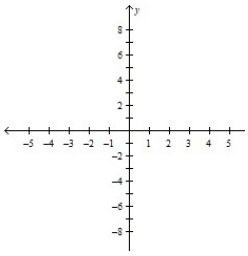
Polynomials: Multiplicity and "a"

Multiplicity

1) Evaluate $(x-3)^3$ for the following x-values:
   a. 1 b. 2 c. 3 d. 4 e. 5

2) Now graph the points you found in problem 1 (given number is the x-coordinate, found value is the y-coordinate). Then connect the dots.



3) Above is an example of a root of **multiplicity 3.** Does it bounce off the x-axis?_____

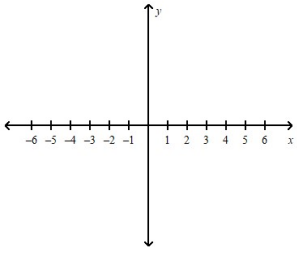
   Describe this x-intercept with one word. _____

4) Note that there are only three different ways zeros are described. We'll fill in the chart below together.

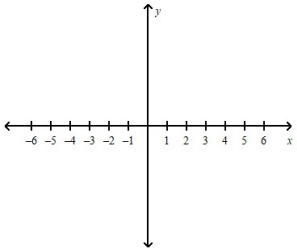
Multiplicity	Description	Picture

Sketch the polynomials. Don't worry about y-intercepts.

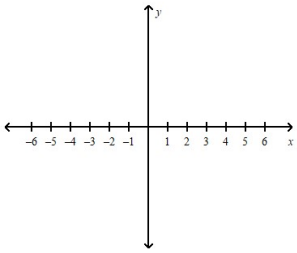
5) $y = -2(x+3)^3(x-1)^2$



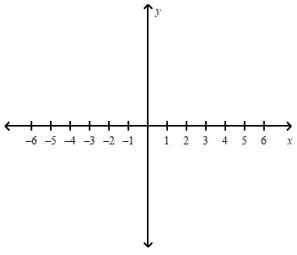
6) $f(x) = x^4(x-2)^2(x+5)$



7) $y = \frac{2}{3}(x-4)^5(x+2)^8(x-1)^3$



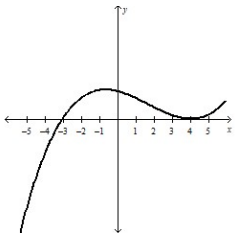
8) $g(x) = -(x-2)(x+5)(x-2)(x+1)^2(x-2)$



"a" values

Sometimes the difference between two polynomials is only noticeable based on how high up/down the hills/valleys go. This is determined by the "a" value. Bigger "a" values have more extreme hills and valleys.

9) Based on the paragraph above and what you know about right end behavior, match each equation to its graph.

a. 

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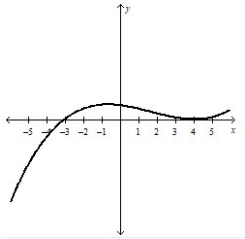
b. 

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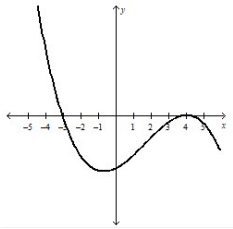
c. 

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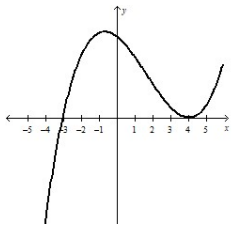
d. 

_____

$y = 2(x+3)(x-4)^2$ $y = -4(x+3)(x-4)^2$ $y = \frac{1}{2}(x+3)(x-4)^2$ $y = 7(x+3)(x-4)^2$

Find the y-intercept for each polynomial. Show work. [Note that some values will get big.]

10) $y = 3(x+2)(x-4)(x-1)$

11) $f(x) = -4(x-2)^2(x+3)(x+5)$

12) $f(x) = \frac{1}{4}(x+2)(x-6)(x-1)^2$

13) $y = -4x(x-17)(x+11)(x-4)^3$
[Hint: This one isn't as hard as it looks.]

Remember that we can find the "a" value for a polynomial by plugging in an ordered pair from the graph and solving for a. If you use the y-intercept, the x-value is zero. However, you can use other x-y pairs.

Use the information given to find the "a" value for each polynomial below. Show work.

14) $y = a(x+3)(x-2)(x-1)$
y-intercept at -24

15) $y = a(x-4)(x+5)(x-2)$
the point (2, 48) is on the graph

16) $y = a(x+2)^3(x-1)$
The point (-1, -20) is on the graph

17) $y = a(x+6)(x-1)^3(x+2)^2$
y-intercept at 12