FINAL REVIEW WORKSHEET
INTRODUCTORY ALGEBRA

Chapter 1.

1. Change the following to an algebraic expression: a number multiplied by three hundred fifty-two
   
   (A) $352 - x$  (B) $352x$  (C) $352 + x$  (D) $\frac{352}{x}$

2. Change the following to an algebraic expression: a number increased by eleven
   
   (A) $11x$  (B) $11 - x$  (C) $x + 11$  (D) $\frac{11}{x}$

3. Evaluate $(y - 1)^2$ for $y = -6$.
   
   (A) $-7$  (B) $49$  (C) $25$  (D) $-49$

4. Evaluate $\frac{2x - 3y}{3}$ for $x = 6$ and $y = -1$.
   
   (A) $3$  (B) $-3$  (C) $5$  (D) $-5$

5. Use the commutative law of addition to write an expression equivalent to $a + 2b$
   
   (A) $a + b \cdot 2$  (B) $2b + a$  (C) $(a + b)2$  (D) $2ab$

6. Use the associative law of multiplication to write an expression equivalent to $(2s)t$
   
   (A) $2s + 2t$  (B) $(s2)t$  (C) $t(2s)$  (D) $2(st)$

7. Multiply: $-7(b - 5)$
   
   (A) $-7b + 35$  (B) $7b + 35$  (C) $-35b - 7$  (D) $-7b - 5$
8. Add: $\frac{7}{8} + \frac{2}{3}$
   (A) $\frac{7}{12}$ (B) $\frac{37}{24}$ (C) $\frac{29}{24}$ (D) $\frac{9}{11}$

9. Find the reciprocal of $\frac{6}{7}$, if it exists.
   (A) $-\frac{6}{7}$ (B) $-\frac{7}{6}$ (C) $\frac{5}{6}$ (D) $-1$

10. Write the number 504 as the product of prime factors.
    (A) $2 \cdot 2 \cdot 3 \cdot 3 \cdot 7$ (B) $2 \cdot 3 \cdot 3 \cdot 3 \cdot 7$ (C) $2 \cdot 2 \cdot 2 \cdot 3 \cdot 7$ (D) $2 \cdot 2 \cdot 3 \cdot 3 \cdot 7$

11. Find the difference. $-11 - (-8)$
    (A) 3 (B) -3 (C) -19 (D) 19

12. Find the value of the following expression: $22(-18) + 29(-5)$
    (A) 541 (B) 74 (C) -541 (D) 5170

13. Find the area of a triangle when the height $h$ is 16 ft. and the base $b$ is 24 ft.
    (A) 384 sq. ft. (B) 80 sq. ft. (C) 40 sq. ft. (D) 192 sq. ft.

14. Simplify: $7y - 8y + 3(y - 4)$
    (A) $2y - 12$ (B) $-4y + 3$ (C) $-4y - 12$ (D) $2y + 3$

15. Simplify the expression by combining like terms.
    $-5(10r^2 + 2) + 7(3r + 6)$
    (A) $-50r^2 + 21r + 32$ (B) $-29r - 3$ (C) $-60r$ (D) $21r + 2$
16. Simplify: \((-4x)^2\)
   - (A) \(-8x^2\)
   - (B) \(16x^2\)
   - (C) \(-16x^2\)
   - (D) \(16x\)

17. Simplify: \(4 \div (-2) \cdot 2 + 3 \cdot (-4)\)
   - (A) 4
   - (B) -4
   - (C) -16
   - (D) 16

Chapter 2.

18. Solve the equation: \(21(x - 84) = 42\)
   - (A) \(x = 86\)
   - (B) \(x = 42\)
   - (C) \(x = 82\)
   - (D) \(x = 84\)

19. Solve the equation: \(5 = 2x + 15\)
   - (A) \(x = 10\)
   - (B) \(x = -10\)
   - (C) \(x = -5\)
   - (D) \(x = 5\)

20. Solve the equation: \(4(y - 5) = -2(y + 2)\)
   - (A) \(y = -12\)
   - (B) \(y = 12\)
   - (C) \(y = \frac{3}{8}\)
   - (D) \(y = \frac{8}{3}\)

21. Solve the formula for the specified variable. \(A = 5a + 2ab\) for \(a\).
   - (A) \(a = \frac{2b-a}{5}\)
   - (B) \(a = \frac{A}{5+2b}\)
   - (C) \(a = \frac{A-2b}{5}\)
   - (D) \(a = \frac{A-2b}{5}\)

