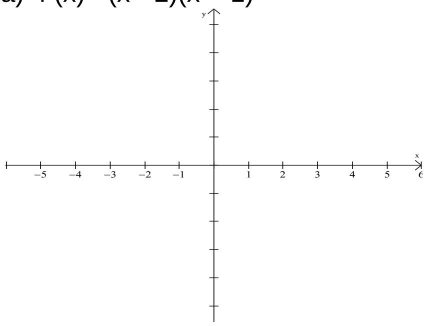
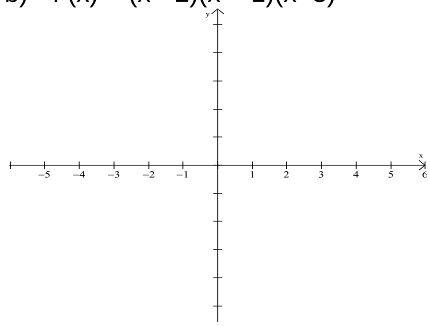
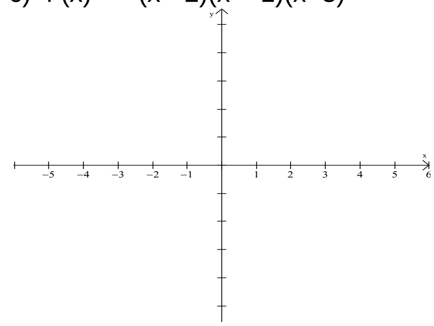
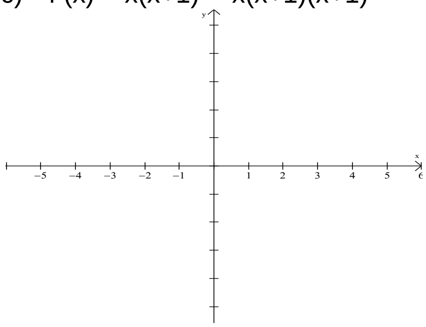
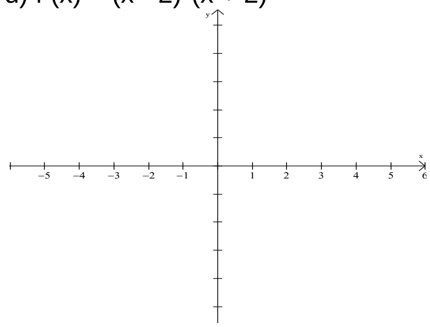
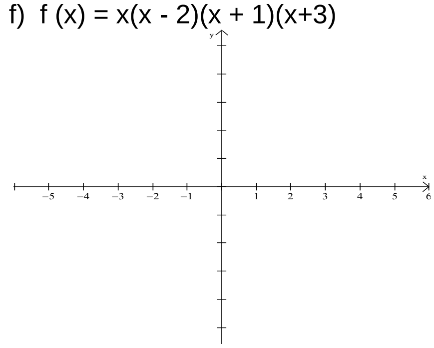
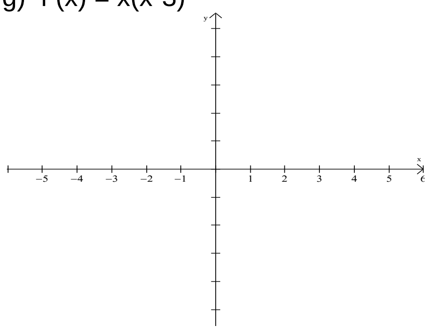
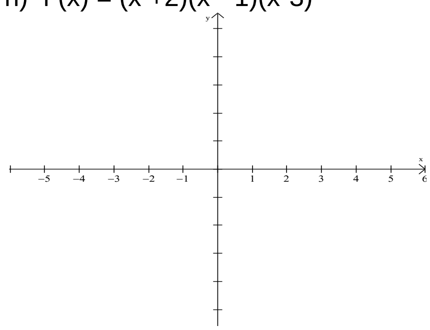
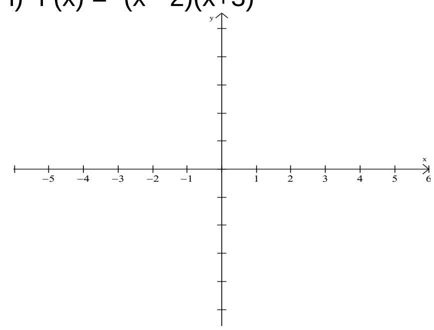
# 1.7.1: What Role Do Factors Play?

