x+3)$

$$A = (x+3)^2$$

For the following questions, find the factors by choose from these factors.

a. $(x+2)$ b. $(x+4)$

c. $(x-2)$ d. $(x-4)$

e. $(x+3)$ f. $(x+6)$

g. $(x-3)$ h. $(x-6)$

159. $x^2 - x - 12$

$(x-4)(x+3)$ D, E

160. $x^2 - 16$

$(x+4)(x-4)$ B, D

161. $x^2 - 4x - 12$

$(x-6)(x+2)$ H, A

162. $x^2 + x - 12$

$(x+4)(x-3)$ B, G

163. $x^2 + 4x - 12$

$(x+6)(x-2)$ F, C

For the following questions, find the factors by choose from these factors.

a. $(x+5)$ b. $(3x+5)$

c. $(x-5)$ d. $(3x-5)$

e. $(3x+1)$ f. $(9x+1)$

g. $(3x-1)$ h. $(9x-1)$

i. $(3x+1)^2$

164. $9x^2 + 12x - 5$

$$9x^2 + 15x - 3x - 5$$

$$3x(3x+5) - 1(3x+5)$$

$$(3x-1)(3x+5)$$

G, B

165. $9x^2 + 6x + 1$

$$9x^2 + 3x + 3x + 1$$

$$3x(3x+1) + (3x+1)$$

$$(3x+1)(3x+1)$$

$$(3x+1)^2$$

i

166. $9x^2 + 44x - 5$

$$9x^2 + 45x - x - 5$$

$$9x(x+5) - 1(x+5)$$

$$(9x-1)(x+5)$$

H, A

167. $9x^2 - 44x - 5$

$$9x^2 - 45x + x - 5$$

$$9x(x-5) + 1(x-5)$$

$$(9x+1)(x-5)$$

F, C

168. $9x^2 - 12x - 5$

$$9x^2 - 15x + 3x - 5$$

$$3x(3x-5) + 1(3x-5)$$

$$(3x+1)(3x-5)$$

E, D