

**Polynomial Practice**

Name McG Key

1. If  $f(x) = 8x + 4x^3 - 6x^5 + 7 - 3x^2$

- a. Write the equation in standard form  $-6x^5 + 4x^3 - 3x^2 + 8x + 7$
- b. State the degree. 5
- c. State the maximum number of real roots of the graph. 5 (equal to degree)
- d. Draw a rough sketch to show the general shape and orientation of the graph.

No Calc!



e. State the y-intercept (0, 7)

f. Describe the left and right end behaviors of the graph. **Explain** how you know from looking at the equation.

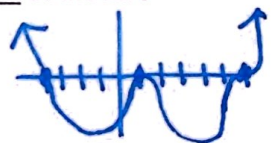
*Because the leading coefficient is negative, graph falls on the right - since the degree is odd, graph has opposite behavior on the left and rises.*

g. As  $x \rightarrow -\infty, y \rightarrow \infty$  and As  $x \rightarrow \infty, y \rightarrow -\infty$ .

2.  $f(x) = x(x+3)^3(x-2)$  is a degree 5 (1+3+1) polynomial with a positive leading coefficient. The right end behavior points up ( $\infty$ ) and the left end behavior points down ( $-\infty$ ). It has 3 real zeros at  $x = \underline{0}, \underline{2},$  and  $-3$  (with multiplicity 3). *Now graph.*



3.  $f(x) = (x-1)^2(x-6)^3(x+4)$  is a degree 6 (2+3+1) polynomial with a positive leading coefficient. The graph will bounce at the zero of  $x = \underline{1}$ , wiggle at the zero of  $x = \underline{6}$ , and cross at the zero of  $x = \underline{-4}$ . *Now graph.*



4. Write the equation and then sketch a graph of each polynomial satisfying the given information.

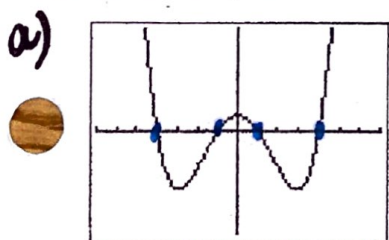
a) A polynomial with a negative leading coefficient and zeros of  $x = -2$  (multiplicity 2) and  $x = 1$ .

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

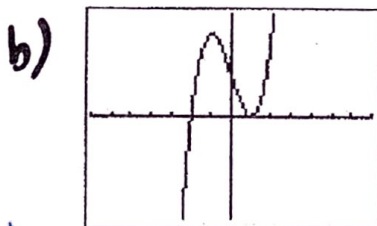
b) A polynomial with a positive leading coefficient and zeros of  $x = -2$  (multiplicity 3),  $x = 0$ , and  $x = 3$  (multiplicity 2).

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

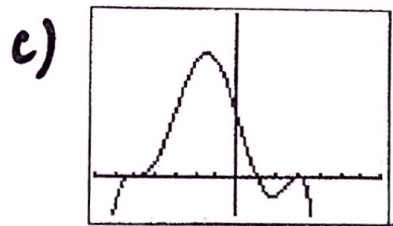
5. Write the equation of the polynomial in factored form.



