

Key

Math 4

1-5 Solving Inequalities (NLA)

Name _____

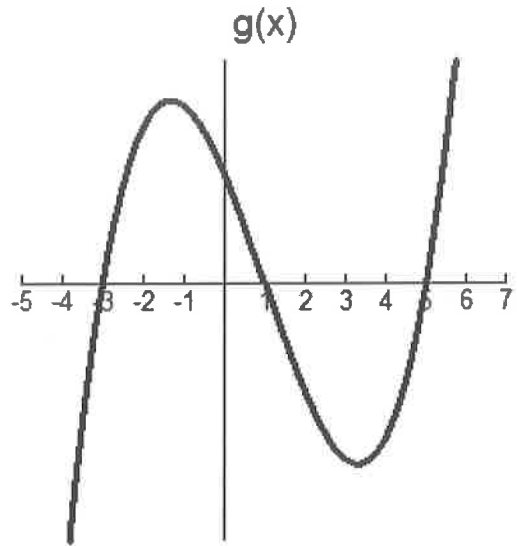
Date _____

I. Consider the function $g(x)$ graphed at the right.

What does it mean to say ...

“Where does the function equal zero?”

Where is the y-coordinate zero?
(x-intercepts)



“Where is the function positive?”

Above the x-axis.

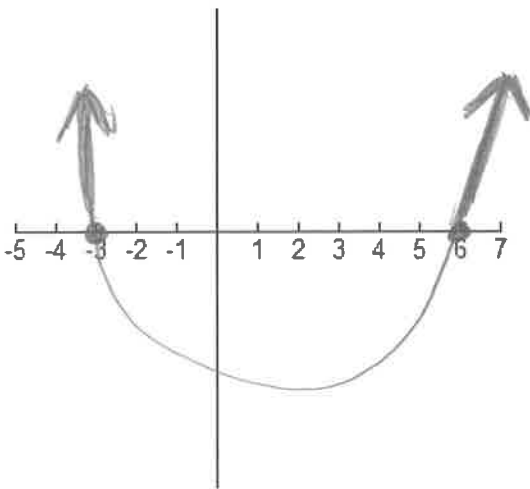
Positive y-coordinates

How can you look at the graph of a function and determine where a function is positive or negative?

Find where it is above & below the x-axis.

II. Graph the function $f(x) = x^2 - 3x - 18$ and determine where $f(x) > 0$.

$$= (x - 6)(x + 3)$$



$x < -3 \text{ or } x > 6$

III. How could you determine where a function is positive or negative without the aid of a graphing calculator? **Number Line Analysis!!**

Example: Solve $x^2 + 3x - 4 < 0$. (this means negative!)

Solution: 1. Factor completely. $x^2 + 3x - 4 = (x - 1)(x + 4)$

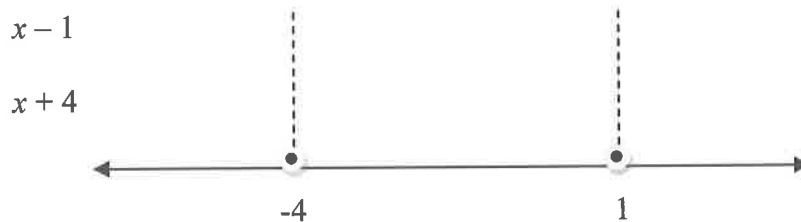
2. Create a number line putting the zeros of each of the factors on the number line.



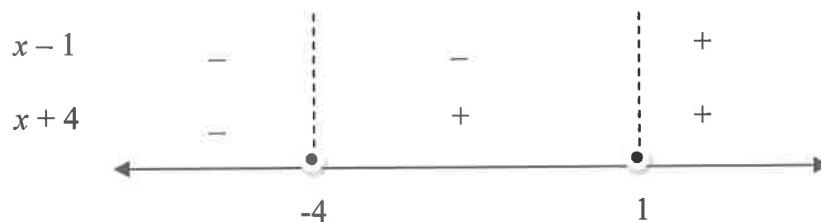
3. Divide the number line into regions using the zeros.



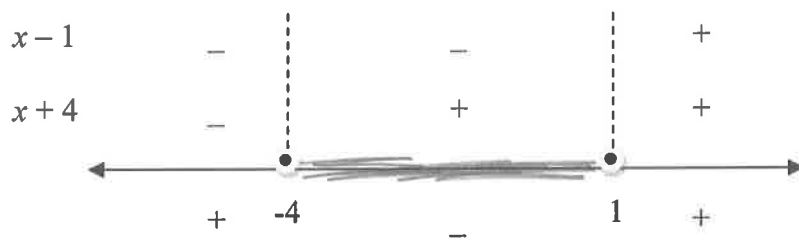
4. Place the factors along the side.



5. Determine if the factors are positive or negative in each interval.



6. Multiply down the columns to determine the final sign in each interval.



less than (-)
↑

7. Answer the question! We were trying to determine where $x^2 + 3x - 4 < 0$. Looking at the above number line we see that happens between $x = -4$ and $x = 1$. This is written $(-4, 1)$ or using inequalities as $-4 < x < 1$.