

## PreCalculus

**Summer Packet 2019-2020**

**Name:**

**Per:**

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This packet is to help you review various topics that are considered to be prerequisite knowledge upon entering PreCalculus. In order to ensure that the good skills that you developed in your Algebra II and Geometry courses do not disappear this summer, working on this packet is highly recommended over the summer. (A good habit would be to do at least one math problem every day.) Enjoy your summer, but be sure to come prepared with the necessary knowledge to continue on into PreCalculus next year. There will be a skills quiz on these topics in the fall.

### **I. Distance, Midpoint, Linear Equation, and Other Geometry Topics**

1. Given points A (-3, 4) and B (6, -7), find each of the following:

a. the midpoint of the segment

b. the distance between A and B

c. the slope of the line through A and B

d. the standard form of the equation of the line through the points (where A, B, and C are integers,  $A > 0$ )

2. Write the equation in slope-intercept form of the line through (2, -4) and perpendicular to  $x - 2y = 7$ .

3. Write the equation in slope-intercept form of the line parallel to the line  $4x - 6y = -1$  that contains the x-intercept of  $3x - 2y = 12$ .

**II. Quadratics and Factoring** You should be able to answer each of these problems both with and without the use of your calculator. Check your answers if necessary.

1. Solve:  $\sqrt{3x + 7} = x + 1$

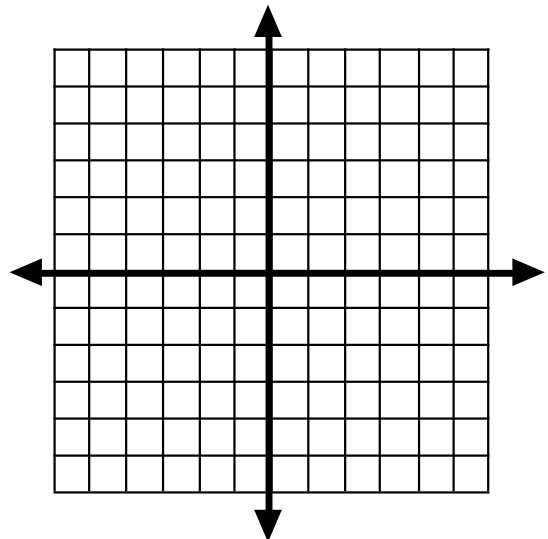
2. Given  $y = -3x^2 - 6x + 2$ , find each of the following then sketch the graph:

a. vertex: \_\_\_\_\_

b. y-intercept: \_\_\_\_\_

c. x-intercept(s): \_\_\_\_\_

d. axis of symmetry: \_\_\_\_\_



3. Factor each of the following completely.

a.  $3x^3 - 6x^2 - 45x$

b.  $-28y^2 + 7t^2$

c.  $x^3 - 2x^2 - 9x + 18$

d.  $x^3 - 64$

4. Solve for all solutions (real and complex). Leave solutions in simplest radical form as needed.

a.  $(x - 5)^2 = 9$

b.  $x^3 - 64 = 0$

c.  $3x^3 - 6x^2 - 45x = 0$

d.  $3x^2 + 5x = 6$

**III. Systems** Be able to solve both with and without your calculator.

5. Solve each of the following:

a. 
$$\begin{cases} 3x - 4y = 2 \\ -x + 3y = 1 \end{cases}$$

b. 
$$\begin{cases} 3x + 6y = 9 \\ -2x - 4y = 3 \end{cases}$$

c. 
$$\begin{cases} -x + y = 3 \\ 2x - 2y = -6 \end{cases}$$

6. Explain in a few sentences how you would solve a system on your calculator.

**IV. Exponents** Simplify using only positive exponents. This section is **no calculator**.

1.  $\left(\frac{81}{64}\right)^{-\frac{1}{2}}$

2.  $(27^{-2})^{-\frac{1}{3}}$

3.  $(8y^4)(2y^{-3})^{-2}$

4.  $(4^{-1} + 2^{-1})^2$

5.  $\frac{(3x^2)^{-1}}{6x^{-3}}$

6.  $16^{\frac{3}{2}}$

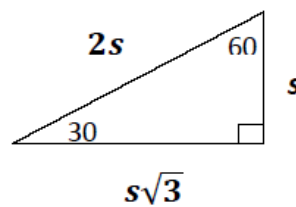
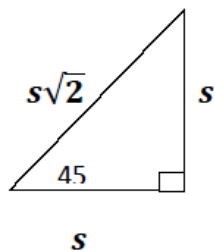
7.  $-2^4$

8.  $(-3x^2)^2$

9.  $\frac{3^{-5} \cdot 3^{10}}{3^2}$

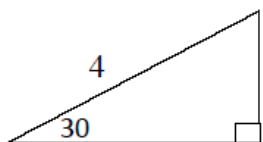
## V. Right Triangles

Recall Special Triangles

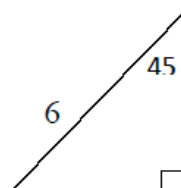


1. Find the missing sides of the special right triangle. Give exact answers!

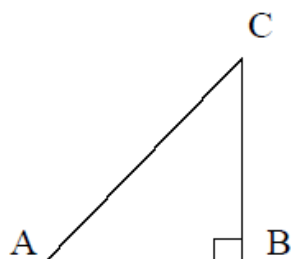
a.



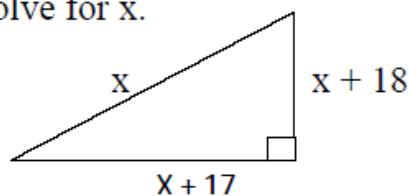
b.



2. Given a right triangle with side  $AC = 12$  and  $m\angle A = 46^\circ$ , find side  $BC$  and  $AB$ . Round your answer to the nearest hundredth. (hint: use SOH CAH TOA)



3. Solve for  $x$ .



## VI. Rational Functions

1. Simplify to a single fraction.

a.  $\frac{1}{ab} - \frac{2}{b^2}$

b.  $\frac{\frac{2}{x} + \frac{1}{x-2}}{x-1}$

c.  $\frac{x^2+6x+8}{x^2-4}$

d.  $\frac{\frac{x}{x-1}+1}{x}$

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

3. Find the quotient and remainder when  $x^3 - 6x^2 + 5x - 7$  is divided by  $x - 5$ .