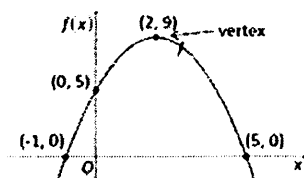


PARCC Prep – Packet 1: Up to Polynomials

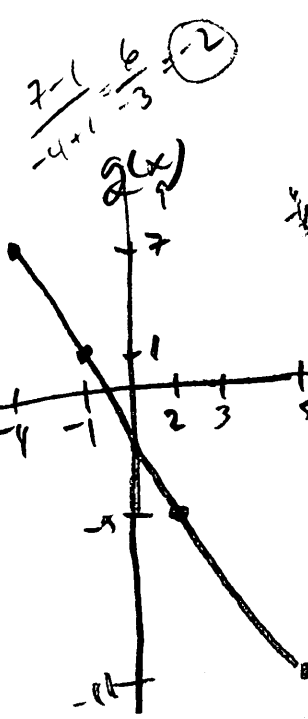
Do the best you can to answer each of these.

1. Analyzing the graph of a quadratic:

A portion of the graph of a quadratic function $f(x)$ is shown in the xy -plane. Selected values of a linear function $g(x)$ are shown in the table.



	$g(x)$
-4	7
-1	1
2	-5
5	-11



For each comparison below, use the drop-down menu to select a symbol that correctly indicates the relationship between the first and the second quantity.

First Quantity	Comparison	Second Quantity
The y-coordinate of the y-intercept $f(x)$ 5	<input type="text" value=">"/>	The y-coordinate of the y-intercept $g(x)$ $1 > 4 > -5$
$f(3)$	<input type="text" value=">"/>	$g(3)$
Maximum value of $f(x)$ on the interval $-5 \leq x \leq 5$ $(2, 9)$	<input type="text" value="="/> Equal	Maximum value of $g(x)$ on the interval $-5 \leq x \leq 5$ $(-5, 9)$
$\frac{f(5) - f(2)}{5 - 2}$	<input type="text" value="<"/>	$\frac{g(5) - g(2)}{5 - 2}$

$(-3) = \frac{0 - 9}{3} <$
 $\frac{-11 + 5}{3} = \frac{-6}{3} = (-2)$

2. Converting forms of a quadratic & solving:

An expression is given: $x^2 - 8x + 21$

Determine the values of h and k that make the expression $(x - h)^2 + k$ equivalent to the given expression.

Enter your answers in the space provided. Enter **only** your answer.

$h = \boxed{4}$ $k = \boxed{5}$

$x^2 - 8x + 16 = -21 + 16$
 $(x - 4)^2 = -5$
 $y = (x - 4)^2 + 5$

An equation is given: $x^2 - 8x + 21 = (x - 4)^2 + 3x - 16$

Find one value of x that is a solution to the given equation.

Use the Equation Editor. Enter **ONLY** your solution.

$x = \boxed{7}$

$x^2 - 8x + 21 = x^2 - 8x + 16 + 3x - 16$
 $x^2 - 8x + 21 = x^2 - 5x$
 $-8x + 21 = -5x$
 $21 = 3x$
 $x = 7$

3. Working with Imaginary numbers:

The table shows several complex numbers, where i is the imaginary unit. Select all appropriate cells in the table where the product of the two numbers is a real number.

$$i^2 = -1$$

	$8 - 2i$	3	i
$8 + 2i$	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
$5i$	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
-4	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>

4. Use the discriminant:

For each system of equations shown in the table, determine the number of points of intersection. Select one cell for each row.

System	No points of intersection	One point of intersection	Two points of intersection
$\begin{cases} y = 1 - x^2 \\ y = x - 1 \end{cases}$	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
$\begin{cases} y = 1 - x^2 \\ y = 1 \end{cases}$	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
$\begin{cases} y = 1 - x^2 \\ y = 2 - x \end{cases}$	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Set equations equal + solve

5. Function Operations & Simplifying:

The functions f and g are defined by $f(x) = x^2$ and $g(x) = 2x$, respectively.

Rewrite the function $h(x) = \frac{f(2x)g(-2x)}{2}$ in terms of x .

$$\frac{(2x)^2 \cdot 2(-2x)}{2} = \frac{4x^2 \cdot (-4x)}{2}$$

Enter your answer in the space provided. $h(x) = \frac{\quad}{\quad}$

$$\frac{-16x^3}{2}$$

6. Graphing / Finding points of intersection

Given the functions $h(x) = |x - 4| + 1$ and $k(x) = x^2 + 3$, which intervals contain a value for x for which $h(x) = k(x)$?

