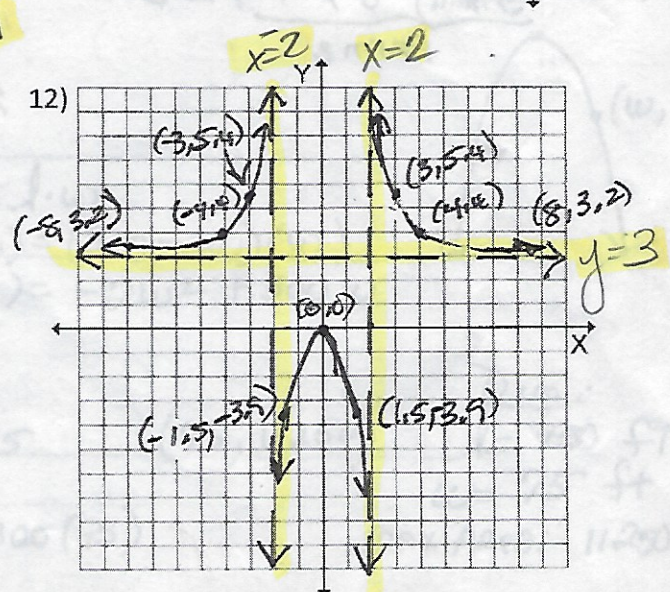
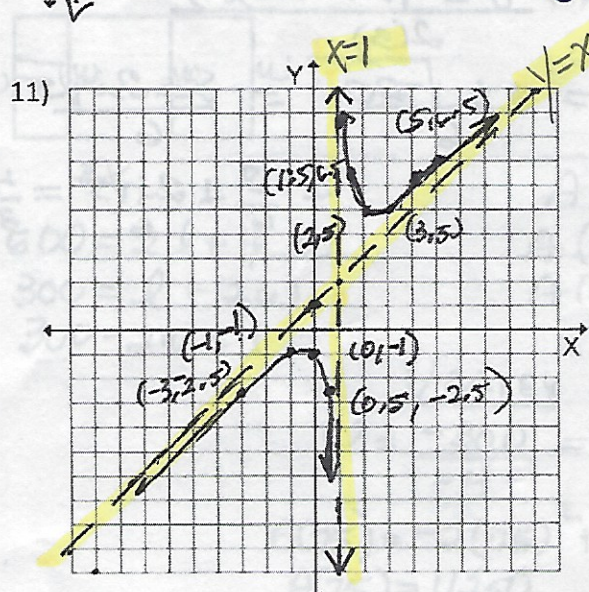
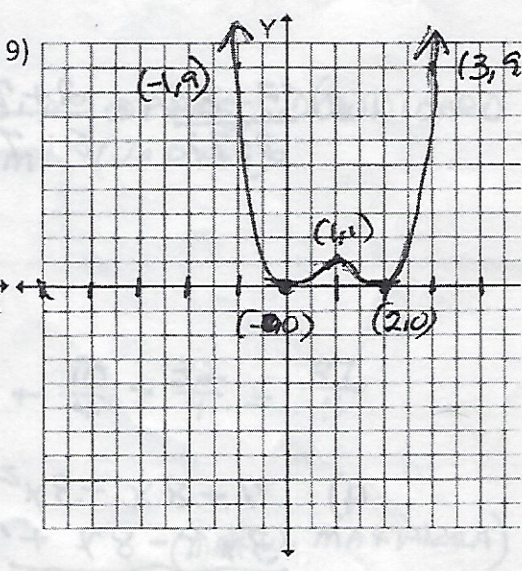
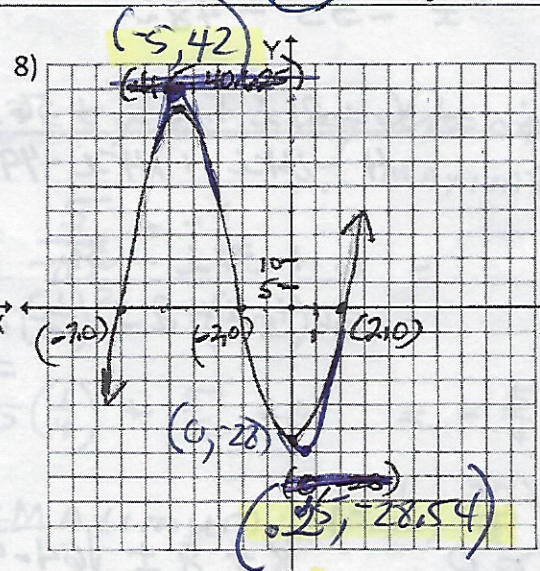
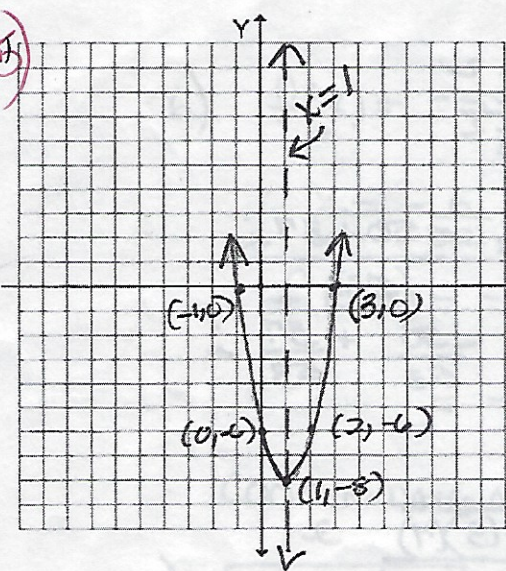


