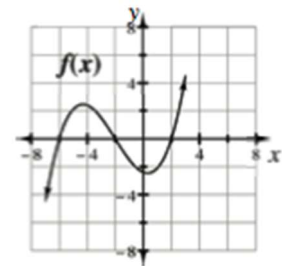# 2.9 HW

1. In parts (a) through (d) below, for each polynomial function $f(x)$, the graph of $f(x)$ is shown. Based on this information, state the number of linear and quadratic factors the factored form of its equation should have and how many real and complex (non-real) solutions $f(x) = 0$ might have. (Assume a polynomial function of the lowest possible degree for each one.)
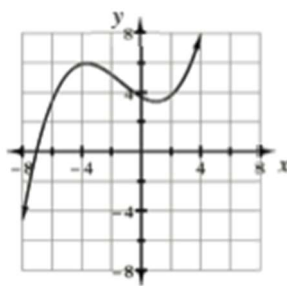

- Example: $f(x)$ at right will have three linear factors, therefore three real roots and no complex roots. <u>Homework Help</u> ✎
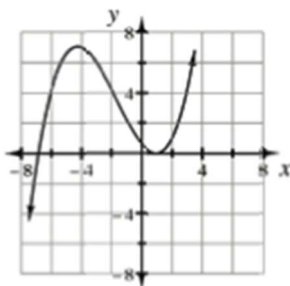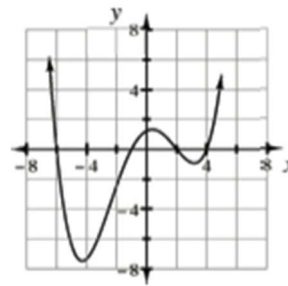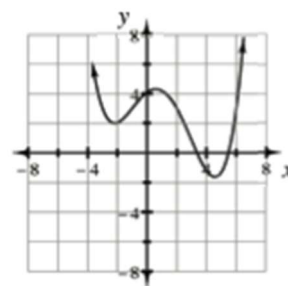
a.   b.   c.   d.

2. Make a sketch of a graph $p(x)$ so that $p(x) = 0$ would have the indicated number and type of solutions. <u>Homework Help</u> ✎

   a.   5 real solutions

   b.   3 real and 2 complex

   c.   4 complex

   d.   4 complex and 2 real

   e.   For parts (a) through (d), what is the lowest degree each function could have?

3. Consider the function $y = x^3 - 9x$. <u>Homework Help</u> ✎

   a.   What are the roots of the function? (Factoring will help!)

   b.   Sketch a graph of the function.

4. Make rough sketches of the graphs of each of the following polynomial functions. Be sure to label the x- and y- intercepts. <u>Homework Help</u> ✎

   a. $y = x(2x + 5)(2x - 7)$

   b. $y = (15 - 2x)^2(x + 3)$

Answer Key

1. **See below:**
   a. three real linear factors (one repeated), therefore two real (one single, one double) and zero complex (non-real) roots
   b. one linear and one quadratic factor, therefore one real and two complex (non-real) roots
   c. four linear factors, therefore four real and zero complex (non-real) roots
   d. two linear and one quadratic factor, therefore two real and two complex (non-real) roots
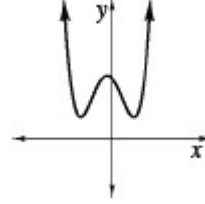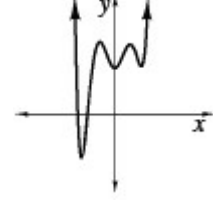
2. **See graphs below:**
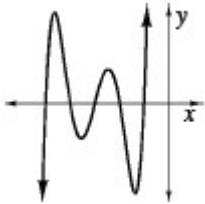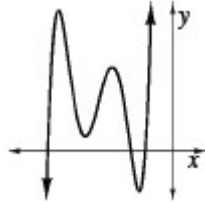
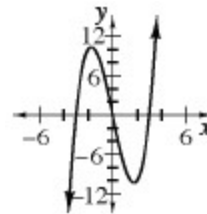   a.   b.   c.   d.
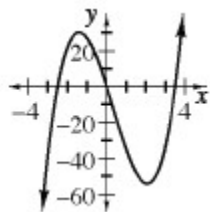

   e. (a) 5, (b) 5, (c) 4, (d) 6

3. See below:

   a. (3, 0), (0, 0), and (–3, 0)   b. See graph below.

4. See below:

   a. x-intercepts: $\left(-\frac{5}{2},0\right)$, $(0, 0)$, and $\left(\frac{7}{2},0\right)$, y-intercept: $(0, 0)$

   b. x-intercepts: $(-3, 0)$ and $\left(\frac{15}{2},0\right)$ (double root), y-intercept: $(0, 675)$