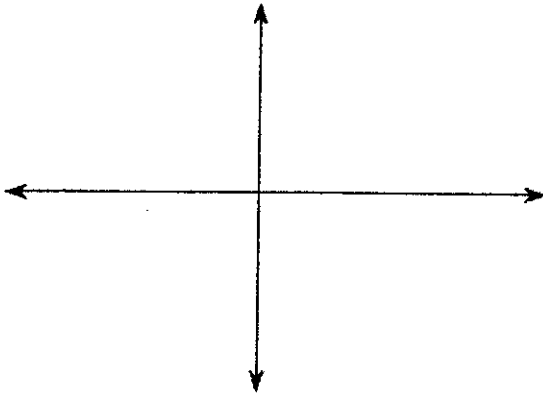


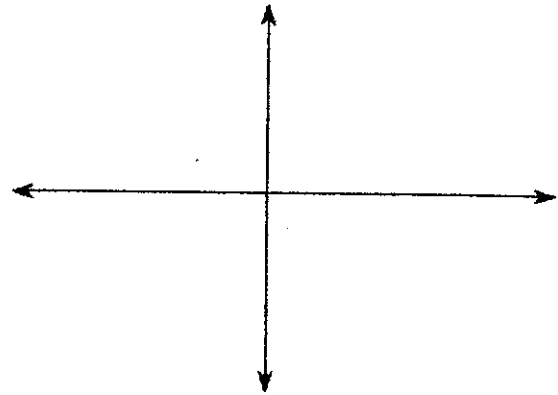
Name: \_\_\_\_\_ "Pass Through" and "Bounce" Points

We want to examine the role of the exponent on each factor and its effect on the graph of the polynomial. Without using your calculator, make a quick sketch of the graph of each of the following functions. It is not important to have the heights drawn to scale. Draw smooth flowing curves.