Chapt. 2 - PRACTICE TEST

OR (-5, 42)

1) $3 + 29i$	Zeros: $X = -7, \pm 2$ y-Int: $(0, -28)$
2) $-55 - 48i$	8) Critical Points: $(-4.5, 40.625)$ & $(0, -28)$ OR $(-5, 42)$
3) $-\frac{50}{53} + \frac{37}{53}i$	Zeros: $X = 0, 2$ y-Int: $(0, 0)$
4) $X = \frac{4}{3} \pm \frac{\sqrt{5}}{3}i$	9) Critical Points: $(1, 1)$
5) Vertex: $(1, -8)$ Zeros: $X = -1, 3$ x-Int: $(3, 0)$ $(-1, 0)$ y-int: $(0, -6)$	10) $X = -1, -2, 3 \pm \sqrt{13}$
6) Circle one: <u>Maximum/Minimum</u> Coordinates: $(-\frac{1}{2}, \frac{37}{4})$	11) VA: $X = 1$ HA: NONE SA: $y = X + 1$
7) Length: <u>150 ft</u> Width: <u>75 ft</u> Maximum Area: <u>11,250 ft²</u>	12) VA: $X = -2, X = 2$ HA: $y = 3$ SA: NONE
	13) $[-2, -1] \cup [1, 00)$
	14) $(-\infty, -6]$ OR $(-2, 00)$
	15) $f(x) = 3x^3 + 9x^2 + 12x + 3$



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

VERTEX:

$$x = \frac{4}{4} = 1$$

$$\begin{aligned} f(1) &= 2(1)^2 - 4(1) - 6 \\ &= 2 - 4 - 6 \\ &= -8 \\ (1, -8) \end{aligned}$$

ZEROS

$$\begin{aligned} 0 &= 2x^2 - 4x - 6 \\ 0 &= 2(x^2 - 2x - 3) \\ 0 &= 2(x-3)(x+1) \\ x-3 &= 0 & x+1 &= 0 \\ x &= 3 & x &= -1 \end{aligned}$$

X-INT
(3, 0) (-1, 0)

y-INT (x=0)
 $f(0) = 2(0)^2 - 4(0) - 6$
 $f(0) = -6$
(0, -6)