$y = (x+4)(x+1)(x-1)(x-4)$

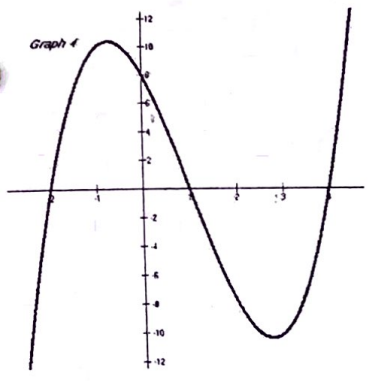


$y = (x+2)(x-1)^2$



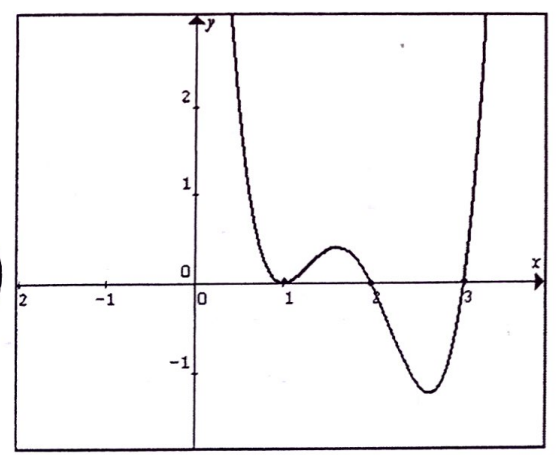
$y = -(x+5)^3(x-1)(x-3)^2$

d)



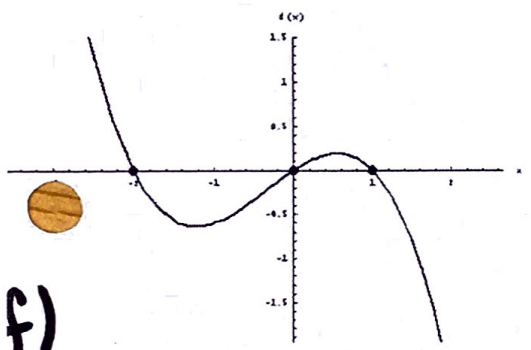
$$y = (x+2)(x-1)(x-4)$$

e)



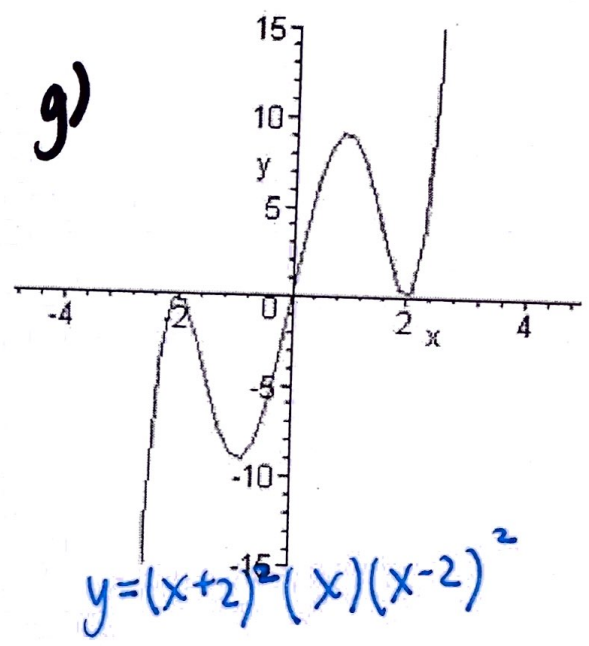
$$y = (x-1)^2(x-2)(x-3)$$

f)



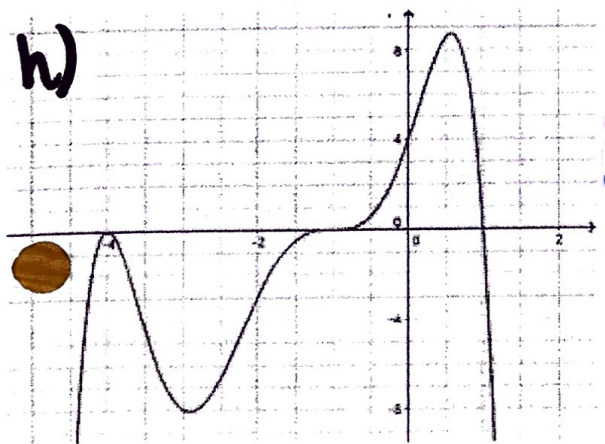
$$y = -(x+2)(x)(x-1)$$

g)



$$y = (x+2)^2(x)(x-2)^2$$

h)



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