

5.3 Corrective Assignment – Polynomial Graphs

Pre-Calculus

1. $f(x) = -5(x+4)(x-3)(x+1)^3$

a. How does the graph behave with relation to the x -axis at $x = -1$? *crosses*

b. What are the real zeros of the function? *-4, 3, -1*

c. What is the degree of the function? *5*

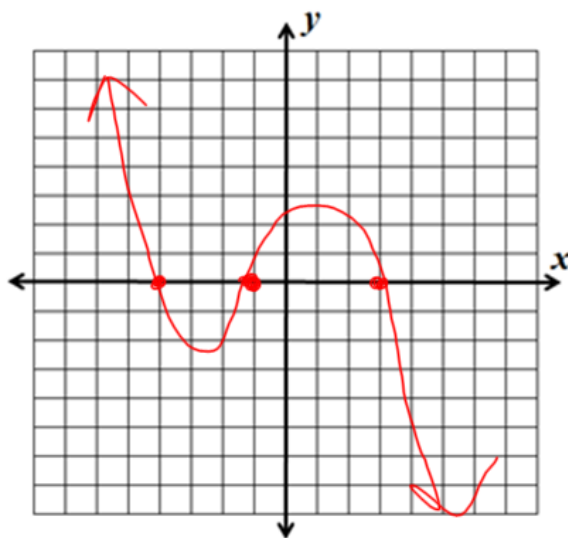
d. Describe the end behavior using limit notation.

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

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

e. Sketch a possible graph

Name: Solutions



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

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? *0, -3, 2, -6*

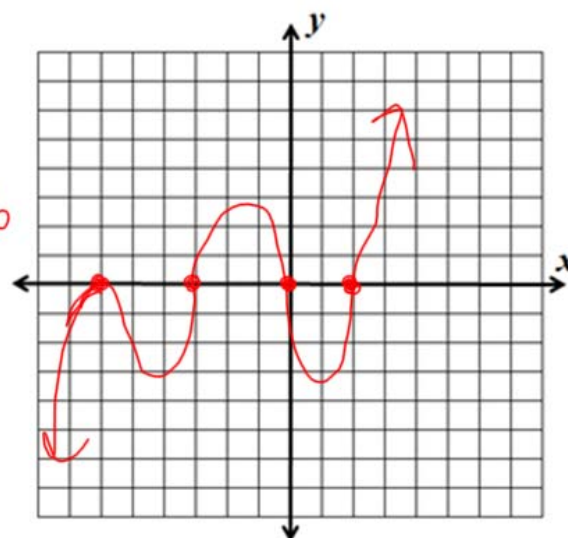
c. What is the degree of the function? *9*

d. Describe the end behavior using limit notation.

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

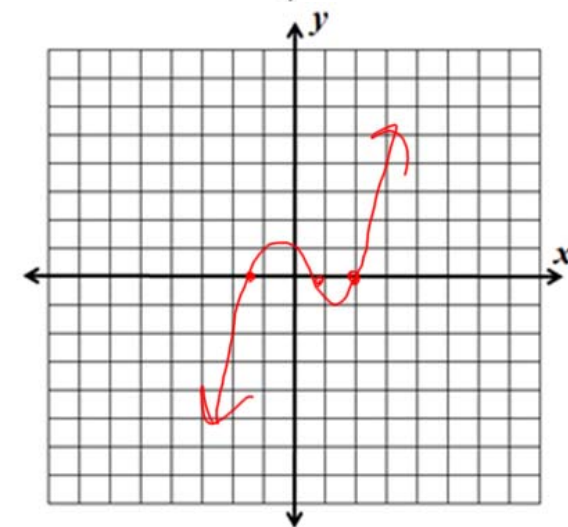
$$\lim_{x \rightarrow \infty} f(x) = \infty$$