ADDITIONAL Point

Reflecting (0, -6)
over the axis of
Symmetry \rightarrow (2, -6)

$$6) f(x) = -5x^2 - 5x + 8 \rightarrow \text{PARABOLA OPENS DOWNWARD}$$

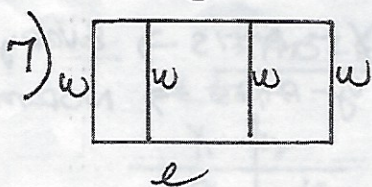
\therefore MAXIMUM (VERTEX)

$$x = \frac{-b}{2a} = \frac{5}{-10} = -\frac{1}{2}$$

$$f(-\frac{1}{2}) = -5(-\frac{1}{2})^2 - 5(-\frac{1}{2}) + 8$$

$$= -5(\frac{1}{4}) + \frac{5}{2} + 8 = -\frac{5}{4} + \frac{10}{4} + \frac{32}{4} = \frac{37}{4}$$

COORDINATES OF MAXIMUM: $(-\frac{1}{2}, \frac{37}{4})$



$$600 = 2l + 4w$$

$$300 = l + 2w$$

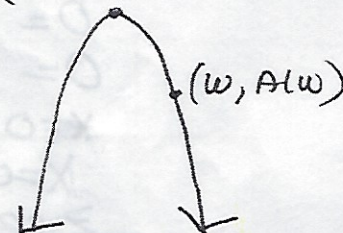
$$300 - 2w = l$$

$$A = l \cdot w$$

$$A(w) = (300 - 2w)(w)$$

$$A(w) = -2w^2 + 300w$$

(MAX W, MAX AREA)



VERTEX

$$w = \frac{-300}{-4} = 75$$

$$(75, 11250)$$

$$A(75) = -2(75)^2 + 300(75)$$

$$A(75) = 11250$$

Dim:

$$l = 150 \text{ ft.}$$

$$w = 75 \text{ ft}$$

$$\text{MAX AREA: } 11250 \text{ ft}^2$$

$$8) f(x) = x^3 + 7x^2 - 4x - 28$$

$$0 = x^3 + 7x^2 - 4x - 28$$

$$0 = x^2(x+7) - 4(x+7)$$

$$0 = (x+7)(x^2-4)$$

$$0 = (x+7)(x+2)(x-2)$$

$$x+7=0 \quad x+2=0 \quad x-2=0$$

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

$$\underline{\text{ZEROS: } x = -7, \pm 2}$$

2 TURNS

CRITICAL POINTS (APPROX):

$(-5, 42)$

$(-4.5, 40.625)$ AND $(0, -28)$

BETWEEN -7 and $-2 \rightarrow x = -4.5$

$$f(-4.5) = (-4.5)^3 + 7(-4.5)^2 - 4(-4.5) - 28$$

$$f(-4.5) = 40.625$$

BETWEEN -2 and $2 \rightarrow x = 0$

$$f(0) = 0^3 + 7(0)^2 - 4(0) - 28$$

$$f(0) = -28$$

y-INT $(0, -28)$

$$x=0$$

$$f(0) = -28$$

SCALE

x-AXIS By ONE

y-AXIS By FIVE

$$9) f(x) = x^4 - 4x^3 + 4x^2$$

$$0 = x^4 - 4x^3 + 4x^2$$

$$0 = x^2(x^2 - 4x + 4)$$

$$0 = x^2(x-2)(x-2)$$

$$x=0 \quad x=0 \quad x-2=0 \quad x-2=0$$

$$x=0 \quad x=0 \quad x=2 \quad x=2$$

$$\underline{\text{ZEROS: } x = 0, 2}$$

GRAPH will flatten out at 0 and 2 \rightarrow tangent to x-axis

CRITICAL POINT (APPROX) $(1, 1)$

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

$$= 1 - 4 + 4 = 1$$

other pts:

$$f(3) = 9 \quad (3, 9)$$

$$f(-1) = 9 \quad (-1, 9)$$

y-INT:
 $x=0$

$$f(0) = 0 \quad (0, 0)$$

10) $f(x) = x^4 - 3x^3 - 20x^2 - 24x - 8$
 $0 = x^4 - 3x^3 - 20x^2 - 24x - 8$
 $0 = (x+1)(x^3 - 4x^2 - 16x - 8)$
 $0 = (x+1)(x+2)(x^2 - 6x - 4)$
 $x+1=0 \quad x+2=0 \quad x^2 - 6x - 4=0$
 $x=-1 \quad x=-2 \quad x = \frac{6 \pm \sqrt{36 - 4(1)(-4)}}{2}$