1. Use technology (graphing calculator, software, GSP_Gr12_U1D7) to determine the graph of each polynomial function. Sketch the graph, clearly identifying the x-intercepts.

| | | |
|---|---|---|
| a) f (x)= (x - 2)(x + 1)<br><br>Degree of the function: _______<br>x-intercepts: _____________ | b) f (x) = (x - 2)(x + 1)(x+3)<br><br>Degree of the function: _______<br>x-intercepts: _____________ | c) f (x) = - (x - 2)(x + 1)(x+3)<br><br>Degree of the function: _______<br>x-intercepts: _____________ |
| c) f (x) = $x(x+1)^2$= x(x+1)(x+1)<br><br>Degree of the function: _______<br>x-intercepts: _____________ | d) f (x) = $(x - 2)^2(x + 2)^2$<br><br>Degree of the function: _______<br>x-intercepts: _____________ | f) f (x) = x(x - 2)(x + 1)(x+3)<br><br>Degree of the function: _______<br>x-intercepts: _____________ |
| g) f (x) = $x(x-3)^3$<br><br>Degree of the function: _______<br>x-intercepts: _____________ | h) f (x) = $(x +2)(x - 1)(x-3)^2$<br><br>Degree of the function: _______<br>x-intercepts: _____________ | i) f (x) = $-(x - 2)(x+3)^3$<br><br>Degree of the function: _______<br>x-intercepts: _____________ |

