

#s 1 – 4 Make a rough sketch of the graph of the given (factored) polynomial function.

1.  $(x-1)^2(x+3)$

2.  $(x+2)^2(x-5)^2$  This is one where end behavior needs to be carefully handled.

3.  $-2(2x-1)^2(x+1)^3$

4.  $-3(3x-4)^2(2x+1)^4$

#s 5, 6 Make a rough sketch of the graph of the given polynomial function.

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

6.  $f(x) = x^3 - 10x^2 - 600x$

#s 7 – 12 Solve the inequalities.

7.  $x^3 - 3x > 0$

8.  $2x^2 - x^4 \leq 0$

9.  $x^3 + 4x^2 - x - 4 > 0$

10.  $x^3 - 4x^2 - 20x + 48 \geq 0$

11.  $x^3 - x^2 + x - 1 < 0$  A student who recognizes a factoring-by-grouping opportunity, here, can work this one very efficiently.

12.  $x^4 - 19x^2 + 90 \leq 0$

Any of these exercises can be turned into further exercise by graphing the inequality questions, turning graphing questions into inequality questions, and/or changing the inequality questions by reversing the inequalities and/or turning strict  $>$  or  $<$  into non-strict  $\geq$  or  $\leq$ .