

Date:

Section: 2.3

Objective: Finding x and y intercepts & when a function is positive or negative

Intercepts

x-Intercepts: The points where a graph crosses the x-axis. They have the form $(x, 0)$.

- To find the x-intercept(s), let $y=0$ then solve for x .

y-Intercepts: The points where a graph crosses the y-axis. They have the form $(0, y)$.

- To find the y-intercept(s), let $x=0$ then solve for y .

Examples: Find the intercepts of each graph. Write the intercepts as ordered pairs.

a) $f(x) = 2x + 6$

$y = 2x + 6$
 Let $y = 0$
 $0 = 2x + 6$

$-6 = 2x$
 $\frac{-6}{2} = \frac{2x}{2}$
 $-3 = x$

Let $x = 0$
 $y = 2x + 6$
 $y = 2(0) + 6$
 $y = 0 + 6$
 $y = 6$

x-intercept $(-3, 0)$

y-intercept $(0, 6)$

b) $f(x) = -3x + 2$

$y = -3x + 2$
 Let $y = 0$
 $0 = -3x + 2$

$-2 = -3x$
 $\frac{-2}{-3} = \frac{-3x}{-3}$
 $\frac{2}{3} = x$

x-intercept $(\frac{2}{3}, 0)$

y-intercept $(0, 2)$

Let $x = 0$
 $y = -3x + 2$
 $y = -3(0) + 2$
 $y = 0 + 2$
 $y = 2$

c) $3x + 2y = 12$

Let $y = 0$
 $3x + 2(0) = 12$
 $3x = 12$
 $\frac{3x}{3} = \frac{12}{3}$
 $x = 4$

Let $x = 0$
 $3(0) + 2y = 12$
 $2y = 12$
 $\frac{2y}{2} = \frac{12}{2}$
 $y = 6$

x-intercept $(4, 0)$
y-intercept $(0, 6)$

d) $x - 2y = 5$

Let $y = 0$
 $x - 2(0) = 5$
 $x = 5$

Let $x = 0$
 $0 - 2y = 5$
 $-2y = 5$
 $\frac{-2y}{-2} = \frac{5}{-2}$
 $y = -\frac{5}{2}$

