



The purpose of Honors Pre-Calculus is to prepare you for a college-level Calculus course. The skills contained in this packet are prerequisite skills that you should know from your previous math courses. If you find you are deficient in any of these skills, you may want to seek additional practice prior to the start of school. While the completion of this packet is **OPTIONAL**, your knowledge of the skills contained in this packet is not. We will begin the school year with a review of prerequisite algebra skills, and any students who did not complete the packet over the summer will receive one. I will be available to answer questions about the packet the first few days of school. **Solutions will be posted in August.**

Contact Mrs. Heil: dheil@clearviewregional.edu with questions.

We look forward to meeting you in September!

FOIL PRACTICE: (*First, Outside, Inside, Last*)

1. $(x^2 + 3)(x - 7)$

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

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

4. $(5x - 6)(-x + \frac{1}{2})$

5. $(\sqrt{2} + x)(\sqrt{8} - x)$

FACTORING PRACTICE

Factor each.

1. $y^2 - 12y + 20$

2. $16x^2 - 25y^2$

3. $12z^2 - z - 6$

4. $18p^3 - 51p^2 - 135p$

5. $36a^3b^2 + 66a^2b^3 - 210ab^4$

RATIONALIZING RADICALS

Simplify.

1. $\frac{3\sqrt{3}}{\sqrt{2}}$

2. $\frac{1}{\sqrt{5}}$

3. $\frac{12}{3\sqrt{2}}$

4. $\frac{3}{2 + \sqrt{5}}$

5. $\frac{xy}{\sqrt{x}}$

SOLVING SYSTEMS OF EQUATIONS

Solve by using the substitution method.

$$\begin{aligned} 1.) \quad & 2x + y = 4 \\ & 3x + 2y = 1 \end{aligned}$$

$$\begin{aligned} 2.) \quad & y = 3x - 27 \\ & y = \frac{1}{2}x - 7 \end{aligned}$$

Solve by using the elimination method.

$$\begin{aligned} 3.) \quad & 3u + 5v = -12 \\ & 2u - 3v = -8 \end{aligned}$$

$$\begin{aligned} 4.) \quad & 2a - b = 8 \\ & 6a - 3b = -9 \end{aligned}$$

SIMPLIFYING SQUARE ROOTS

$$1.) \sqrt{124}$$

$$2.) 135^{1/3}$$

$$3.) \sqrt{20x^2}$$

$$4.) \sqrt{12} \cdot \sqrt{48}$$

$$5.) \sqrt{32} + \sqrt{54} - \sqrt{98}$$

LINEAR EQUATIONS

Standard Form

Put the following equations into standard form.

1. $3y - 5 = 0$

2. $y = \frac{2}{3}x + 1$

3. $4x + 3y = 12$

4. $3(x + 2) - 7(y - 4) = 2x$

Slope-Intercept

Find the slope-intercept form of an equation of the line that has a slope of _____ and passes through _____.

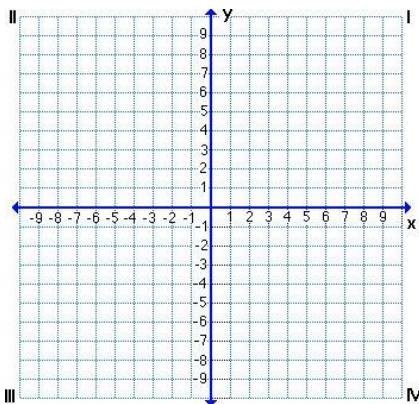
5. slope $-\frac{1}{2}$, passes through $(2, -3)$

6. slope 4, passes through the origin

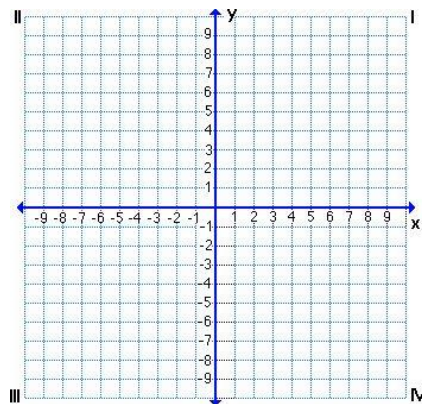
GRAPHING EQUATIONS

Graph the following equations.

