Unit 4 Solving Polynomials: Pre-Unit

Guided Notes

KEY

Name

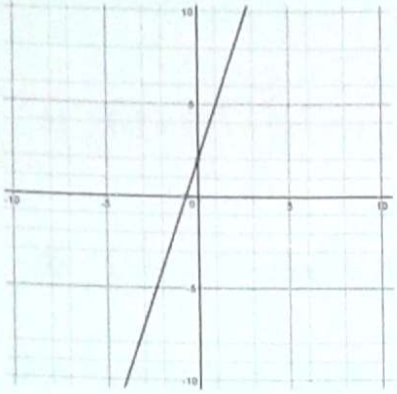
Period

If found, please return to Mrs. Brandley's room, M-8.

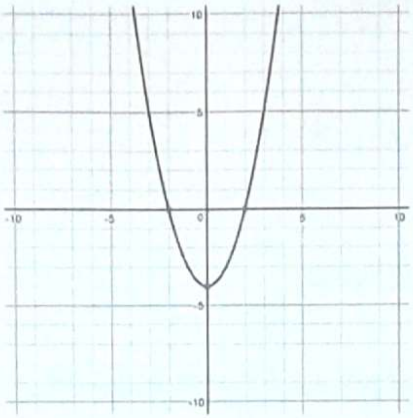
Concept 1: Fundamental Theorem of Algebra

Fundamental Theorem of Algebra: Any polynomial of degree n has n roots……but we may need to use imaginary.☺

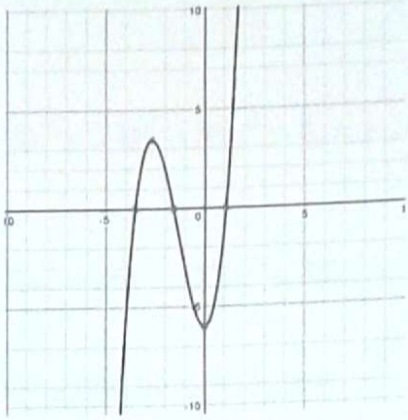
1. $f(x) = 3x + 2$ 1



2. $f(x) = x^2 - 4$ 2

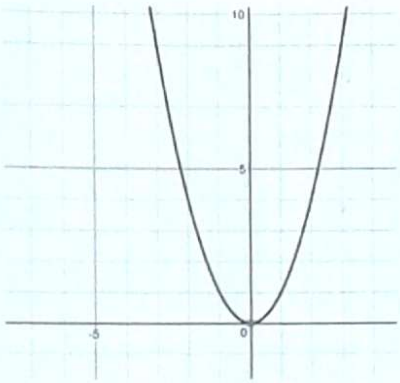


3. $f(x) = x^3 + 4x^2 - 6$ 3

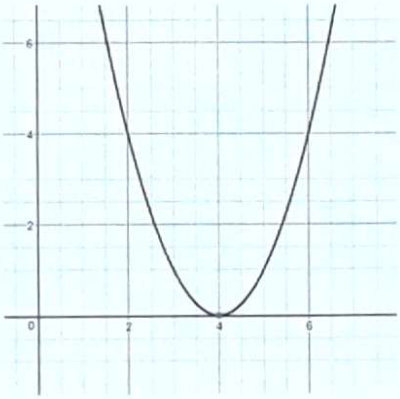


Repeated Roots Exception

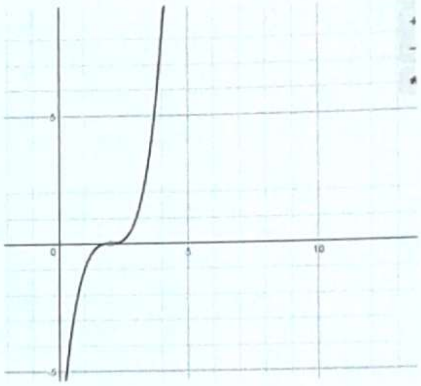
4. $f(x) = x^2$ 2 (rep)



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

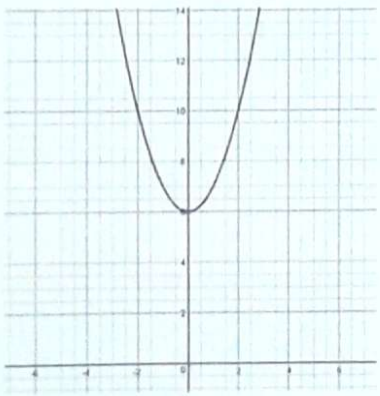


6. $f(x) = (x-2)^3$ 3(rep)



