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) \( f(x) = (x - 4)(x + 3) \)

b) \( f(x) = -(x - 1)(x + 4)(x - \frac{1}{2}) \)

c) \( f(x) = (2x - 1)(x + 1)^2 \)

d) \( f(x) = -(2x - 3)^2(x + 2)^2 \)

e) \( f(x) = x(x - 2)(x + 1)(2x + 3) \)

f) \( f(x) = 2x(x - 2) \)

g) \( f(x) = x^3(x - 4) \)

h) \( f(x) = -(x + 3)^2(x - 3)^3 \)

i) \( f(x) = x(x + 2)(x - 1)(x - 3)(x + 4) \)

Answers for next page:

1a) \( (x + 2)(2x + 1)(2x - 7) \)  
b) \( -(x + 7)^2(x - 6) \)  
c) \( -x^3(x - 4) \)  
d) \( -(x + 3)^2(x - 4)^2 \)  
e) \( (x + 2.5)(x - 3)^3 \)

f) \( -(x + 4)((x + 1)(x - 3)^2(x - 4)^2 \)  
g) \( g(x) = (2x - 1)(4x - 3)(x + 1) \)  
h) \( y = -(x + 2)(x - 3)^2 \)  
i) \( f(x) = -(x + 10)^2(x - 10)^2 \)  

4. \( y = -2(x + 3)(x + 1)(x - 2)^2 \)

5. \( f(x) = (x + 1)^2(x - 2)^2 \)  
g) \( g(x) = a(x + 1)^2(x - 2)^2 \), answers may vary  

6. At a zero with odd order the function changes sign at the zero (order 1 it passes directly through the zero, order 3 it inflects at the zero) and at a zero with even order the function does not change sign (just touches the x-axis creating a local max or min.). The sum of the orders is the degree of the polynomial.