$$x = \frac{6 \pm \sqrt{52}}{2}$$

$$x = \frac{6 \pm 2\sqrt{13}}{2}$$

$$x = 3 \pm \sqrt{13}$$

Zeros: $x = -1, -2, 3 \pm \sqrt{13}$

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

x-int
 $y=0$

$$0 = \frac{x^2 + 1}{x - 1}$$

$$0 = x^2 + 1$$

NO Real SOLUTION
 NO x-int

y-int
 $x=0$

$$f(0) = \frac{0^2 + 1}{0 - 1}$$

$$f(0) = -1$$

(0, -1)

VA
 $x-1=0$
 $x=1$

HA
 NO HA

SA
 $y = x + 1$

$$\begin{array}{r|rrrr} 1 & 1 & 0 & 1 & \\ & & 1 & 1 & \\ \hline & 1 & 1 & 2 & \\ & & & & x+1 \end{array}$$

$P \rightarrow \pm 1, \pm 2, \pm 4, \pm 8$
 $Q \rightarrow \pm 1$
 $\frac{P}{Q} \rightarrow \pm 1, \pm 2, \pm 4, \pm 8$

$f(-1) = 0$

$$\begin{array}{r|rrrrrr} -1 & 1 & -3 & -20 & -24 & -8 \\ & & -1 & 4 & 16 & 8 \\ \hline & 1 & -4 & -16 & -8 & 0 \end{array}$$

$P \rightarrow, Q \rightarrow, \frac{P}{Q} \rightarrow$ SAME AS ABOVE

$f(-2) = 0$

$$\begin{array}{r|rrrr} -2 & 1 & -4 & -16 & -8 \\ & & -2 & 12 & 8 \\ \hline & 1 & -6 & -4 & 0 \end{array}$$

TABLES OF VALUES

LEFT		RIGHT	
x	y	x	y
.9	-18.1	1.5	6.5
0	-1	2	5
-1	-1	3	5
-3	-2.5	5	6.5
.5	-2.5		

12) $f(y) = \frac{3x^2}{x^2-4}$

X-int

$y=0$
 $0 = \frac{3x^2}{x^2-4}$

$0 = 3x^2$
 $x=0$

(0,0)

Left

x	y
-3	5.4
-4	4
-8	3.2

y-int

$x=0$
 $f(0) = \frac{3(0)^2}{0^2-4}$

$= \frac{0}{-4}$
 $= 0$

(0,0)