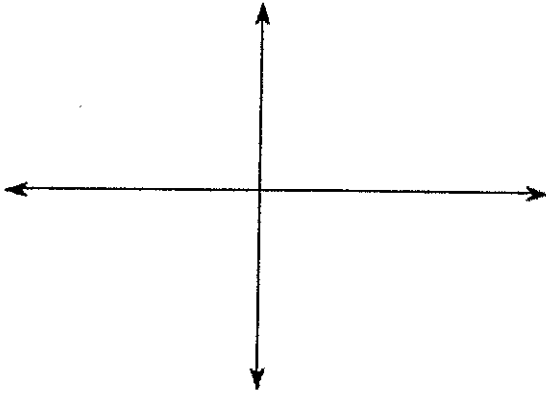
$$y_1 = (x + 2)(x - 1)(x - 3)$$



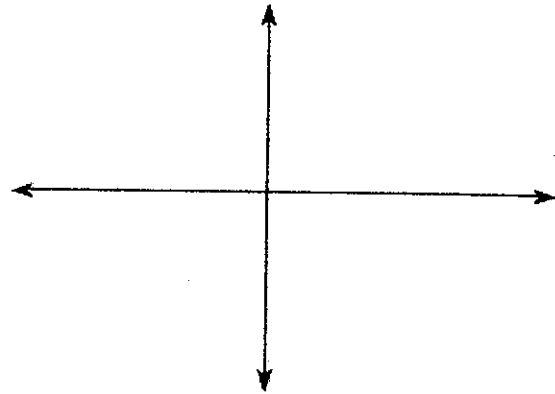
$$y_2 = (x + 2)^2(x - 1)(x - 3)$$



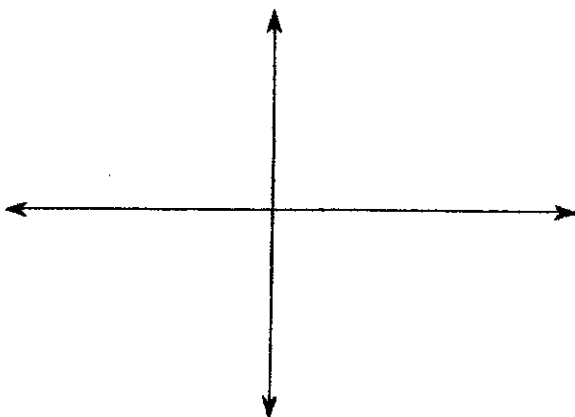
$$y_3 = (x + 2)^2(x - 1)^2(x - 3)$$



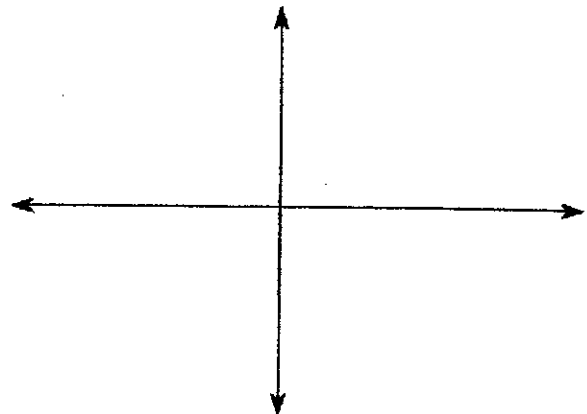
$$y_4 = (x + 2)^2(x - 1)(x - 3)^3$$



$$y_5 = (x + 2)^3(x - 1)(x - 3)^4$$

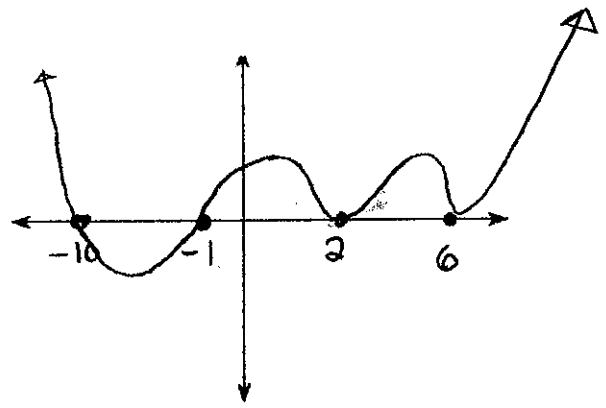
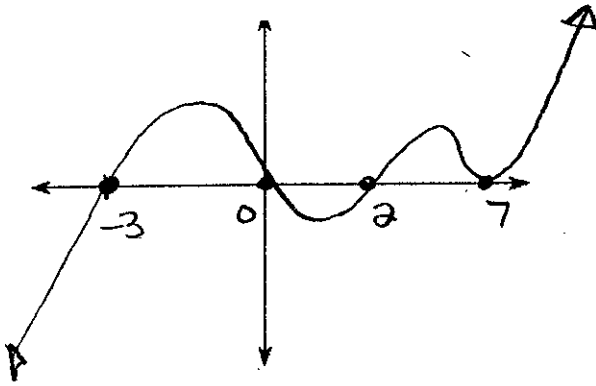
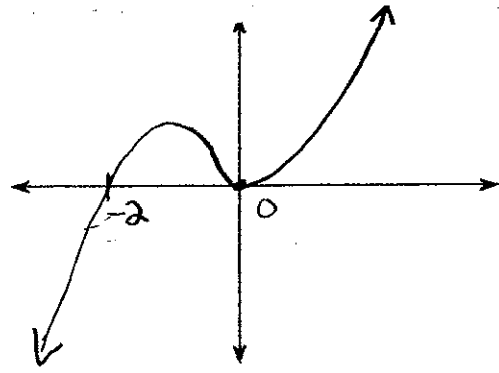
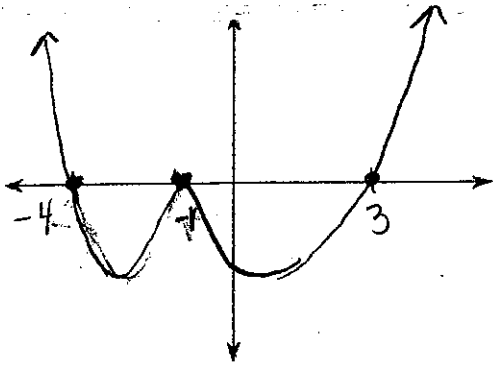


$$y_6 = (x + 2)^5(x - 1)^3(x - 3)^2$$



Find a possible equation for each of these functions

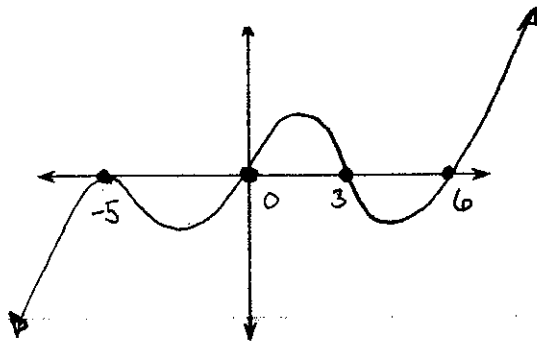
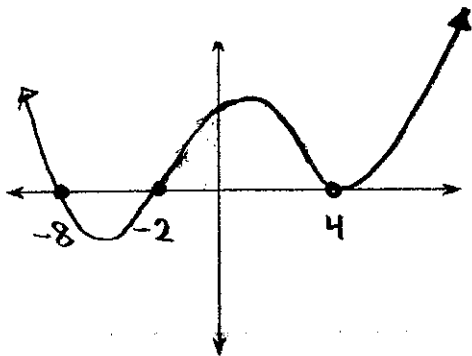
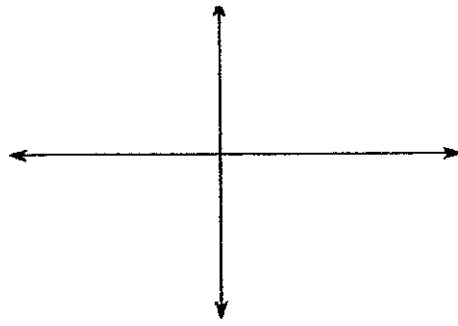
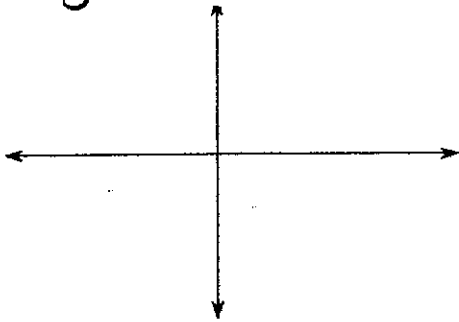
7