22. Find decimal notation for 6.7%.
   - (A) 6.7
   - (B) 0.067
   - (C) 0.0067
   - (D) 0.67

23. Find percent notation for 2.3.
   - (A) 2.3%
   - (B) 0.23%
   - (C) 230%
   - (D) 23%
24. 37% of what number is 78? (Round to the nearest hundredth, if necessary)
   (A) 0.47 (B) 210.81 (C) 2108.12 (D) 47

25. What is 38% of 1174? (Round to the nearest hundredth, if necessary)
   (A) 4461.25 (B) 446.12 (C) 44612 (D) 44.61

26. Steve bought a stereo for $270 and put it on sale at his store at 55% markup rate. What was the retail price of the stereo?
   (A) $540.00 (B) $370.00 (C) $418.50 (D) $318.50

27. Describe the graph from Figure (1) using set-builder notation.

   \[ \{x \mid x > -3\} \] (A) \{x \mid x > -3\} (B) \{x \mid x \leq -3\} (C) \{x \mid x < -3\} (D) \{x \mid x \geq -3\}

28. Solve the following inequality: \( x - 28 < 20 - 2x \), graph your answer.
29. Solve: \(8 - 3x \geq 20\)
   \(\text{ (A) } \{x| x \leq -4\} \quad \text{(B) } \{x| x \geq -4\} \quad \text{(C) } \{x| x \geq 4\} \quad \text{(D) } \{x| x \leq \frac{28}{3}\}\)

30. The perimeter of a rectangle garden is not to exceed 94 feet. The length is 7 feet more than the width. What widths will meet these conditions?
   \(\text{ (A) } \{w| w \leq 20 \text{ feet}\} \quad \text{(B) } \{w| w \leq 27 \text{ feet}\}\)
   \(\text{ (C) } \{w| w \geq 27 \text{ feet}\} \quad \text{(D) } \{w| w \geq 18 \text{ feet}\}\)

Chapter 3. The following bar graph shows the results of a recent survey of 2000 individuals relating information on average income based on years of schooling. Use the graph to answer Problems 31 and 32.

![Bar graph]

31. About how much does a 4-year college graduate earn?
   \(\text{ (A) } $17,000 \quad \text{(B) } $22,500 \quad \text{(C) } $12,000 \quad \text{(D) } $27,000\)

32. About how much more does a person completing 4-years of high school earn than a person who does not attend high school?
   \(\text{ (A) } $12,000 \quad \text{(B) } $2,000 \quad \text{(C) } $5,000 \quad \text{(D) } $8,000\)

33. In which quadrant is the point \((3, -1)\) located?
34. Graph the following line: \( y = -2x + 1 \)

35. Find the coordinates of the \( x \)- and \( y \)-intercepts of \( x = 7 - 3y \)
   
   (A) \( x \)-int. \((0, 7)\); \( y \)-int. \((\frac{7}{3}, 0)\)  
   (B) \( x \)-int. \((7, \frac{7}{3})\); \( y \)-int. \((0, 0)\)  
   (C) \( x \)-int. \((7, 0)\); \( y \)-int. \((0, \frac{7}{3})\)  
   (D) \( x \)-int. \((4, 1)\); \( y \)-int. \((10, -1)\)

36. Graph the following line: \( y = 2 \)
37. Write an equation for the graph.

(A) $y = -2$   (B) $y = 2$   (C) $x = -2$   (D) $x = 2$

38. Nancy drove 550 miles using 32 gallons of gas. What was her gas mileage in miles per gallon? (Round to the nearest tenth, if necessary).

(A) 17.2 miles per gallon   (B) 16 miles per gallon
(C) 2.9 miles per gallon   (D) 43 miles per gallon

39. Find the slope of the line that passes through the points $(-7, 1)$ and $(-1, 1)$.

(A) $m = 0$   (B) $m = 1$   (C) $m = 8$   (D) $m = 2$

40. Find the slope and $y$-intercept of the line $-2x + 3y = 9$.

(A) slope 1; $y$-intercept $-3$   (B) slope $-1$; $y$-intercept 3
(C) slope $\frac{2}{3}$; $y$-intercept 3   (D) slope $-\frac{2}{3}$; $y$-intercept $-3$

41. Write the slope-intercept form of a line with slope $\frac{6}{5}$ and $y$-intercept $-2$.

(A) $y = -\frac{6}{5}x + 2$   (B) $y = -\frac{6}{5}x - 2$
(C) $y = \frac{6}{5}x - 2$   (D) $y = \frac{6}{5}x + 2$
42. Find a point-slope equation for the line containing the point \((4, -3)\) and having a slope of \(-5\).

