

GSE Algebra II
Unit 3 – Review on Polynomials

Name: _____
Date: _____ **Period:** _____

Using your calculator and synthetic division, find ALL the roots of the following polynomial functions.

1. $6x^4 - 11x^3 - 29x^2 + 19x + 15$

2. $2x^4 + x^3 - 11x^2 + 11x - 3$

3. $x^4 + 5x^2 - 36$

4. $4x^4 + 32x^3 + 85x^2 + 93x + 36$

5. $x^4 - 30x^2 - 88x - 315$

6. $x^4 - 4x^3 - 5x^2 + 18x - 90$

Find all the zeros of the functions:

7. $x^3 - 6x^2 - 7x + 60$, given 4 is a solution

8. $x^3 - 5x^2 - 48x + 108$ given $f(2) = 0$

Use the following information to answer the questions.

9. Given $f(x) = x^3 - 6x^2 + 3x + 10$

a. How many solutions will this function have? How do you know? _____

b. find $f(3)$. Write your answer as a coordinate pair. _____

c. divide $f(x)$ by $(x+1)$. Is it a factor of $f(x)$? Why or why not?

d. divide $f(x)$ by $(x-1)$ Is it a factor of $f(x)$? Why or why not?

e. find $f(-1)$. Write your answer as a coordinate pair. What does this coordinate pair represent?

f. Find the rest of the zero's of the function.

g. find $f(0)$. Write your answer as a coordinate pair. What does this coordinate pair represent?

10. Given $f(x) = x^4 - 2x^3 - 3x^2 - 10x - 40$

a. How many solutions will this function have? How do you know? _____

b. find $f(5)$. Write your answer as a coordinate pair. _____

c. divide $f(x)$ by $(x-4)$. Is it a factor of $f(x)$? Why or why not?

d. find $f(-2)$ Is it a factor of $f(x)$? Why or why not?

e. find the y-intercept of the function

f. Find the rest of the zero's of the function.

11. Given a polynomial $h(x)$ where $h(1) = 4$, $h(-2) = 0$, $h(-4) = -2$, $h(0) = 0$, $h(5) = 0$, $h(1) = -2$
a. What is the least possible degree of this polynomial? _____

b. Identify any point on $h(x)$ located in quadrant I _____

c. What is the y-intercept of $h(x)$? _____

d. What are the real zero's of the function $h(x)$? _____

e. What are the factors of the function $h(x)$? _____

f. What is a *possible* equation for $h(x)$? _____

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12. One factor of $x^3 - 4x^2 + x + 6$ is $x - 3$. Find the other factors AND find all the roots.

13. Given that $x + 2$ is a factor of $2x^3 - x^2 - 7x + 6$, factor to find all the zeros.

14. List all the possible rational zeros for the following functions:

a. $2x^3 - x^2 - 7x + 6$

b. $3x^4 - 5x^3 + 2x - 8$

15. A function of degree 3 has two zeros that are $x = 4$ and $x = -2$. The third zero of the function must be...

a. an imaginary zero

b. a real zero

c. no way to tell

d. could be real or imaginary, depending on the function

16. Use the following information about the function $f(x)$.

$$f(0) = -3 \quad f(7) = -4 \quad f(3) = 0 \quad f(-1) = 4 \quad f(-4) = 0 \quad f(-2) = 0$$

a. what is the z-intercept?

b. what are the zeros of $f(x)$?

c. what are the factors of $f(x)$?

d. what is the least possible degree of $f(x)$?

e. if $f(x)$ is divided by $(x + 1)$, what will the remainder be?

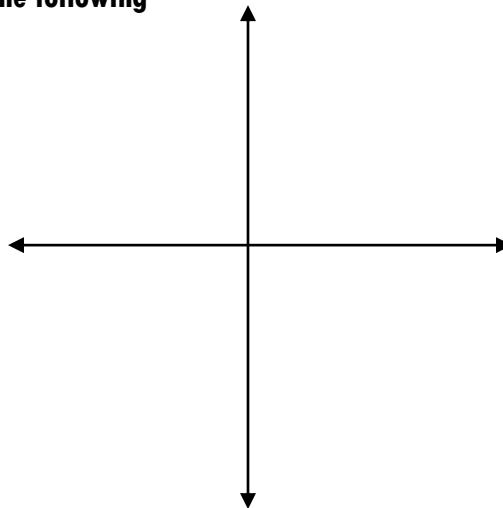
17. Sketch a graph of the following polynomial and answer the following

$$f(x) = -\frac{1}{5}x(x+2)(x-3)^2$$

Zeros	Multiplicity	Cross/Bounce
_____	_____	_____
_____	_____	_____
_____	_____	_____

Y-int: _____

- What is the degree of the function? _____
- Is the leading coefficient pos/neg? _____
- Describe the end behavior.