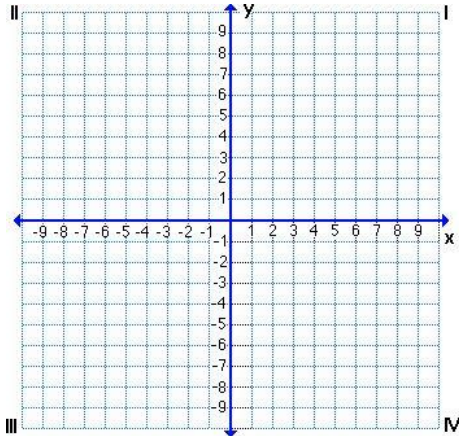
7. $2x + 5y = 10$



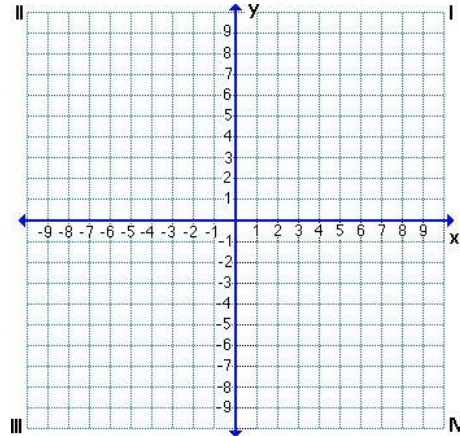
8. $\frac{x}{4} - \frac{y}{3} = 2$



9. $4y = 16 + 2x$



10. $5x + 6y = 4x - 2$



PARALLEL AND PERPENDICULAR LINES

Write an equation in slope-intercept form of the line that passes through _____ and is perpendicular to the line whose equation is _____.

11. passes through $(-9,5)$, equation $y = -3x + 2$

12. passes through $(4,6)$, equation $y = \frac{2}{3}x + \frac{10}{3}$

SOLVING LINEAR EQUATIONS

Solve for x in each equation:

a. $3(2x - 5) - 1 = -2(x + 4)$

b. $\frac{4x+2}{3} = 5x - 1$

c. $\frac{t+x-p}{m} = y$

d. $2x - 12y = 10$

e. $\frac{3}{2}x - 3 = \frac{3}{4}$

QUADRATIC EQUATIONS

Standard Form

Put the following equations into standard form.

1. $f(x) = 2(x - 1)^2 - 5$

2. $f(x) = -(x + 2)^2 + 3$

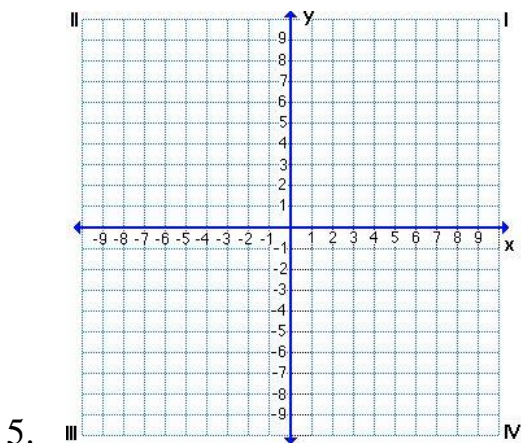
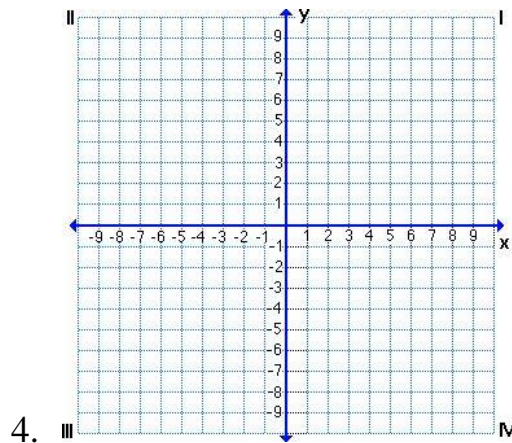
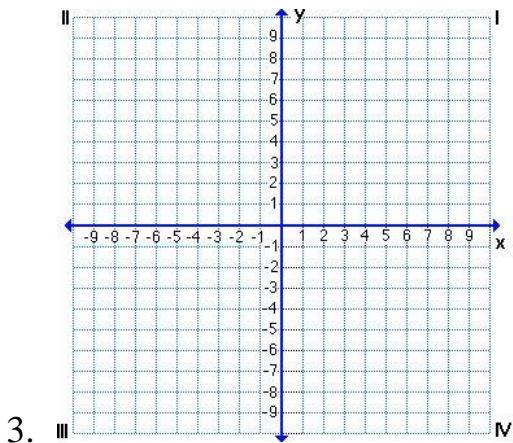
Graphing Quadratics

Identify the vertex, axis of symmetry, direction of opening, and y-intercept for each quadratic equation given and then graph below.