(A) \(y - 4 = -5(x - 3)\)  
(B) \(y - 4 = -5(x - (-3))\)  
(C) \(y - (-3) = -5(x - (-4))\)  
(D) \(y - (-3) = -5(x - 4)\)

Chapter 4.

43. Find the product. \((4x^2z^3)(3x^4z^3)\)

(A) \(12xz\)  
(B) \(12x^6z^6\)  
(C) \(12x^8z^9\)  
(D) \(7x^8z^9\)

44. Determine the degree of the polynomial. \(5x^4 - 3x + 15x^3 - 9x\)

(A) 7  
(B) 15  
(C) 14  
(D) 4

45. Perform the indicated operation: \((3x^4 + 9x^2) - (-15x^4 + 13x^2)\)

(A) \(14x^6\)  
(B) \(18x^4 + 22x^2\)  
(C) \(-2x^4 + 22x^2\)  
(D) \(18x^4 - 4x^2\)

46. Multiply: \((-5x + 2y)(5x + 4y + 1)\)

(A) \(-25x^2 - 20xy - 5x + 8y^2\)  
(B) \(-25x^2 - 10xy - 5x + 8y^2 + 2y\)  
(C) \(-25x^2 + 10xy - 5x + 8y^2 + 2y\)  
(D) \(-25x^2 + 10xy - 10y^2\)

47. Multiply: \((8 - 7x)(8 + 7x)\)

(A) \(64 - 112x - 49x^2\)  
(B) \(64 + 112x - 49x^2\)  
(C) \(64 - 49x^2\)  
(D) \(64 - 7x^2\)

48. Multiply: \((6x - 5y)^2\)

(A) \(36x^2 + 25y^2\)  
(B) \(36x^2 - 60xy + 5y^2\)  
(C) \(36x^2 + 60xy + 25y^2\)  
(D) \(36x^2 - 60xy + 25y^2\)
49. Evaluate the polynomial \(-2x^2 + xy - y^2\) for \(x = -1\) and \(y = 3\)
   (A) 4   (B) 8   (C) -8   (D) -14

50. Divide: \(\frac{20x^5 - 8x^2 + 6x}{2x}\)
    (A) 10x^5 - 4x^2 + 3x   (B) 10x^4 - 4x + 3   (C) 10x^5 - 8x^2 + 6x   (D) 20x^4 - 8x + 3

51. Divide (use long division): \(\frac{w^2 + 2w - 55}{w + 9}\)
    (A) \(w + 7 + \frac{8}{w + 9}\)   (B) \(w - 7\)   (C) \(w - 7 + \frac{8}{w + 9}\)   (D) \(w - 8 + \frac{7}{w + 9}\)

52. Simplify: \((a^{-3})^{-7}\)
    (A) \(\frac{1}{a}\)   (B) \(\frac{1}{a^7}\)   (C) \(a^{21}\)   (D) \(a^4\)

53. Express 269,203 in scientific notation.
    (A) 2.69203 \times 10^1   (B) 2.69203 \times 10^2
    (C) 2.69203 \times 10^{-1}   (D) 2.69203 \times 10^{-2}

Chapter 5.

54. Factor out the greatest common factor: \(18x^7y^9 + 30x^2y^4 - 18x^5y^2\)
    (A) \(6(3x^7y^9 + 5x^2y^4 - 3x^5y^2)\)   (B) \(6x^2(3x^5y^9 + 5y^4 - 3x^3y^2)\)
    (C) no common factor   (D) \(6x^2y^2(3x^5y^7 + 5y^2 - 3x^3)\)

55. Find one of the factors when \(x^4 + 2x^3 - 4x - 8\) is factored completely.
    (A) \(x^3 + 2\)   (B) \(x^3 - 4\)   (C) \(x^2 + 4\)   (D) \(x - 2\)
56. Factor completely: \(x^2 - 8x - 33\)
   (A) \((x - 3)(x + 11)\)  (B) \((x + 3)(x - 11)\)
   (C) \((x - 3)(x - 11)\)  (D) \((x + 3)(x + 11)\)

57. Factor: \(4x^2 - 12x + 9\)
   (A) \((2x - 3)(2x + 3)\)  (B) \((2x + 3)^2\)  (C) \((2x - 3)^2\)  (D) Prime

58. Factor completely: \(25y^4 - 64\)
   (A) Prime  (B) \((5y^2 + 8)^2\)  (C) \((5y^2 + 8)(5y^2 - 8)\)  (D) \((5y^2 - 8)^2\)

59. Solve the equation: \(2x^2 - 16x + 30 = 0\)
   (A) \(x = 0\) or \(x = 3\) or \(x = 5\)  (B) \(x = 2\) or \(x = 3\) or \(x = 5\)
   (C) \(x = 3\) or \(x = 5\)  (D) \(x = -3\) or \(x = -5\)

60. The height of a triangle is 8 cm less than the base. The area is 90 sq. cm. Find the height.
   (A) 10 cm  (B) 12 cm  (C) 8 cm  (D) 18 cm

Chapter 6.