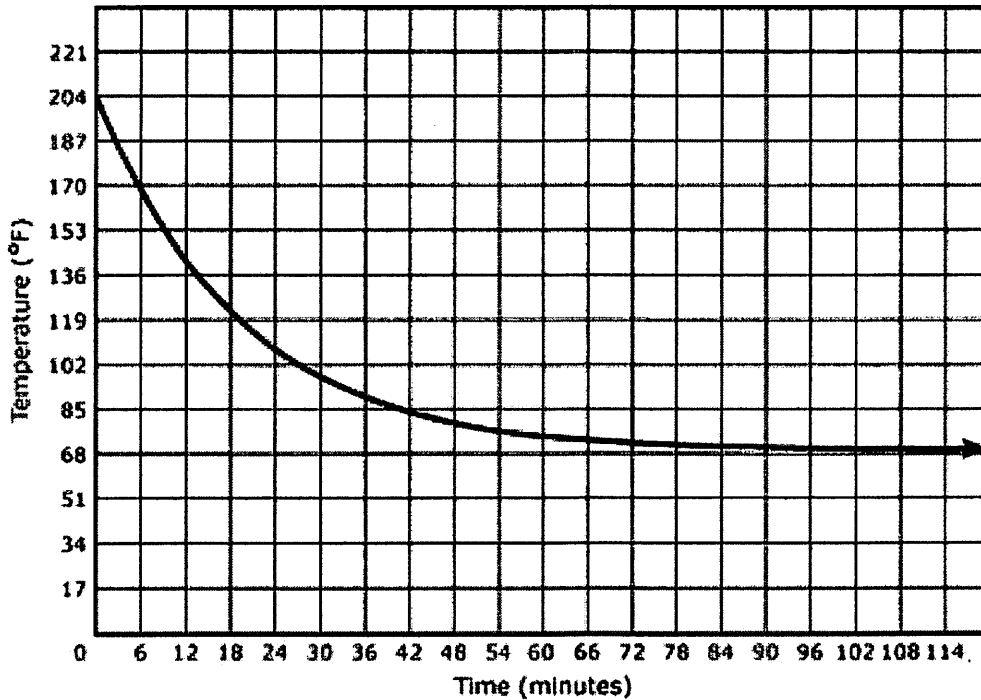
- A. $-4.5 < x < -3$ **B.** $-3 < x < -1.5$
 C. $-1.5 < x < 1.5$ D. $1.5 < x < 3$
 E. $3 < x < 4.5$

$x = (-1, 4)$
 $x = (-2, 7)$

7. Analyzing a graph:

NEWTON'S LAW OF COOLING

The graph represents the temperature, in degrees Fahrenheit (F°), of tea for the first 120 minutes after it was poured into a cup.



A

Based on the graph, what was the temperature of the tea when it was first poured into the cup?

A. 68°

B. 114°

C. 136°

D. 204°

B

Based on the graph, as the number of minutes increased, what temperature did the tea approach?

A. 68°

B. 114°

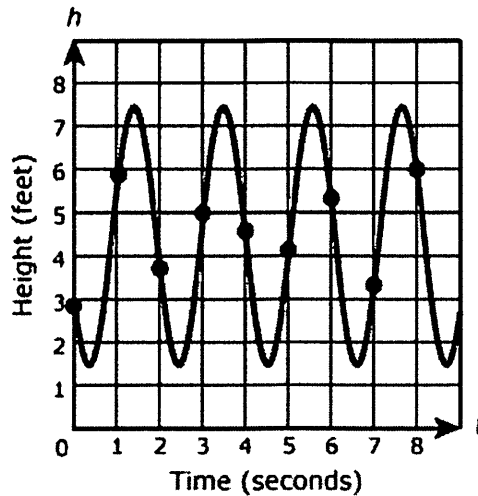
C. 136°

D. 204°

↑
horizontal
asymptote

8. Rate of Change from a graph:

The graph models the height h above the ground, in feet, at time t seconds of a person swinging on a swing. Each point indicated on the graph represents the height of the person above the ground at the end of each one-second interval.



Over each interval, the average rate of change in the height, in feet per second, of the person on the swing can be calculated. Order the intervals from least to greatest, based on the corresponding rate of change.

Drag and drop each interval to the correct position.

LEAST

GREATEST

Slope

From 2 seconds to 3 seconds

From 0 seconds to 1 second

From 7 seconds to 8 seconds

$m = 1.3$
 $(2, 3.7)$
 $(3, 5)$

$(0, 3)$
 $(1, 6) \quad m = 3$

$(7, 3.3)$
 $(8, 6) \quad m = 2.7$

9. Synthetic Division/Substitution:

If k is constant, what is the value of k such that the polynomial $k^2x^3 - 6kx + 9$ is divisible by $x - 1$?

then $f(1) = 0$

$k = \boxed{3}$

$k^2(1)^3 - 6k(1) + 9 = 0$

$k^2 - 6k + 9 = 0$

$(k-3)(k-3) = 0$

$k = 3$

10. Factoring:

Write the expression $x - xy^2$ as the product of the greatest common factor and a binomial. Then, determine the complete factorization of $x - xy^2$.

