

### 5.3 Practice – Polynomial Graphs (continued)

Name: \_\_\_\_\_

Pre-Calculus

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

a. How does the graph behave with relation to the  $x$ -axis at  $x = 3$ ? *Tangent*

b. What are the real zeros of the function?

*-2, 3, -5*

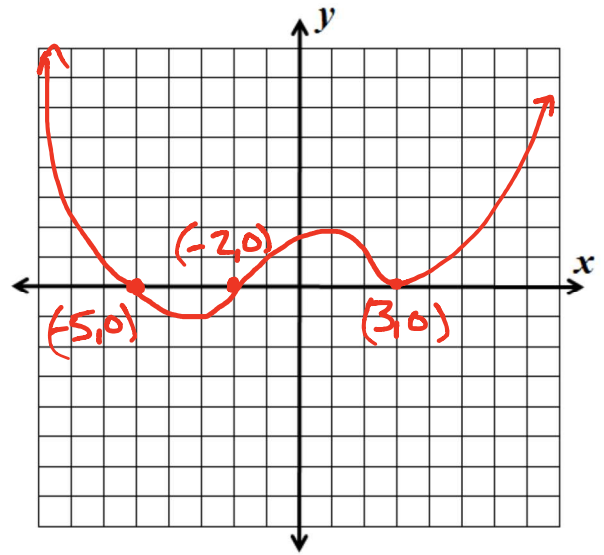
c. What is the degree of the function?

*4*

d. Describe the end behavior using limit notation.

$\lim_{x \rightarrow -\infty} f(x) = \infty$      $\lim_{x \rightarrow \infty} f(x) = \infty$

e. Sketch a possible graph



5.  $f(x) = -2x(x + 6)(x - 4)^3(x - 2)^4$

a. How does the graph behave with relation to the  $x$ -axis at  $x = 4$ ? *Crosses it*

b. What are the real zeros of the function?

*-6, 0, 4, 2*

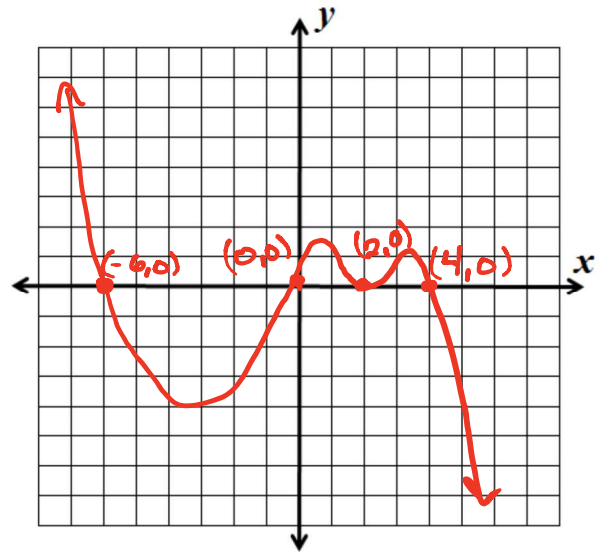
c. What is the degree of the function?

*9*

d. Describe the end behavior using limit notation.

$\lim_{x \rightarrow -\infty} f(x) = \infty$      $\lim_{x \rightarrow \infty} f(x) = -\infty$

e. Sketch a possible graph



6.  $f(x) = \overbrace{3x^2(x+2)}^{6x^2(x+2)}(x - 6)^6(x - 3)^3$

a. How does the graph behave with relation to the  $x$ -axis at  $x = 6$ ? *Tangent*

b. What are the real zeros of the function?

*-2, 0, 3, 6*

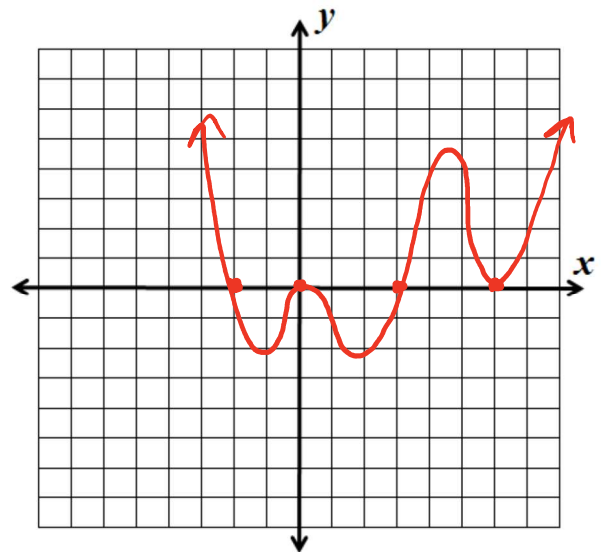
c. What is the degree of the function?

*12*

d. Describe the end behavior using limit notation.

