

Name: \_\_\_\_\_ Period: \_\_\_\_\_ Date: \_\_\_\_\_

## 5-6 Day 2 Analyzing Graphs of Polynomial Functions

Multiplicity: - The number of times a factor is repeated. It tells us how the graph passes through the x-axis.

If a zero of a function has multiplicity that is:

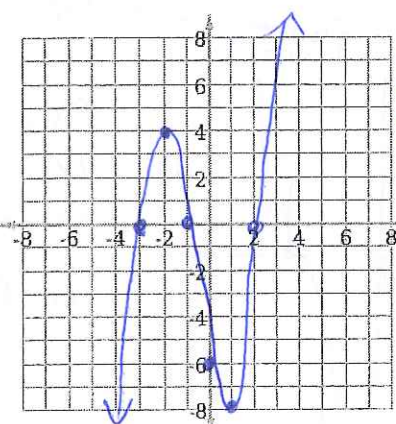
*Passes Straight*

1: through the x-axis odd: flattens as it crosses the x-axis even: bounces off the x-axis

### Graphing a polynomial function by hand:

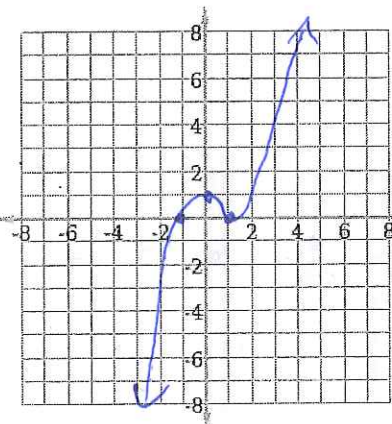
1. Find and plot the x-intercepts (noting their multiplicities)
2. Find and plot the y intercept and at least one point on the function for each of the intervals between the x-intercepts.
3. Determine the end behaviors.
4. Sketch the curve.

1) Sketch:  $f(x) = (x + 3)(x + 1)(x - 2)$



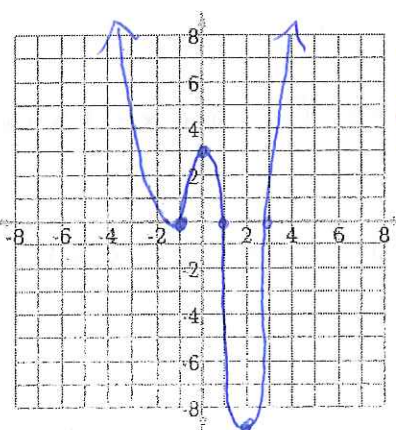
$x^3$   
Positive  
Leading  
Coefficient  
 $(3)(1)(-2) = -6$   
y-int

2) Sketch:  $f(x) = (x + 1)(x - 1)^2$



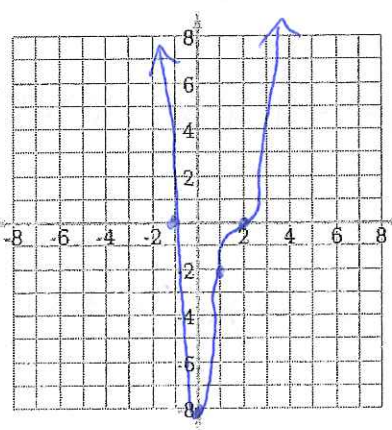
$x^3$   
Positive  
Leading  
Coefficient  
 $(1)(-1)(-1) = 1$   
y-int

3) Sketch:  $f(x) = (x - 1)(x - 3)(x + 1)^2$



$x^3$   
Positive  
Leading  
Coefficient  
 $(-1)(-3)(1)(1) = 3$   
y-int

4) Sketch:  $f(x) = (x + 1)(x - 2)^3$



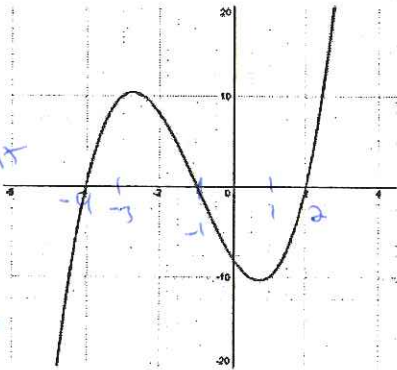
$x^3$   
Positive  
Leading  
Coefficient  
 $(1)(-2)(-2)(-2) = -8$   
y-int

Write the equation for each polynomial function in factored form:

5)

Positive  
Leading  
Coefficient

Three  
Factors



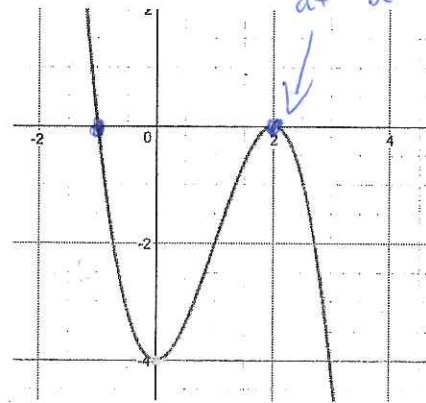
$$f(x) = (x+4)(x+1)(x-2)$$

6)

Bounces  
at 2 = multiplicity

Negative  
Leading  
Coefficient

3 factors



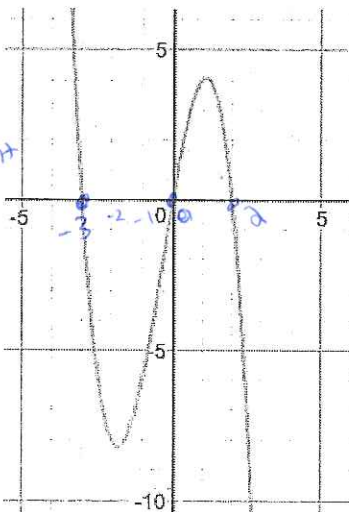
$$f(x) = -1(x+1)(x-2)(x-2)$$

$$f(x) = -1(x+1)(x-2)^2$$

7)

Negative  
Leading  
Coefficient

Three  
Factors



$$f(x) = -1(x+3)(x+0)(x-2)$$

or

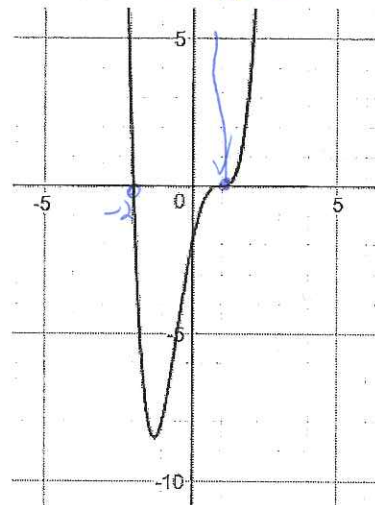
$$f(x) = -x(x+3)(x-2)$$

8)

Flattens  
at 1 = multiplicity

Positive  
Leading  
Coefficient

4 factors



$$f(x) = (x+2)(x-1)(x-1)(x-1)$$

$$f(x) = (x+2)(x-1)^3$$