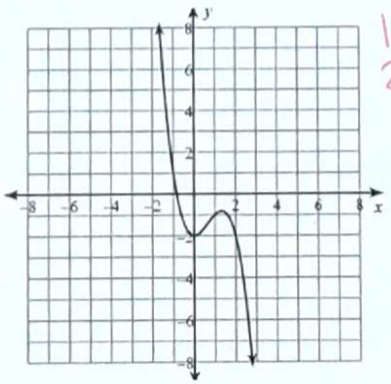
Imaginary Roots Exception

7. $f(x) = x^2 + 6$ 2 (I)



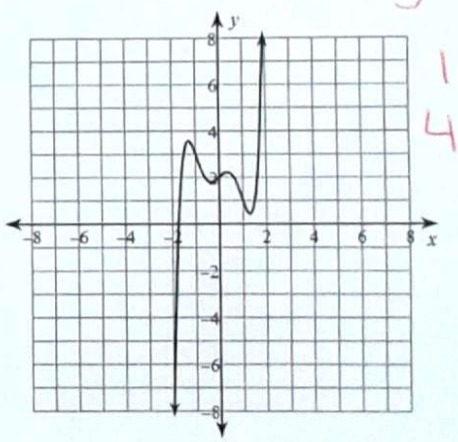
8. $f(x) = -x^3 + 2x^2 - 2$ 3

1R
2I



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

1R
4I



How many solutions do the following polynomials have?

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

2) $f(x) = 2x^6 + 3x^4 - 32x^2 - 48$ 6

3) $f(x) = 3x^2 + 3x + 4$ 2

4) $f(x) = 3x^2 - 13x^5 - 10$ 5

5) $f(x) = 3x^2 + 4x^3 + 1$ 3

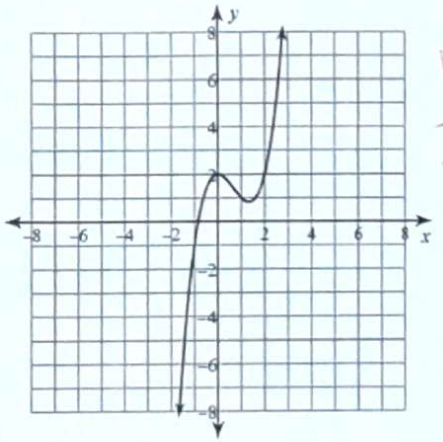
6) $f(x) = 2x^5 + 6x^4 + 27x^7 + 81x^2 + 81x + 243$ 7

7) $f(x) = 2x^4 - 11x^2 + 14$ 4

8) $f(x) = 3x^3 - 6x^4 + 26x^6 - 52x^2 + 48x^5 - 96$ 6

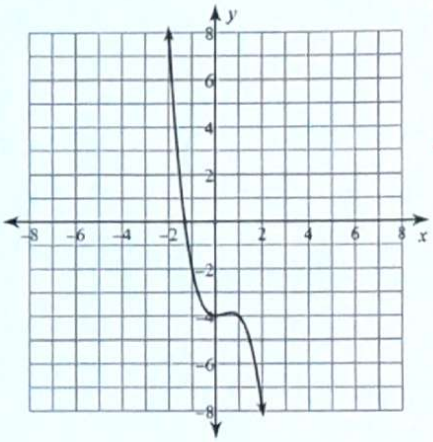
How many solutions do the following functions have? How many are complex and how many are real?