Enter your answers in the boxes.

Product of greatest common factor and binomial: $x(1 - y^2)$

Complete factorization: $x(1 + y)(1 - y)$

11. Factoring:

The expression $x^2(x - y)^3 - y^2(x - y)^3$ can be written in the form $(x - y)^a(x + y)$, where a is a constant. What is the value of a ?

Enter your answer in the box.

$a = 4$

$$\begin{aligned} &(x-y)^3(x^2-y^2) \\ &(x-y)^3(x-y)(x+y) \\ &(x-y)^4(x+y) \end{aligned}$$

12. Factoring:

Consider the expression $6x^3 - 5x^2y - 24xy^2 + 20y^3$.

A

Factor by grouping

Which expression is equivalent to $6x^3 - 5x^2y - 24xy^2 + 20y^3$?

$$\begin{aligned} &6x^3 - 24xy^2 - 5x^2y + 20y^3 \\ &6x(x^2 - 4y^2) - 5y(x^2 - 4y^2) \\ &(6x - 5y)(x^2 - 4y^2) \end{aligned}$$

A. $x^2(6x - 5y) + 4y^2(6x + 5y)$

B. $x^2(6x - 5y) + 4y^2(6x - 5y)$

C. $x^2(6x - 5y) - 4y^2(6x + 5y)$

D. $x^2(6x - 5y) - 4y^2(6x - 5y)$

B

Which expressions are factors of $6x^3 - 5x^2y - 24xy^2 + 20y^3$? Select all that apply.

A. $x^2 + 4y^2$

B. $6x - 5y$

C. $x + 2y$

D. $6x + 5y$

E. $x - 2y$

$$\begin{aligned} &(6x - 5y)(x^2 - 4y^2) \\ &(6x - 5y)(x + 2y)(x - 2y) \end{aligned}$$

13. Polynomials in intercept form:

Set $x=0$

Consider the function $f(x) = (2x - 1)(x + 4)(x - 2)$.

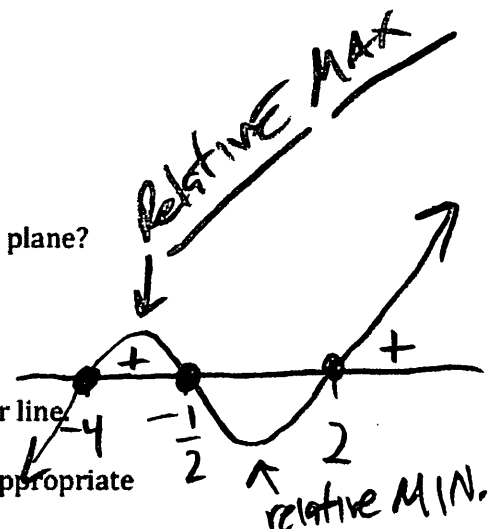
$(-1)(4)(-2) = 8$

A What is the y -intercept of the graph of the function in the coordinate plane?

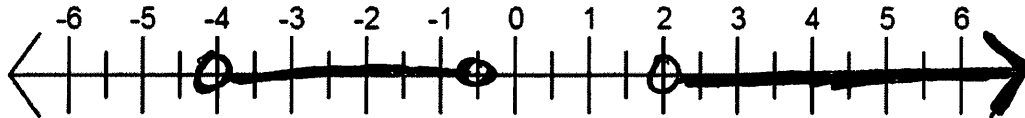
Enter your answer in the box.

B For what values of x is $f(x) > 0$? Show your answer on the number line.

Select a solution set indicator. Drag the points on the indicator to the appropriate locations on the number line.



$(-4, \frac{1}{2}) \cup (2, \infty)$



C What is the end behavior of the graph of the function?

- A. As $x \rightarrow -\infty$, $f(x) \rightarrow \infty$, and as $x \rightarrow \infty$, $f(x) \rightarrow \infty$.
- B. As $x \rightarrow -\infty$, $f(x) \rightarrow \infty$, and as $x \rightarrow \infty$, $f(x) \rightarrow -\infty$.
- C. As $x \rightarrow -\infty$, $f(x) \rightarrow -\infty$, and as $x \rightarrow \infty$, $f(x) \rightarrow \infty$.
- D. As $x \rightarrow -\infty$, $f(x) \rightarrow -\infty$, and as $x \rightarrow \infty$, $f(x) \rightarrow -\infty$.

D How many relative maximums does the function have?

(HILLS IN GRAPH)

- A. none
- B. one
- C. two
- D. three