

Directions: Complete this summer packet by our first day of class. We will be reviewing the contents of this packet during the first week of school. There will be an assessment during the second week of school.

For the following questions find the requested information regarding lines. Write all equations in slope-intercept form.

1. Find the slope of a line passing through the points: (7, -2) and (-1, 4).
2. Find the equation of the line with slope  $m = \frac{3}{4}$  and y-intercept (0, 6).
3. Find the equation of a line passing through (6, 3) and (8, -1).
4. Find the equation of a line with undefined slope, passing through (-3, -5).
5. Find the equation of a line parallel to  $y = -\frac{1}{5}x + 2$  passing through (10, 3).
6. Find the equation of a line perpendicular to  $3x + 4y = 12$ , through (-6, 1).

Simplify the following algebraic expressions.

7.  $3x^2 - 5x + 7 - 8x + 2 - x^2$
8.  $4x(3xy - 8y^2) - 5y(2x^2 - 7xy) - x^3 + 3x^2y$
9.  $(4x - 7y)(2x + 3y)$
10.  $(5z - 7)(5z + 7)$
11.  $(3c + 1)^2$

Express each of the following in simplest form. Answers should not include negative exponents.

12.  $(5x^3y^{-2}) \cdot (-4x^{-1}y)^3$
13.  $(8x^5yz^7)^0$
14.  $\frac{24x^{-3}y^6z}{30x^4y^{-1}z^3}$
15.  $8mn^5(2m^3n^4)$
16.  $(-2x^3y^5)^4$
17.  $(\frac{2x^3y^{-1}}{z^2})^{-2}$

Factor the following algebraic expressions completely.

18.  $x^2 - 13x + 30$
19.  $6x^2 + 5xy - 4y^2$
20.  $2z^4 - 2z^3 - 60z^2$
21.  $9a^2 + 30a + 25$
22.  $x^4 - 16$
23.  $8x^3 - 125$
24.  $24 + 10x - x^2$
25.  $2x^3 + 3x^2 - 8x - 12$

Simplify the following radical expressions. Rationalize the denominator if necessary.

26.  $\sqrt{49}$
27.  $\sqrt{72}$
28.  $\sqrt{48x^4y^8z^5}$
29.  $3\sqrt{5} + 2\sqrt{3} - 6\sqrt{3} + 8\sqrt{5}$
30.  $4\sqrt{12} - 2\sqrt{18} + 3\sqrt{75}$
31.  $\sqrt[3]{125x^9}$
32.  $3\sqrt{6}(4\sqrt{3} - 5\sqrt{2})$
33.  $\sqrt{\frac{20}{9}}$
34.  $(2 - 3\sqrt{3})(4 + 2\sqrt{3})$
35.  $(5 + \sqrt{2})(5 - \sqrt{2})$
36.  $\frac{8}{\sqrt{5}}$
37.  $\frac{14}{3 - \sqrt{2}}$

Simplify the complex expressions. Leave your answers in a+bi form. Rationalize the denominator if necessary.

38.  $\sqrt{-36}$
39.  $8 + 2\sqrt{-50}$
40.  $4(3 + 2i) - 2(1 - 5i)$
41.  $(6 - 3i)(4 - 5i)$
42.  $(2 + 7i)(2 - 7i)$
43.  $\frac{4}{3 - 5i}$

Simplify the following rational expressions.

44.  $\frac{x^2-7x+10}{x^2-5x}$

45.  $\frac{9x^4-12x^3+6x^2}{3x}$

46.  $\frac{2x^2-6x}{x^2-9} \cdot \frac{x^2+4x+3}{4x^3}$

47.  $\frac{2x^2-3x+1}{4x-4} \div \frac{4x^2-1}{12x^3-6x^2}$

48.  $\frac{3x}{5} + \frac{2x}{7}$

49.  $\frac{5}{x-2} - \frac{3}{x+1}$

50.  $\frac{x+3}{2x^2-4x} + \frac{3}{4x^2}$

51.  $\frac{\frac{3}{9}-1}{x^2-1}$

52.  $\frac{\frac{5}{m^2} - \frac{6}{m} + 1}{\frac{2}{m^2} - \frac{2}{m}}$

Solve the following equations.

53.  $3x - 5(x + 2) = 4x + 12$

54.  $\frac{2x}{5} - \frac{1}{6} = \frac{7x}{10}$

55.  $x^2 - 5x = 6$

56.  $2x^3 + 7x = 15x^2$

57.  $|2x - 5| - 4 = 7$

58.  $\sqrt{x+3} - 2 = 5$

59.  $\sqrt{x+2} + 4 = x$

60.  $\frac{3x}{x-5} = \frac{5}{2}$

61.  $\frac{x}{x-3} - \frac{5}{x+3} = \frac{15}{x^2-9}$

Solve the following equations using the quadratic formula or by completing the square.

62.  $3x^2 - x - 7 = 0$

63.  $x^2 + 6x + 20 = 0$

Solve for x in the following literal equations.

64.  $5x - 3y = 10$

65.  $8m + 2xy = 3p$

66.  $xy - 5y = 3x + 2y$

Solve the following systems of equations using any method:

$$67. \begin{cases} 3x - 5y = 11 \\ y = 2x - 5 \end{cases}$$

$$68. \begin{cases} 4x + 3y = 19 \\ 3x - y = -2 \end{cases}$$

$$69. \begin{cases} 6x - 5y = 8 \\ 5x = 21 - 3y \end{cases}$$

Solve the following inequalities and write the solutions in interval notation.

$$70. 3x - 5 \geq x + 7$$

$$71. -2(3x + 1) > 10$$

$$72. -7 \leq 2x + 11 < 15$$

$$73. |2x + 1| > 7$$

$$74. x^2 - 5x \leq 6$$

$$75. 2x^3 - 18x < 0$$

$$76. \frac{2x-7}{x+2} \geq 1$$

Given the functions defined below, evaluate the following.

$$f(x) = 3x - 5$$

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

$$77. f(7)$$

$$78. g(-2)$$

$$79. (g \circ f)(1)$$

$$80. f(x + 3)$$

$$81. (f \circ g)(x)$$

Divide the following polynomials using synthetic division or long division.

$$82. (x^3 - 4x^2 - 5x + 2) \div (x - 3)$$

$$83. (x^3 + 2x^2 - 3x + 7) \div (x^2 - x - 2)$$

On graph paper, graph the following:

$$84. y = -2x + 3$$

$$85. 5x - 3y = 6$$

$$86. y = x^2 - 2x - 3$$

$$87. y > \frac{2}{5}x - 4$$

$$88. \begin{cases} y \leq 3x - 1 \\ y > -\frac{1}{4}x + 2 \end{cases}$$