61. Simplify this rational expression: \(\frac{a^2 - 2a}{a^2 + 6a - 16}\)
   (A) \(\frac{a - 2}{a + 8}\)  (B) \(\frac{1}{a + 8}\)  (C) \(\frac{a^2}{a + 8}\)  (D) \(\frac{a}{a + 8}\)

62. Divide and simplify, if possible: \(\frac{z^2 + 10z + 21}{z^2 + 13z + 42} \div \frac{z^2 + 3z}{z^2 + 14z + 48}\)
   (A) \(\frac{z}{z^2 + 13z + 42}\)  (B) \(\frac{z + 8}{z}\)  (C) \(\frac{z + 8}{z^2 + 6z}\)  (D) \(z + 8\)
63. Subtract: $\frac{4}{z^2} - \frac{7}{z}$
   (A) $\frac{4-7z}{z^2}$  (B) $\frac{4z+7}{z^2}$  (C) $\frac{4z+7z}{z^2}$  (D) $\frac{7z-4}{z}$

64. Add: $\frac{5ab}{a^2-b^2} + \frac{a+b}{a-b}$
   (A) $\frac{a^2+7ab+b^2}{(a-b)(a+b)}$  (B) $\frac{a^2+5ab-b^2}{(a-b)(a+b)}$  (C) $\frac{5ab+a+b}{(a-b)(a+b)}$  (D) $\frac{7ab}{(a-b)(a+b)}$

65. Simplify: $\frac{6-\frac{1}{y}}{36-\frac{1}{y^2}}$
   (A) $\frac{1}{6}$  (B) $\frac{y}{6y+1}$  (C) $\frac{1}{6} - \frac{1}{y}$  (D) $\frac{y^2}{6y+1}$

66. Solve this equation: $\frac{x}{5} - \frac{x}{9} = 3$
   (A) $x = 27$  (B) $x = 45$  (C) $x = 15$  (D) $x = \frac{135}{4}$

67. Solve the equation: $\frac{x-1}{x-7} = \frac{x-10}{x-4}$
   (A) $x = \frac{11}{2}$  (B) $x = -\frac{33}{14}$  (C) $x = -9$  (D) $x = -3$

68. Solve the equation: $\frac{15}{x} - \frac{15}{x-2} = -2$
   (A) $x = -5$ or $x = 3$  (B) $x = 5$ or $x = -3$
   (C) $x = 28$  (D) $x = -5$ or $x = -3$

69. Frank can type a report in 6 hours and James takes 7 hours. How long will it take the two of them working together to type the report?
   (A) 7 hours  (B) $\frac{42}{13}$ hours  (C) $\frac{13}{42}$  (D) 42 hours
70. The sum of a number and 4 times its reciprocal is −5. Find the number.
   (A) 1 or 4   (B) −1 or −4   (C) −1   (D) −5 or 1

Chapter 7.

71. Determine which of the following ordered pairs is the solution of the system of
equations.

\[
\begin{align*}
x &= 9 + 4y \\
3x - 4y &= 3 \\
\end{align*}
\]

(A) (5, −1)   (B) (−3, −3)   (C) (3, 1)   (D) (−2, −3)

72. Solve the following:

\[
\begin{align*}
x - 3y &= 5 \\
5x - 2y &= -1 \\
\end{align*}
\]

The \(x\)-coordinate of the solution is:

(A) \(x = -2\)   (B) \(x = 2\)   (C) \(x = -1\)   (D) \(x = 3\)

73. Find an equation of variation in which \(y\) varies inversely as \(x\) when \(y = 35\) and
    \(x = 32\).

(A) \(y = \frac{1120}{x}\)   (B) \(y = \frac{109}{x}\)   (C) \(y = 1120x\)   (D) \(y = 1.09x\)

74. Find an equation of variation in which \(y\) varies directly as \(x\) when \(y = 2\) and
    \(x = 1.6\).

(A) \(y = \frac{1}{1.25}x\)   (B) \(y = 1.25x\)   (C) \(y = 2x\)   (D) \(y = \frac{3.2}{x}\)