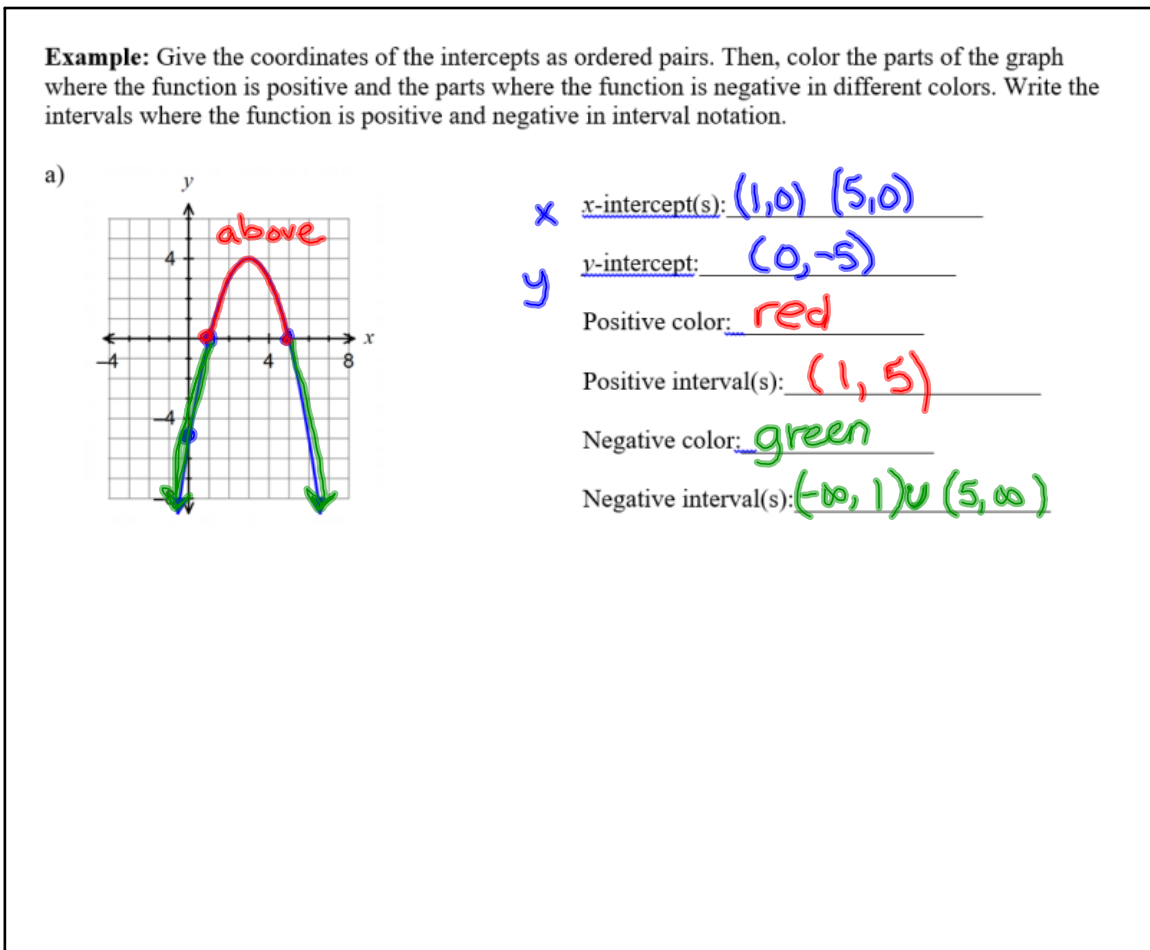
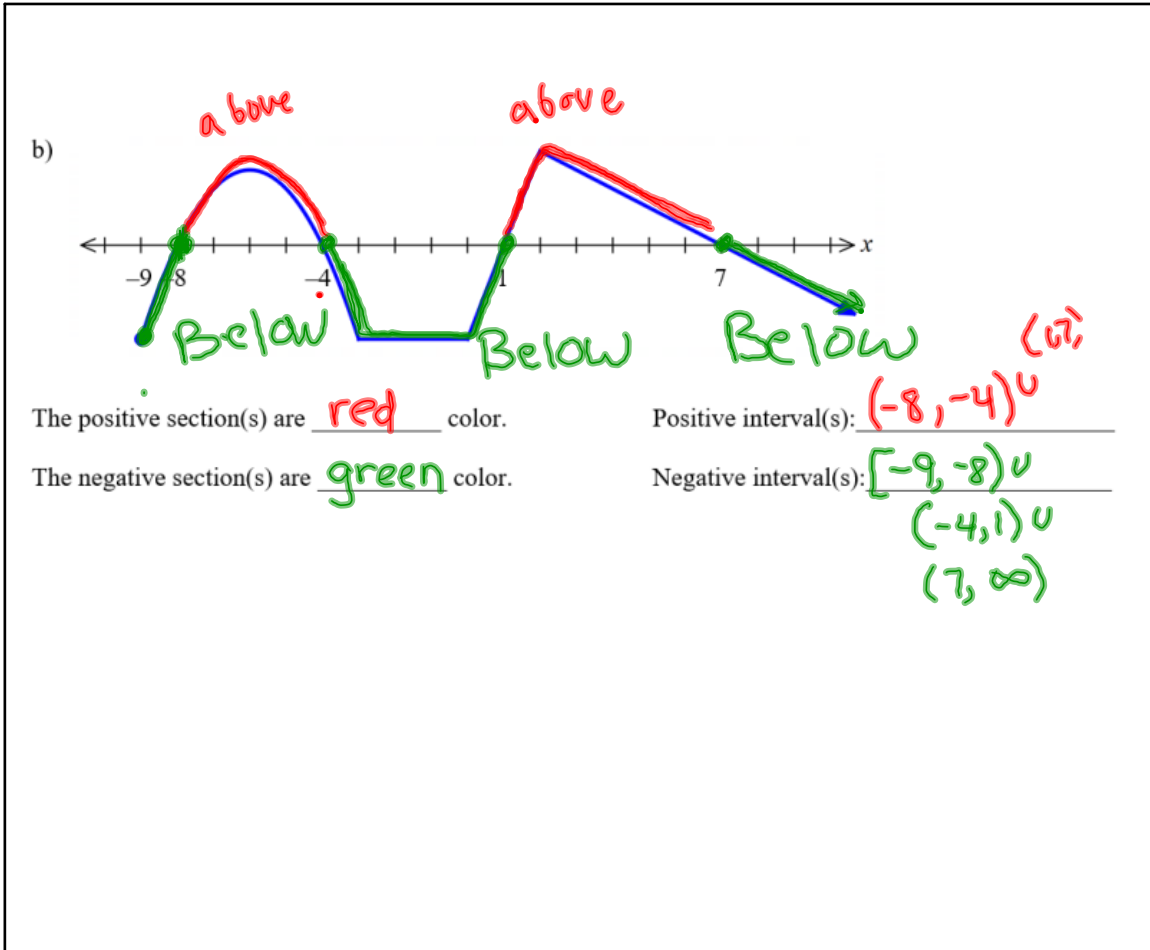
x-intercept $(5, 0)$
y-intercept $(0, -\frac{5}{2})$

Positive and Negative

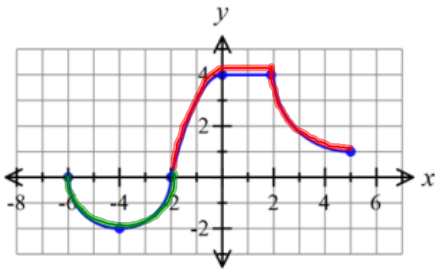
- A function is positive where the y-coordinates are positive. The graph is above the x-axis.
- A function is negative where the y-coordinates are negative. The graph is below the x-axis.
- ★ When you are asked to state where the graph is positive and negative, write the intervals of the of x - coordinates from left to right.
least greatest
- ★ Use () at the x-intercepts, where the graph crosses over from positive to negative. The y-coordinate is zero at the intercepts, so the graph is neither positive or negative there. That means those points are not included in the interval.
- ★ Use [] if the graph has an endpoint somewhere above or below the x-axis.

Example: Color the increasing, decreasing, and constant sections of the graph each a different color. Then write the intervals where the graph is increasing, decreasing, and constant in interval notation.





b)



x-intercept(s): $(-6, 0) \cup (-2, 0)$

y-intercept: $(0, 4)$

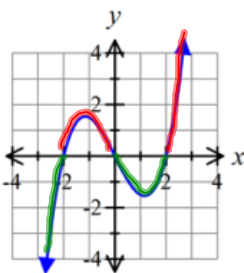
Positive color: red

Positive interval(s): $[-2, 5]$

Negative color: green

Negative interval(s): $(-6, -2)$

c)



x-intercept(s): $(-2, 0) \cup (0, 0) \cup (2, 0)$

y-intercept: $(0, 2)$

Positive color: Red

Positive interval(s): $(-2, 0) \cup (2, \infty)$

Negative color: green

Negative interval(s): $(-\infty, -2) \cup (0, 2)$