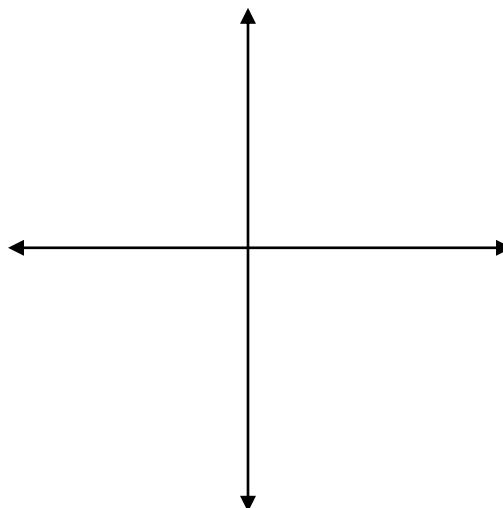
18. Sketch a graph of the following polynomial and answer the following

$$f(x) = (x-2)^2(x+7)^2(2x-1)$$

Zeros	Multiplicity	Cross/Bounce
_____	_____	_____
_____	_____	_____
_____	_____	_____

Y-int: _____

- What is the degree of the function? _____
- Is the leading coefficient pos/neg? _____
- Describe the end behavior



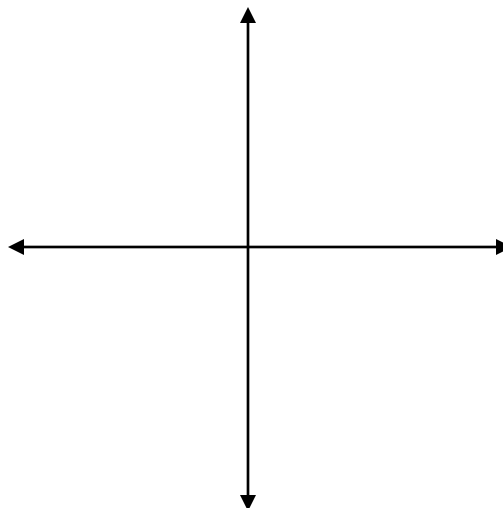
19. Sketch a graph of the following polynomial and answer the following

$$f(x) = 2x^3 + 4x^2 - 18x - 36$$

Zeros	Multiplicity	Cross/Bounce
_____	_____	_____
_____	_____	_____
_____	_____	_____

Y-int: _____

- What is the degree of the function? _____
- Is the leading coefficient pos/neg? _____
- Describe the end behavior



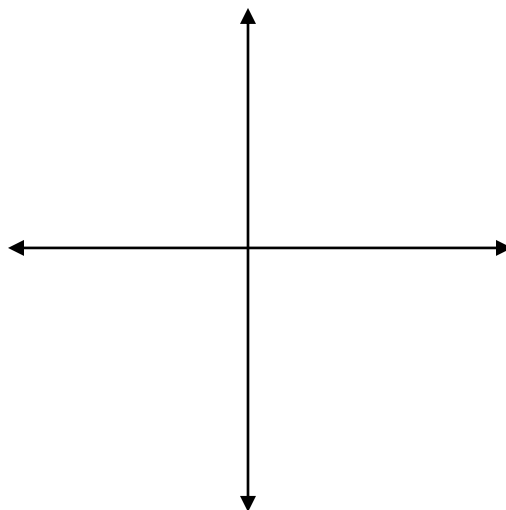
20. Sketch a graph of the following polynomial and answer the following

$$f(x) = x^4 - 41x^2 + 400$$

Zeros	Multiplicity	Cross/Bounce
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____

Y-int: _____

- What is the degree of the function? _____
- Is the leading coefficient pos/neg? _____
- Describe the end behavior



21. Given the following graph, answer the following

- Name the zeros of the function and their multiplicity.
- What is the least possible degree of the polynomial?
- Describe the end behavior.
- Local Minimums
- Local Maximums
- Absolute Minimum
- Absolute Maximum
- Interval of Increase
- Interval of Decrease