Right

x	y
3	5.4
4	4
8	3.2

VA

$x^2-4=0$
 $(x+2)(x-2)=0$
 $x+2=0 \quad x-2=0$
 $x=-2 \quad x=2$

HA

$y=3$

SA

NO SA

Center

x	y
-1.5	-3.9
0	0
1.5	3.9

13) $x^3 + 2x^2 \geq x + 2$

$x^3 + 2x^2 - x - 2 \geq 0$

$x^3 + 2x^2 - x - 2 = 0$

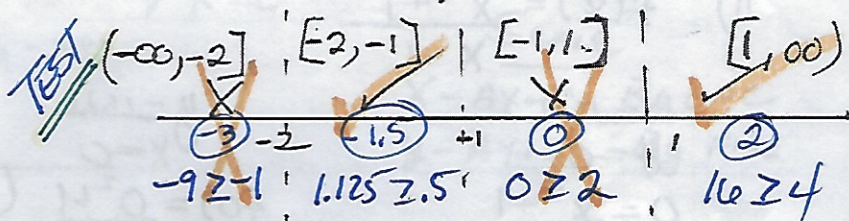
$x^2(x+2) - (x+2) = 0$

$(x+2)(x^2-1) = 0$

$(x+2)(x+1)(x-1) = 0$

$x+2=0 \quad x+1=0 \quad x-1=0$

$x=-2 \quad x=-1 \quad x=1$



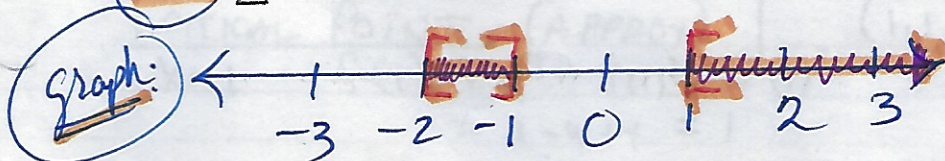
SUBST $\left\{ \begin{aligned} (-3)^3 + 2(-3)^2 &\stackrel{?}{\geq} -3 + 2 \\ -27 + 18 &\stackrel{?}{\geq} -1 \\ -9 &\stackrel{?}{\geq} -1 \end{aligned} \right. X$

SUBST $\left\{ \begin{aligned} (-1.5)^3 + 2(-1.5)^2 &\stackrel{?}{\geq} -1.5 + 2 \\ 1.125 &\stackrel{?}{\geq} 0.5 \end{aligned} \right. \checkmark$

SUBST $\left\{ \begin{aligned} 0^3 + 2(0)^2 &\stackrel{?}{\geq} 0 + 2 \\ 0 &\stackrel{?}{\geq} 2 \end{aligned} \right. X$

SUBST $\left\{ \begin{aligned} 2^3 + 2(2)^2 &\stackrel{?}{\geq} 2 + 2 \\ 8 + 8 &\stackrel{?}{\geq} 4 \\ 16 &\stackrel{?}{\geq} 4 \end{aligned} \right. \checkmark$

Sol: $[-2, -1] \cup [1, \infty)$



14) $\frac{x-2}{x+2} \leq 2$

$\frac{x-2}{x+2} - 2 \leq 0$

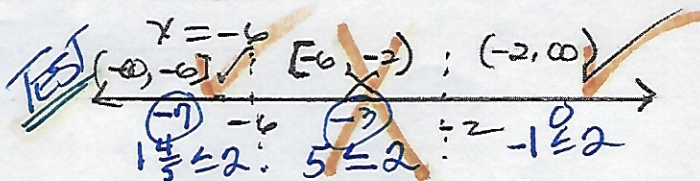
$\frac{x-2-2(x+2)}{x+2} \leq 0$

$\frac{x-2-2x-4}{x+2} \leq 0$

$\frac{-x-6}{x+2} \leq 0$

$-x-6=0$
 $-x=6$

$x+2=0$
 $x=-2$



$x = -7$ $\frac{-7-2}{-7+2} \stackrel{?}{\leq} 2$

$\frac{-9}{-5} \stackrel{?}{\leq} 2$

$1.4 \leq 2 \checkmark$

$x = -3$ $\frac{-3-2}{-3+2} \stackrel{?}{\leq} 2$

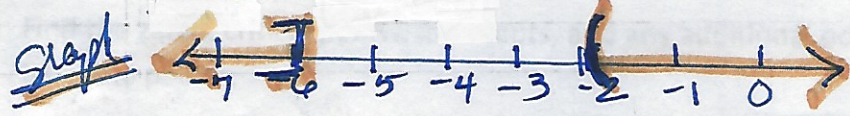
$\frac{-5}{-1} \stackrel{?}{\leq} 2$

$5 \leq 2 \times$

$x = 0$ $\frac{0-2}{0+2} \stackrel{?}{\leq} 2$

$-1 \leq 2 \checkmark$

Sol: $(-\infty, -6] \cup (-2, \infty)$



15) $n=3$ zeros $x=3$ $x=2i$ $x=-2i$ $f(1)=-30$

$0 = k(x-3)(x-2i)(x+2i)$

$0 = k(x-3)(x^2+4)$

$0 = k(x^3-3x^2+4x-12)$

$f(x) = k(x^3-3x^2+4x-12)$

$f(x) = +3(x^3-3x^2+4x-12)$

$f(x) = -3x^3+9x^2-12x+36$

$f(x) = 3x^3-9x^2+12x-36$

$-30 = k(1-3+4-12)$

$-30 = k(-10)$

$k = +3$

DO NOT FORGET TO REVIEW 2.8!!!