9) $f(x) = x^3 - 2x^2 + 2$



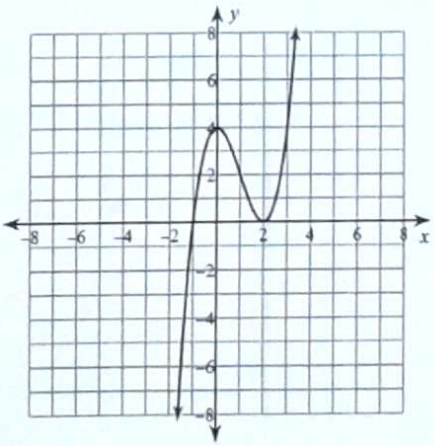
T: 3
R: 1
I: 2

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



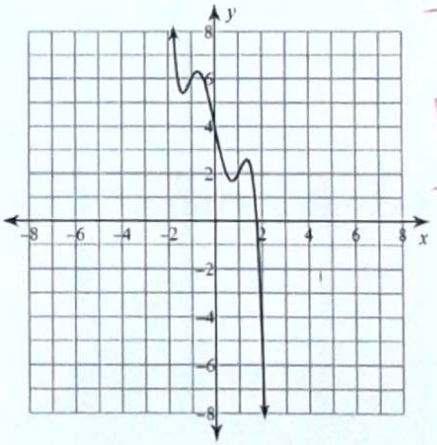
T: 3
R: 1
I: 2

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



T: 3
R: 3
I: 0

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



T: 5
R: 1
I: 4

Concept 2 Complex Operations

REMINDER: $\sqrt{-1} =$ i $\quad i^2 =$ -1

Adding, Subtracting, and Multiplying Polynomials Review:

$(3x^2 - 3x + 2) + (2x^2 + 5x - 7)$ $\quad (3x^2 - 3x + 2) - (2x^2 + 5x - 7)$ $\quad (x - 5)(3x^2 + 4)$

$5x^2 + 2x - 5$ $\quad x^2 - 8x + 9$ $\quad 3x^3 + 4x - 15x^2 - 2$

$3x^3 - 15x^2 + 4x - 20$

Order of Operations Review:

P Parentheses or other grouping symbols

E Exponents

MD Multiplication & Division from left to right

AS Addition & Subtraction from left to right

Adding Complex Numbers:

1) $(7 + 5i) + (-2 + 8i)$

$5 + 13i$

2) $(3 + i) + (-7 + 2i)$

$-4 + 3i$

Subtracting Complex Numbers:

1) $(1 - 5i) - (4 - 7i)$

$-3 + 2i$

2) $(8i) - (3i) - (-3 - 2i)$

$5i - (-3 - 2i)$

$3 + 7i$

Concept 3: Solving Radical Equations

Factoring Review:

1. $x^2 + 4x + 3 = 0$

AC: 3
B: 4
3 $\$$ 1

$(x+1)(x+3)$

2. $x^2 - 13x + 42 = 0$

AC: 42
B: -13
-6 $\$$ -7

$(x-6)(x-7)$

3. $x^2 - 5x + 6 = 0$

AC: 6
B: -5
-2 $\$$ -3

$(x-2)(x-3)$

Solving Radical Equations:

1. $2^2 = \sqrt{4a}^2$

$\frac{4}{4} = \frac{4a}{4}$

$1 = a$

$a = 1$

2. $\sqrt{1-16x}^2 = 7^2$

$1 - 16x = 49$
$-1 \quad -1$

$\frac{-16x}{-16} = \frac{48}{-16}$

$x = -4$

3. $\sqrt{64-n}^2 = \sqrt{\frac{n}{7}}^2$

$7(64-n) = \frac{n}{7} \cdot 7$

$448 - 7n = n$
$+7n \quad +7n$

$\frac{448}{8} = \frac{8n}{8}$

$n = 56$

4. $\sqrt{-2-x}^2 = \sqrt{-7-2x}^2$

$-2 - x = -7 - 2x$
$+7 \quad +7$

$5 - x = -2x$
$+x \quad +x$

$5 = -x$

$x = -5$

5. $(p-2)^2 = \sqrt{4p-11}^2$

$(p-2)(p-2) = 4p - 11$

$p^2 - 2p - 2p + 4 = 4p - 11$

$p^2 - 4p + 4 = 4p - 11$
$+11 \quad +11$

$p^2 - 4p + 15 = 4p$
$-4p \quad -4p$

$p^2 - 8p + 15 = 0$ AC: 15, B: -8

$(p-5)(p-3)$ $-5 \$ -3$

$p = 5, 3$

6. $6 + 3w = \sqrt{2w+12} + 2w$
$-2w \qquad -2w$

$(6+w)^2 = \sqrt{2w+12}^2$

$(w+6)(w+6) = 2w + 12$

$w^2 + 12w + 36 = 2w + 12$
$-2w \qquad -2w$

$w^2 + 10w + 36 = 12$
$-12 \quad -12$

$w^2 + 10w + 24 = 0$

$(w+2)(w+8)$ AC 24, B 10, $2 \$ 8$

$w = -2, -8$