3. $f(x) = -2x^2 - 4x + 3$

4. $f(x) = (x - 3)^2 - 4$

5. $f(x) = -x^2 + 5$



SOLVING QUADRATIC EQUATIONS

Remember that quadratic functions can be solved in a variety of ways, by graphing, factoring, completing the square, and the quadratic formula. You must be comfortable determining the most appropriate method and solving.

Solve the following.

1. $16x^2 = 25$

2. $x^2 - 10x + 25 = 0$

3. $x^2 - 5x = -3$

4. $2x^2 + x - 28 = 0$

5. $12x^2 - 11x = 5$

6. $2x^2 + 7x - 1 = 0$

MANIPULATING RADICALS

Simplify the following. Express in radical form.

1) $\sqrt[4]{b^4}$

2) $\sqrt{50 a^3 b^7 c^2}$

3) $\sqrt[3]{8 b^2 z^3}$

4) $\sqrt[3]{64 a^6 b^9}$

5) $\sqrt{\frac{b^3}{a^4}}$

6) $\sqrt{a} \cdot \sqrt[3]{b} \cdot \sqrt[4]{c}$

EXPONENT RULES

$$(a^m)^n = a^{mn}$$

$$\frac{a^n}{a^m} = a^{n-m}$$

$$(ab)^n = a^n b^n$$

$$\left(\frac{a}{b}\right)^n = \frac{a^n}{b^n}$$

$$a^{-n} = \frac{1}{a^n}$$

$$a^{\frac{m}{n}} = \sqrt[n]{a^m} \text{ or } (\sqrt[n]{a})^m$$

You are expected to know the above rules. Use them to simplify the following. Answers may not be expressed with negative exponents!

$$1) \frac{2x^2 y^4 t^7}{6x^7 y^5 t}$$

$$2) \frac{m^{-4} p^3 k^{-1}}{p^{-2} k^{-2} m^{-2}}$$

$$3) \frac{1}{2x^{-3}} \cdot 4x^{\frac{1}{2}}$$

$$4) \frac{3 x^{\frac{4}{5}} y^2}{6 x^{\frac{1}{3}} y^2}$$

$$5) \frac{20x^{20} t^{-\frac{1}{3}}}{10x^{10} t^{-4}}$$

$$6) \frac{3 x p^{-3}}{6 x^3 p^{-2}}$$

DISTANCE AND MIDPOINT

You are expected to have the distance and midpoint formulas memorized from Algebra 2.

A rectangle has vertices located at $A(2,1)$, $B(10,1)$, $C(10,16)$, and $D(2,16)$.

- A. What is the horizontal width of the rectangle from A to B?
- B. What is the length of the diagonal AC?
- C. What are the coordinates of the point midway between A and D?
- D. What are the coordinates of the intersection of diagonals AC and BD?
- E. What is the slope of diagonal BD?
- F. What is the slope of a line perpendicular to diagonal AC?

A significant portion of this course will be calculator-free. You may want to brush up on basic arithmetic without the use of a calculator.

FRACTIONS

Complete without a calculator. Leave all answers as simplified fractions.

a. $\frac{2}{3} + \frac{3}{4} + \frac{5}{6}$

b. $\frac{2x}{3} + \frac{3x}{8}$

c. $\frac{4}{3} \times 9 \times \frac{3}{4} \times \frac{8}{9}$

d. $\frac{35q^8}{9p^5} \div \frac{25q^6}{10p^5}$

e. $\left(\frac{mt}{p}\right)\left(\frac{pt}{m}\right)$

f. $\frac{x}{x-2} + \frac{-8}{x^2-4}$

OPERATIONS

Simplify #1-16 **without** the use of a calculator.

1. $45 - [3(5-3)]$

2. $(9^2 + 4 \cdot 9 \div 4 - 6) \div 3$

3. Find the value of $2X^2 + 3X - 4$ when $X = -3$

Subtract:

4. $-21 - (-0.8)$

5. $-0.8 - (-1.1)$

6. $\frac{15}{16} - \frac{7}{20}$

7. $(+13) - (-2)$

Multiply:

8. 0.35×0.3

9. $\frac{10}{33} \cdot \frac{9}{50}$

10. $-5.2 \cdot (-12.8)$

11. $1\frac{1}{5} \cdot 4\frac{1}{2}$

12. $7.3 \cdot (-12.1)$

Divide

13. $-21.07 \div -4.3$

14. $0.27 \div 0.1$

15. $5\frac{1}{3} \div 3\frac{1}{5}$

16. Add: $\frac{3}{10} + \frac{1}{4}$