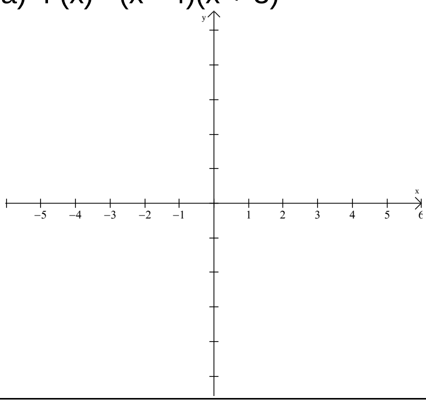
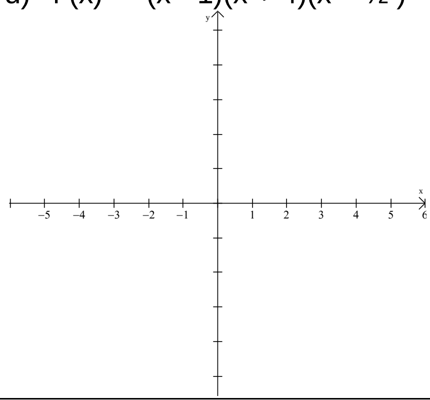
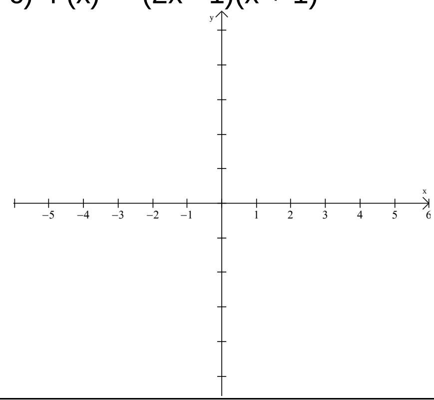
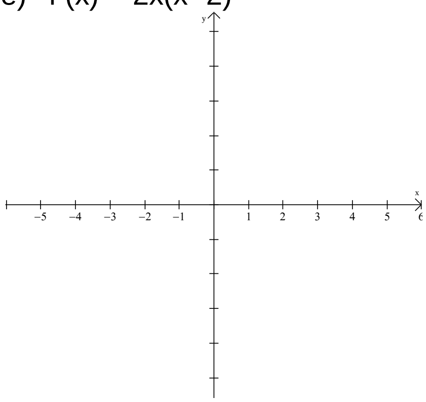
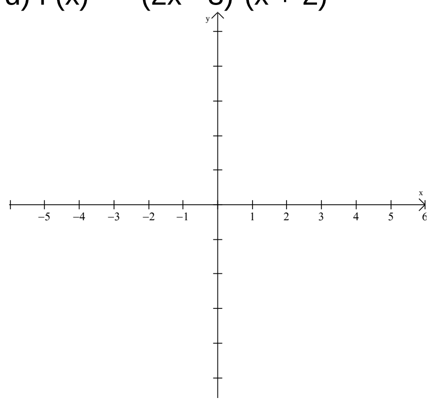
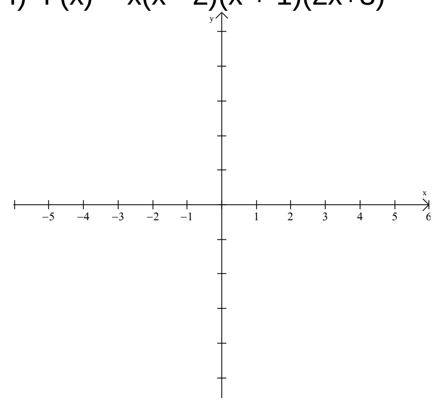
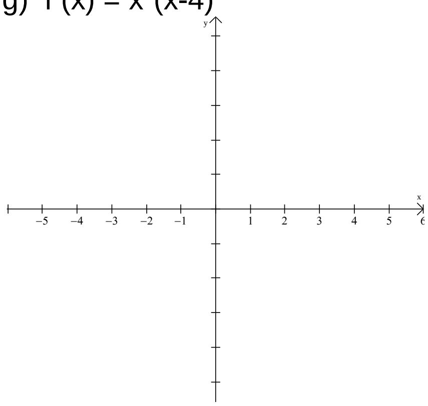
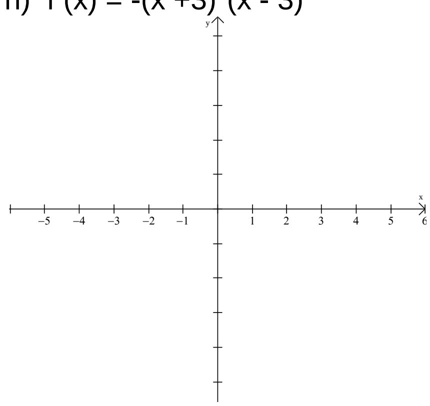
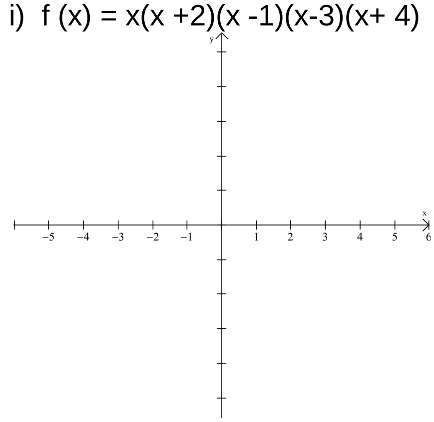
2. Compare your graphs with the graphs generated on the previous day and make a conclusion about the degree of a polynomial when it is given in factored form.
3. Explain how to determine the degree of a polynomial algebraically if given in factored form.
4. What connection do you observe between the factors of the polynomial function and the x-intercepts? Why does this make sense? (hint: all co-ordinates on the x axis have y = 0).
5. Use your conclusions from #4 to state the x-intercepts of each of the following. Check by graphing with technology, and correct if necessary.

| | | |
|---|---|---|
| f(x) = (x-3)(x+5)(x-1/2)<br>x-intercepts: _____________<br>does this check? _________ | f(x) = (x-3)(x+5)(2x-1)<br>x-intercepts: ___________<br>does this check? ________ | f(x) = (2x-3)(2x+5)(x-1)(3x-2)<br>x-intercepts: ___________<br>does this check? _________ |

