 COMMUNITY CHARTER SCHOOL OF CAMBRIDGE	Algebra 2 to Pre-Calc	Summer Packet Name: Date:
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What: This is an packet that will both review the content we studied in Algebra 2 and prepare you for Pre-Calculus. It will be graded for accuracy and completion by your math teacher next school year and count as a **minor assessment**. The content is organized such you can use Khan Academy if you are stuck.

<https://www.khanacademy.org/math>

Why: Just like the muscles you would use to play an instrument or play sports, your brain is a muscle that needs practice. While we math teachers are convinced that you do math all the time without realizing it, we also want to give you some practice that is a little more like what you see while you are in school. If you do not do any math all summer you're math muscles will get weak and soft! Instead, you should do this assignment to keep your math muscles strong so that you can be ready for next school year.

When: While it is worthwhile to do this packet at any point this summer, your math teacher will be really happy if you spread out the work over the summer. Your muscles will be much stronger if you do some practice every week rather than if you were to do one intense workout and nothing the rest of the summer (ask Mr. Gibson, it's true!).

Due: First day of school next year.

Show your work, attach extra paper if necessary!

1. **Solving Quadratic Equations:**

Quadratic Formula

Steps to Solve:

1. Try to use a diamond to factor and then solve.
2. Use the square root property if there is no linear term
3. If you can't solve a diamond, use the quadratic formula:

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

a) $2x^2 - 8 = 0$

c) $2x^2 + 5x - 12 = 0$

b) $2x^2 - 7x - 4 = 0$

d) $9x^2 + 6x - 8 = 0$

2) Simplify using laws of exponents and radicals.

a) $(pq)^{-5} \cdot (pq)^{-1}$

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

b) $t^{1/5} \cdot t^{4/5}$

e) $\frac{13}{13^{\frac{3}{4}}}$

c) $\frac{(ab)^7}{(ab)^2}$

f) $\frac{1}{(h^2)^{-3}}$

3) Solve the Radical Equations. Be sure to check for extraneous solutions.

a) $\sqrt{3x+7} = 4$

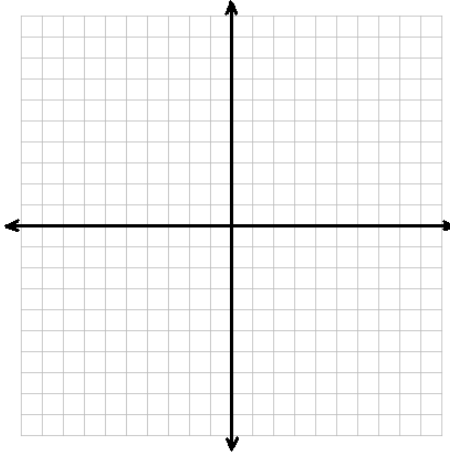
c) $x-10 = \sqrt{9x}$

b) $\sqrt{x-25} + 3 = 5$

d) $x - 1 = \sqrt{2x - 2}$

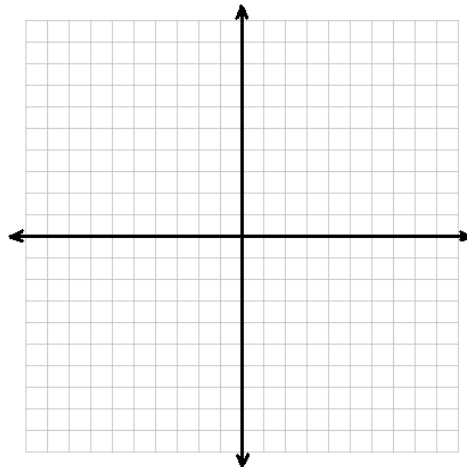
4) Graph the following:

a) $y = 2\left(\frac{1}{4}\right)^x - 3$



Domain: _____
Range: _____
End behavior:

b) $y = (3)^x - 2$



Domain: _____
Range: _____
End behavior:

5) Solve for x by creating like bases:

a) $8^x = 2^{x+6}$

b) $4^{2x} = 8^{x+4}$

b) $3^{x^2-3x} = 81$

d) $4^{x+1} = \frac{1}{64}$

Solve $5^{3x-2} = 125^{2x}$
$5^{3x-2} = 125^{2x}$
$5^{3x-2} = (5^3)^{2x}$
$5^{3x-2} = 5^{6x}$
$3x-2 = 6x$
$-2 = 3x$
$x = -\frac{2}{3}$

6) Find the x and y intercepts of the following:

a) $y = 2\sqrt{x-4}$

c) $f(x) = |x-5|$

b) $f(x) = x^3 - 13x + 12$

d) $f(x) = \sqrt[3]{x+8}$

7) Rewrite in exponential form:

a.) $\log_r s = t$

b.) $\log_q 5 = n$

8) Rewrite in logarithmic form:

a.) $2^t = c$

b.) $b^a = 16$

9) Solve the following:

a.) $\log_4 29 = t$

b.) $5^a = 317$

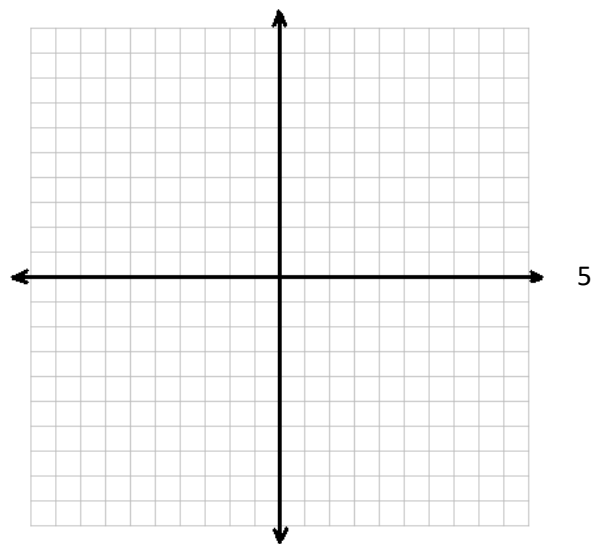
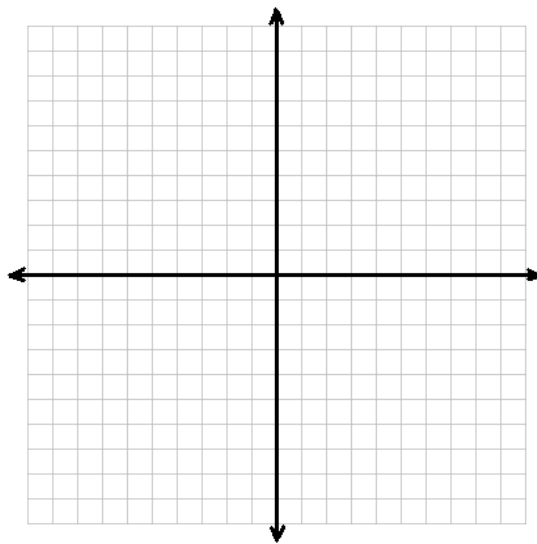
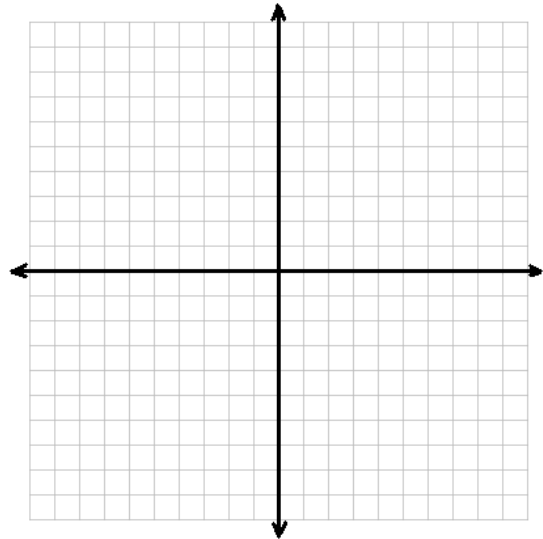
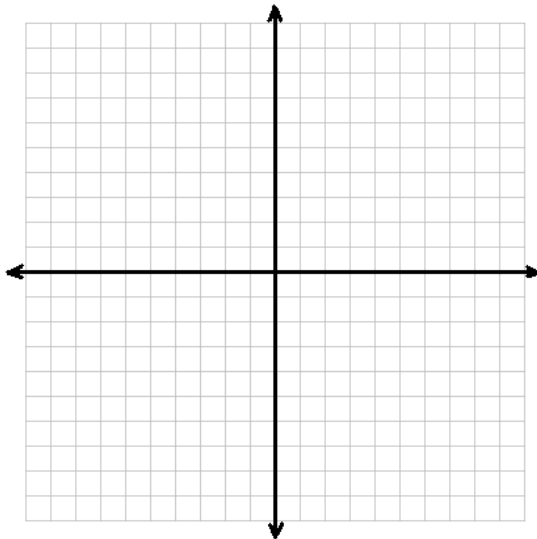
10) Graph the following polynomial functions using the x and y intercepts, as well as the vertex for the parabolas.

