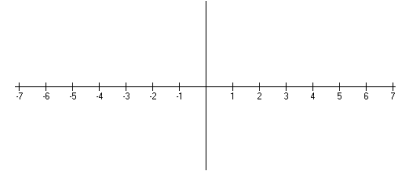
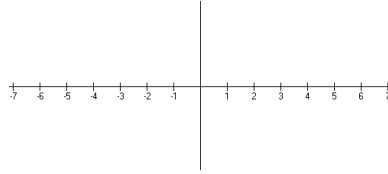
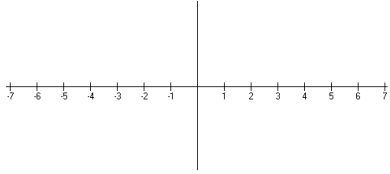


1. We started by looking at some nifty graphing tricks for factored polynomials. Sketch a graph of each polynomial.

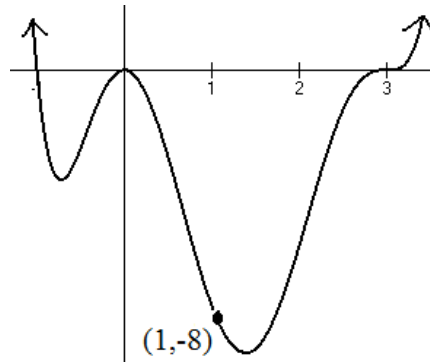
(a)  $y = -(x-1)(x-3)(x-5)$

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

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



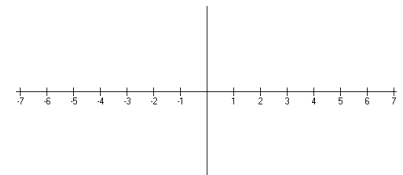
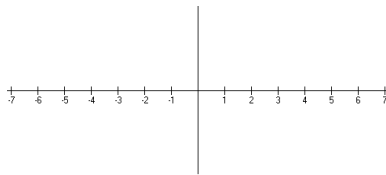
2. Find an equation for the graph shown.



3. We then looked out how to do the factoring ourselves. Factor each of the following and sketch graphs!!

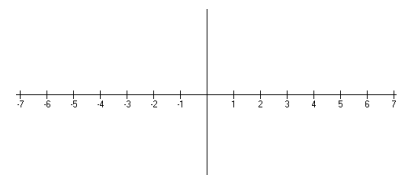
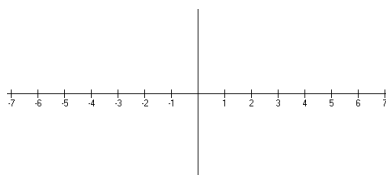
(a)  $y = -4x^5 + 24x^4 - 36x^3$

(b)  $y = 2x^3 - 3x^2 - 18x + 27$



(c)  $y = 8x^3 - 50x$

(d)  $y = 2x^3 - 11x^2 + 12x$



4. *Surprisingly polynomial division was a helpful factoring technique.*

Divide  $x^3 + 3x^2 - 4x - 10$  by  $x + 3$  using each method. Identify the quotient and remainder.

(a) Using Long Division

(b) Using Synthetic Division

5. Factor  $x^4 - 6x^3 + 54x - 81$  completely given that 3 is a root.

6(a) List all potential rational roots of  $2x^3 - 11x^2 + 8x + 21 = 0$

(b) Find all of its roots.