$\lim_{x \rightarrow -\infty} f(x) = \infty$      $\lim_{x \rightarrow \infty} f(x) = \infty$

e. Sketch a possible graph



7. Factor the function  $f(x) = 3x^3 - 3x^2 - 48x - 60$  and sketch the graph if  $f(-2) = 0$ .

$$\begin{array}{r|rrrr} -2 & 3 & -3 & -48 & -60 \\ & & -6 & 18 & 60 \\ \hline & 3 & -9 & -30 & \boxed{0} \end{array}$$

$$(x+2)(3x^2 - 9x - 30) = 0$$

$$(x+2)3(x^2 - 3x - 10) = 0$$

$$3(x+2)(x-5)(x+2) = 0$$

$$3(x+2)^2(x-5) = 0$$

8. Factor the function  $f(x) = 3x^6 + 4x^5 - 42x^4 - 36x^3 + 135x^2$  and sketch the graph if  $f(-3) = 0$ .

$$\begin{array}{r|rrrrr} -3 & 3 & 4 & -42 & -36 & 135 \\ & & -9 & 15 & 81 & -135 \\ \hline & 3 & -5 & -27 & 45 & \boxed{0} \end{array}$$

$$(x+3)(3x^5 - 5x^4 - 27x^3 + 45x^2) = 0$$

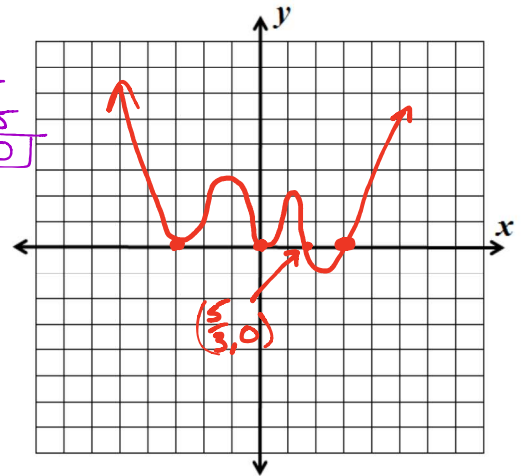
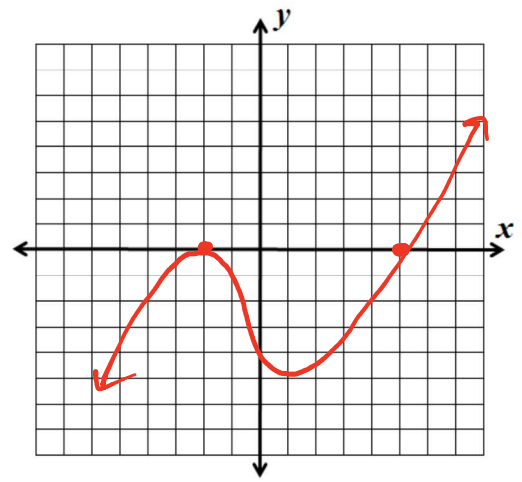
$$(x+3)x^2(3x^3 - 5x^2 - 27x + 45) = 0$$

$$(x+3)x^2[x^2(3x-5) - 9(3x-5)] = 0$$

$$(x+3)x^2(3x-5)(x^2-9) = 0$$

$$x^2(x+3)3(x-\frac{5}{3})(x-3)(x+3) = 0$$

$$3x^2(x+3)^2(x-\frac{5}{3})(x-3) = 0$$



9. Given the graph of  $g(x)$  on the right, identify the following:

- a. Local minimum value(s)

-1

- b. Local maximum value(s)

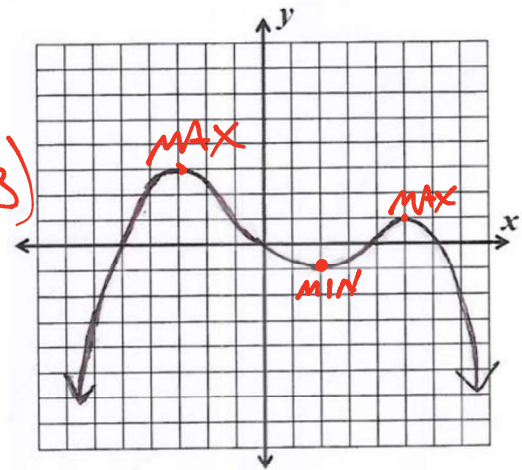
1 (ABS MAX = 3)

- c. Minimum Degree

4

- d. Write out a possible function. Leave it in factored form.

$$f(x) = -x(x+5)(x-4)(x-6)$$



10. Given the graph of  $g(x)$  on the right, identify the following:

- a. Local minimum value(s)

0

- b. Local maximum value(s)

2, 3

- c. Minimum Degree

5

- d. Write out a possible function. Leave it in factored form.

$$f(x) = -(x+4)^2(x-1)^2(x-6)$$