a) $y = 2x^2 - 6x + 4$

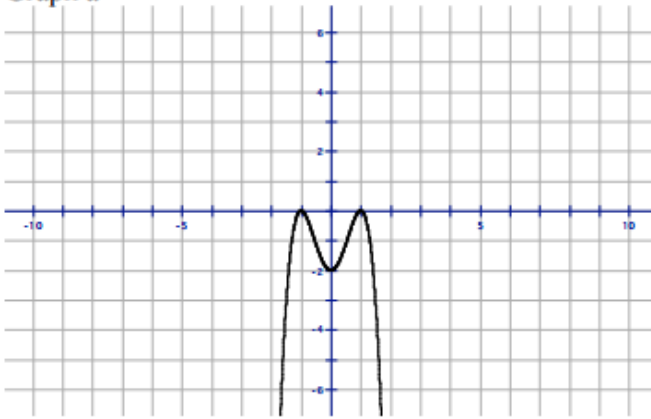
b) $y = x^2 + 6x + 5$

c) $y = -x^2 - 5x + 6$

d) $y = 2x^2 - 8x + 6$



11. Answer the questions about the polynomial function



Even or Odd Degree?

Positive or Negative Leading Coefficient?

End Behavior:

$$x \rightarrow -\infty, \quad y \rightarrow$$

$$x \rightarrow \infty, \quad y \rightarrow$$

12. Simplify the rational expression. State any restrictions on the variable. $\frac{t^2 - 4t - 32}{t - 8}$

a. $t - 4; t \neq -8$

b. $t + 4; t \neq 8$

c. $-t - 4; t \neq 8$

d. $-t + 4; t \neq -8$

13. What is the product in simplest form? State any restrictions on the variable.

$$\frac{y^2}{y - 3} \cdot \frac{y^2 - y - 6}{y^2 + 1y}$$

a. $\frac{y^2 + 2y}{y + 1}, y \neq 3, -1$

b. $\frac{y^2 + 2y}{y + 1}, y \neq 3, 0, -1$

c. $\frac{y + 2}{y + 1}, y \neq 3, 0, -1$

d. $\frac{y + 2}{y + 1}, y \neq 3, -1$

14. What is the quotient in simplified form? State any restrictions on the variable.

$$\frac{x^2 - 16}{x^2 + 5x + 6} \div \frac{x^2 + 5x + 4}{x^2 - 2x - 8}$$

a. $\frac{(x - 4)^2}{(x + 3)(x + 1)}; x \neq -3, -1$

b. $\frac{(x + 4)^2(x + 1)}{(x + 2)^2(x + 3)}; x \neq -3, -2, 4$

c. $\frac{(x - 4)^2}{(x + 3)(x + 1)}; x \neq -4, -3, -2, -1, 4$

d. $\frac{1}{(x + 3)(x + 1)}; x \neq -4, -3, -2, -1, 4$

15. Simplify the sum. $\frac{4}{m+9} + \frac{5}{m^2-81}$

a. $\frac{9}{(m-9)(m+9)}$

c. $\frac{9}{m^2+m-72}$

b. $\frac{4m-31}{(m-9)(m+9)}$

d. $\frac{4m+41}{(m-9)(m+9)}$

16. Solve. $\frac{c+3}{c-8} = \frac{c-4}{c+5}$

a. $\frac{17}{20}$

b. $\frac{47}{4}$

c. $\frac{47}{20}$

d. $-\frac{47}{4}$

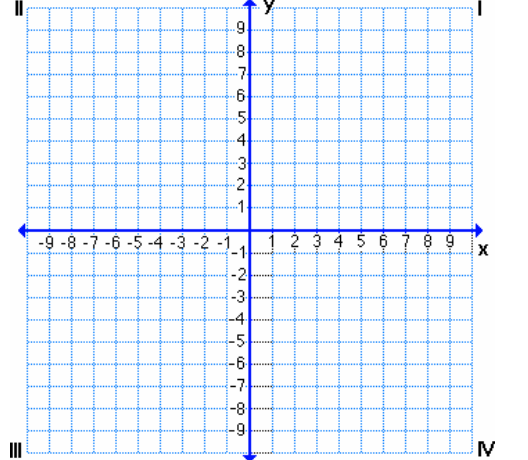