6. What do you notice about the graph when the polynomial function has a factor that occurs twice? Three times?

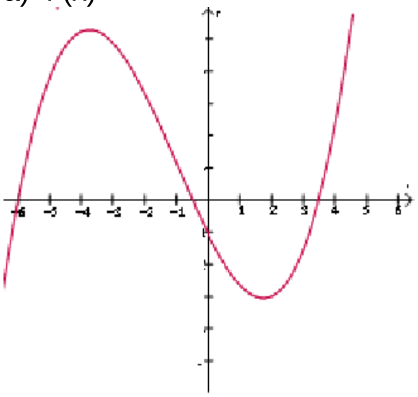
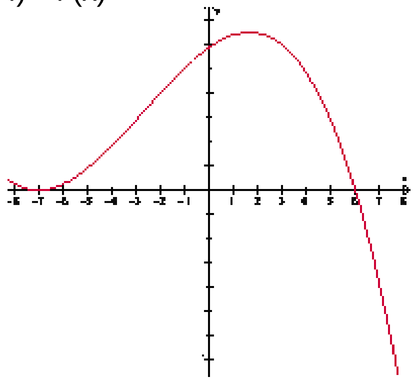
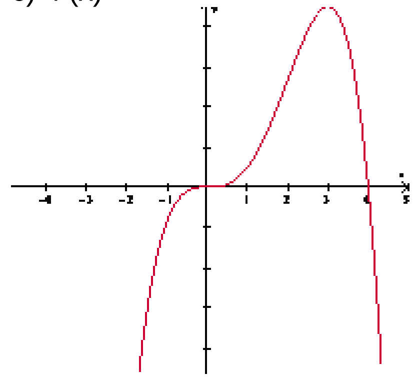
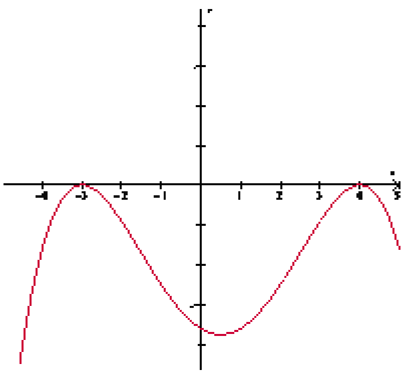
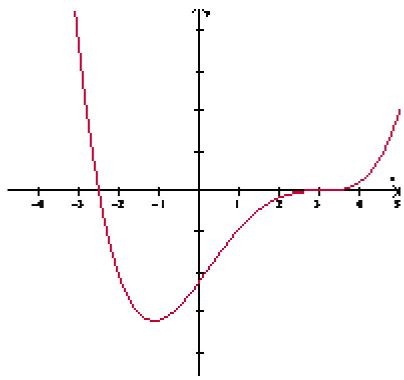
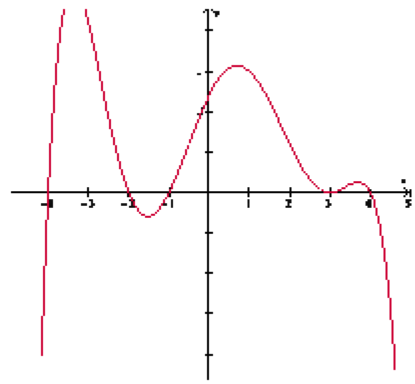
# 1.7.2: Factoring in our Graphs

Draw a sketch of each graph using the properties of polynomial functions. After you complete each sketch, check with your partner, discuss your strategies and make any corrections needed.

| | | |
|---|---|---|
| a) $f(x) = (x - 4)(x + 3)$  | d) $f(x) = -(x - 1)(x + 4)(x - ½)$  | c) $f(x) = (2x - 1)(x + 1)^2$  |
| e) $f(x) = 2x(x - 2)^3$  | d) $f(x) = -(2x - 3)^2(x + 2)^2$  | f) $f(x) = x(x - 2)(x + 1)(2x + 3)$  |
| g) $f(x) = x^3(x - 4)$  | h) $f(x) = -(x + 3)^2(x - 3)^3$  | i) $f(x) = x(x + 2)(x - 1)(x - 3)(x + 4)$  |

# 1.7.3: What's My Polynomial Name?

1. Determine a possible equation for each polynomial function.

| | | |
|---|---|---|
| a) f (x)=  | f) f (x) =  | c) f (x) =  |
| g) f (x) =  | d) f (x) =  | f) f (x) =  |

2. Determine an example of an equation for a function with the following characteristics:

a) Degree 3, a double root at 4, a root at -3 ______________________________

b) Degree 4, an inflection point at 2, a root at 5 ______________________________

c) Degree 3, roots at ½, ¾, -1 _______________________________

d) Degree 3, starting in quadrant 2, ending in quadrant 4, root at -2 and double root at 3

_________________________

e) Degree 4, starting in quadrant 3, ending in quadrant 4, double roots at -10 and 10

_______________________