e. Sketch a possible graph



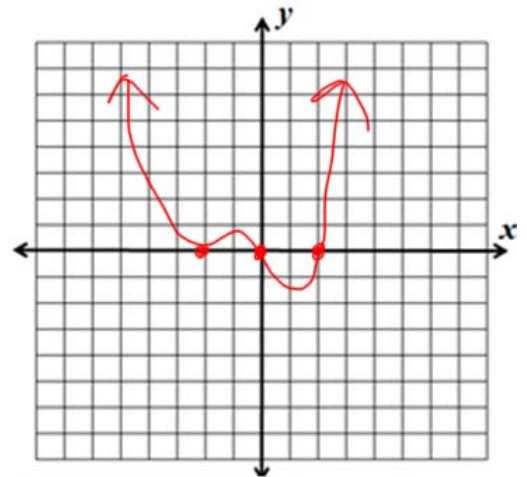
3. Factor the function $f(x) = 3x^3 - 5x^2 - 6x + 8$ and sketch the graph if $f(1) = 0$.

$$\begin{array}{r|rrrr} 1 & 3 & -5 & -6 & 8 \\ & & 3 & -2 & -8 \\ \hline & 3 & -2 & -8 & 0 \\ & (3x^2 - 2x - 8) & (x - 1) & & \\ & (3x + 4)(x - 2) & (x - 1) & & \end{array}$$



4. Factor the function $f(x) = x^4 - 2x^3 - 4x^2 + 8x$ and sketch the graph.

$$\begin{aligned}
 & x^3(x-2) - 4x(x-2) \\
 & (x^3 - 4x)(x-2) \\
 & x(x^2 - 4)(x-2) \\
 & x(x-2)(x+2)(x-2) \\
 & x(x+2)(x-2)^2
 \end{aligned}$$



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

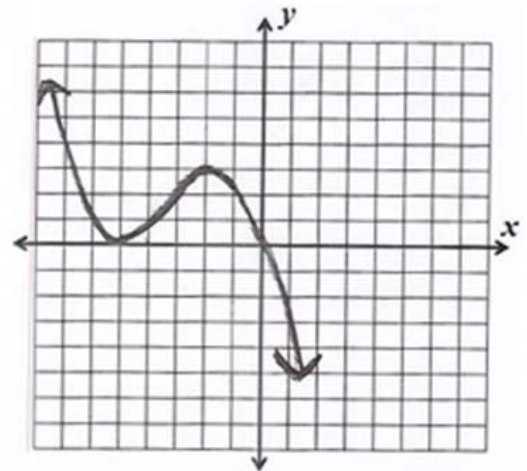
a. Local minimum value(s) 0

b. Local maximum value(s) 3

c. Minimum Degree 3

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

$$f(x) = (x+5)^2(x)$$



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

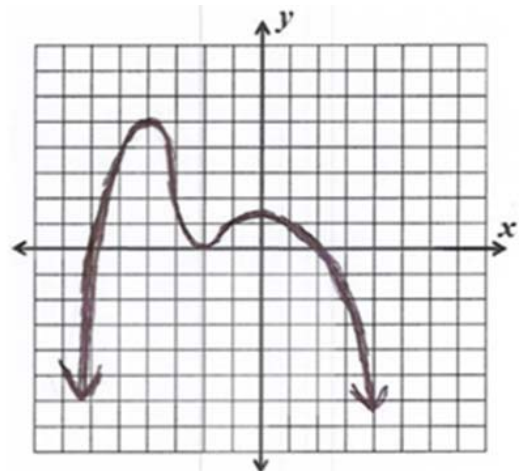
a. Local minimum value(s) 0

b. Local maximum value(s) 5, 1.5

c. Minimum Degree 4

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

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



For 7-9, determine the possible numbers of positive real zeros and negative real zeros.

7. $f(x) = 27x^6 - 37x^3 - 64$

$$f(-x) = 27x^6 + 37x^3 - 64$$

Positive Zeros: 1 or 0

Negative Zeros: 1 or 0

8. $h(x) = 5x^4 - 4x^2 - 12$

$$h(-x) = 5x^4 - 4x^2 - 12$$

Positive Zeros: 1 or 0

Negative Zeros: 1 or 0

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

$$f(-x) = -6x^5 - 8x^4 + x^3 + 1$$

Positive Zeros: 2 or 0

Negative Zeros: 1 or 0