17. Solve. $\frac{a}{a^2-36} + \frac{2}{a-6} = \frac{1}{a+6}$

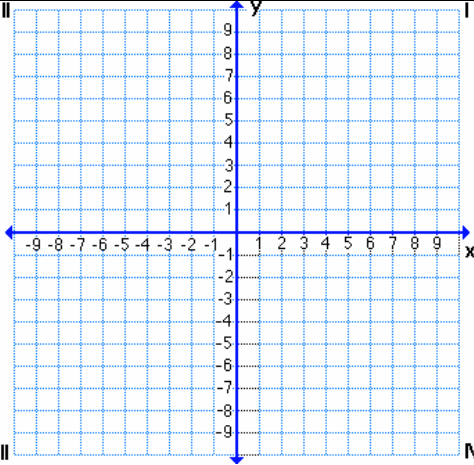
a. -9

b. -6

c. -9 and -6

d. 6

18	$y = \frac{-6}{x+3} + 2$	<p>Value of a:</p> <p>Transformations:</p> <p>Domain:</p> <p>Range:</p> <p>Horizontal Asymptote:</p> <p>Vertical Asymptote:</p>	
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19	$y = \frac{2}{x-1} - 3$	Value of a: Transformations: Domain: Range: Horizontal Asymptote: Vertical Asymptote:	
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20) Imaginary Numbers Review:

a. i^7	b. $2i^2 * 3i^3$
c. $\sqrt{-32}$	d. $6i - 2i + 4$

$$i = \sqrt{-1}$$

$$i^2 = -1$$

$$i^3 = -i$$

$$i^4 = 1$$

21) Fill in the blanks about each polynomial function.

1] $y = 2x^5 + 7x^2 + 4x$ Degree: _____ Sign of LC: _____ as $x \rightarrow -\infty, y \rightarrow$ _____ as $x \rightarrow \infty, y \rightarrow$ _____	2] $y = -5x$ Degree: _____ Sign of LC: _____ as $x \rightarrow -\infty, y \rightarrow$ _____ as $x \rightarrow \infty, y \rightarrow$ _____	3] $y = 12x^4 - 2x + 5$ Degree: _____ Sign of LC: _____ as $x \rightarrow -\infty, y \rightarrow$ _____ as $x \rightarrow \infty, y \rightarrow$ _____
4] $y = 6 - 2x - 4x^2 + 5x^3$ Standard Form: Degree: _____ Sign of LC: _____ as $x \rightarrow -\infty, y \rightarrow$ _____ as $x \rightarrow \infty, y \rightarrow$ _____	5] $y = 1 + 2x^6 - 4x^2 - 2x^6$ Standard Form: Degree: _____ Sign of LC: _____ as $x \rightarrow -\infty, y \rightarrow$ _____ as $x \rightarrow \infty, y \rightarrow$ _____	6] $y = 4x + 2 - 5x^6$ Standard Form: Degree: _____ Sign of LC: _____ as $x \rightarrow -\infty, y \rightarrow$ _____ as $x \rightarrow \infty, y \rightarrow$ _____