Sticker work: either name the graph or sketch the graph

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

$$y = x(x-3)(x+2)^4$$



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

### Factoring Third and Fourth Degree Polynomials

A) Solve each of the following by first factoring the polynomial expression. Give the exact value of all zeros, including irrational and complex zeros! B) Sketch each function, noting x intercepts, y intercepts, and end behavior.

1.  $x^3 - x^2 - 4x + 4 = 0$

6.  $x^4 - 7x^2 + 12 = 0$

2.  $x^3 + 3x^2 - 7x - 21 = 0$

7.  $x^4 - 8x^2 - 9 = 0$

3.  $x^3 + 2x^2 + 9x + 18 = 0$

8.  $x^3 - 2x^2 + 5x - 10 = 0$

4.  $x^4 - 1 = 0$

9.  $x^4 + 7x^2 + 12 = 0$

5.  $16x^4 - 81 = 0$

10.  $x^4 - 25 = 0$

Name: \_\_\_\_\_

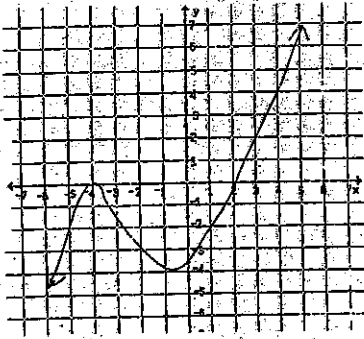
Period: \_\_\_\_\_

Date: \_\_\_\_\_

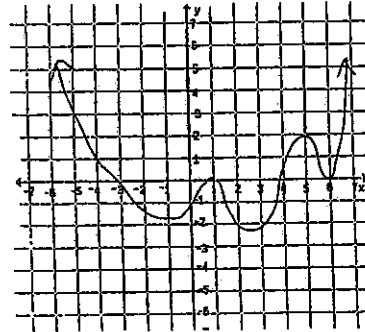
### Writing Possible Polynomial Functions from Graphs

For each of the following, write two possible functions that *could* have the given graph. Base your answers on the number of zeros, the multiplicity of the zeros (does the graph bounce off of the x axis or cut through it?), the number of extrema, and the end behavior.

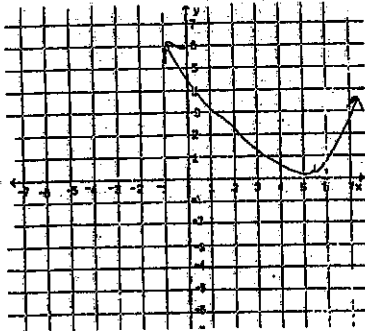
1.



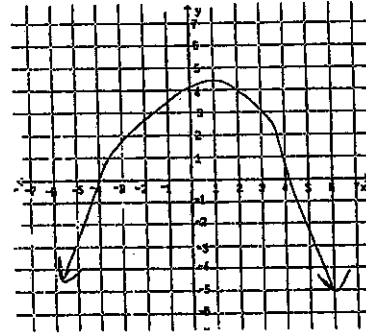
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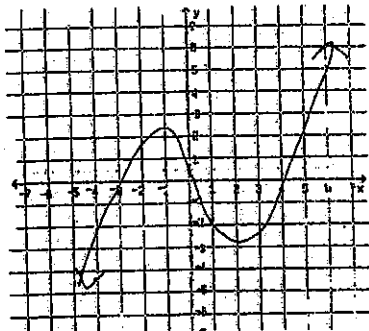
2.



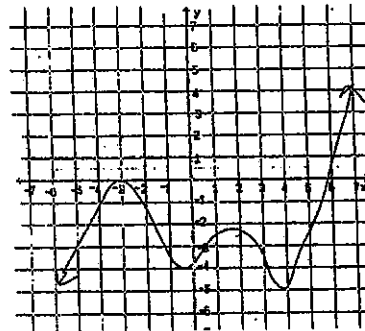
6.



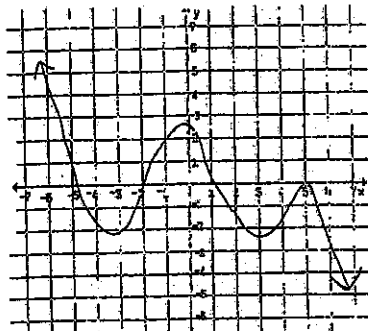
3.



7.



4.



8.

