Pre-Calculus Quiz REVIEW
Section 2.1 to 2.3

Name: Key **Hour:** ___

Evaluate. **Write answer in a + bi form.**

1.) $(-4 + i)(3 - 5i)$

$-12 + 20i + 3i - 5i^2$

$-12 + 23i - 5(-1)$

$-12 + 23i + 5$

$-7 + 23i$

2.) $\frac{5}{2-i}\left(\frac{2+i}{2+i}\right) = \frac{10+5i}{4 + \cancel{2i} - \cancel{2i} - i^2}$

$\frac{10+5i}{4-(-1)} = \frac{10+5i}{5} = 2+i$

3.) Find all solutions to: $x^2 - 2x + 17 = 0$ (**Write answer in a + bi form.**) $a=1$ $b=-2$ $c=17$

$x = \frac{-(-2) \pm \sqrt{(-2)^2 - 4(1)(17)}}{2(1)} = \frac{2 \pm \sqrt{4-68}}{2}$

$\frac{2 \pm \sqrt{-64}}{2} = \frac{2}{2} \pm \frac{8i}{2} = 1 \pm 4i$

4.) Given the function: $f(x) = x^3 + x^2 - 2x + 1$, use the intermediate value theorem to determine if there is a zero between – 3 and -2. (Show all work)

$f(-3) = (-3)^3 + (-3)^2 - 2(-3) + 1 =$
$-27 + 9 + 6 + 1 = -11$ neg

$f(-2) = (-2)^3 + (-2)^2 - 2(-2) + 1 =$
$-8 + 4 + 4 + 1 = 1$ pos

Yes, there is a zero between -3 & -2

5-6 Fill in all of the requested information and draw a graph of the function.

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

$-(1)^2 + 2(1) + 3$
$-1 + 2 + 3$
4

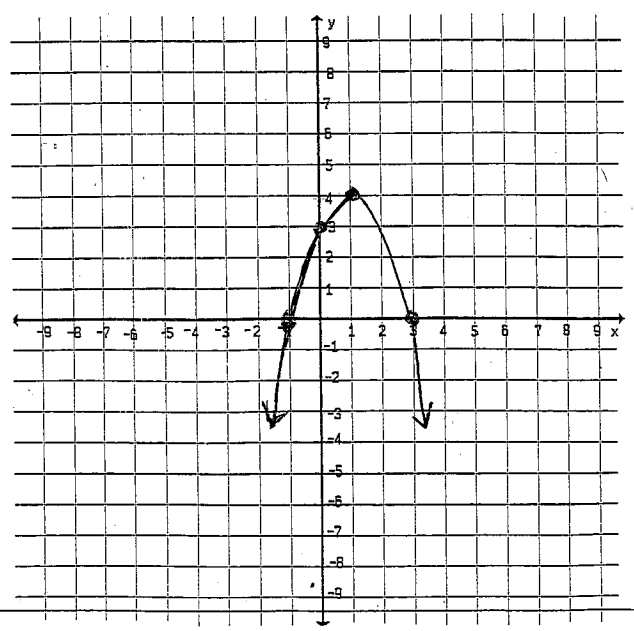
Vertex: $(1, 4)$ Circle: Min or Max

X- Int (s): $(3,0)(-1,0)$ Y-Int: $(0,3)$

Domain: $(-\infty, \infty)$

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

Range: $(-\infty, 4]$



6.) $f(x) = 2(x-1)^2 - 8 \longrightarrow 2(x^2 - 2x + 1) - 8$

$2(x-1)(x-1) - 8$

$2x^2 - 4x + 2 - 8$

$2x^2 - 4x - 6$

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

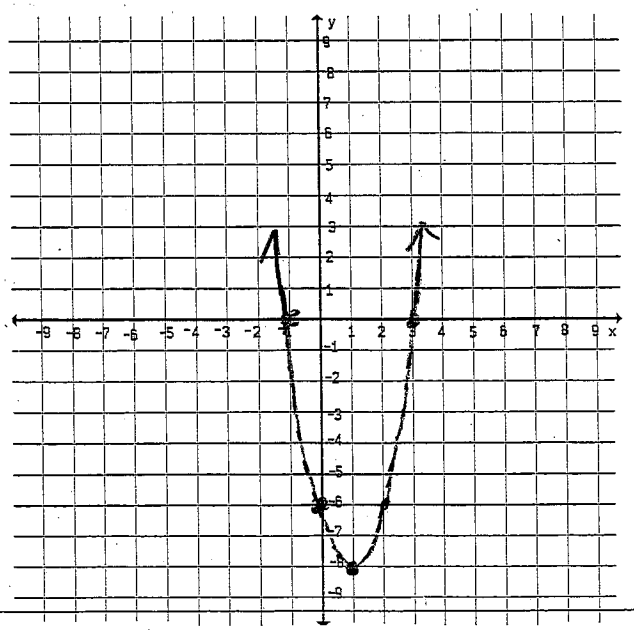
$2(x-3)(x+1)$

Vertex: $(1, -8)$ Circle: Min or Max

X- Int (s): $(3,0)(-1,0)$ Y-Int: $(0,-6)$

Domain: $(-\infty, \infty)$

Range: $[-8, \infty)$



9.) $p(x) = x^3 - 7x^2 + 10x$ $\quad x(x^2 - 7x + 10)$

a) Find the zeros by factoring. $x(x-5)(x-2)$

$x = 0$ odd mult. cross

$x = 5$ odd mult. cross

$x = 2$ odd mult. cross

b) Determine start and end behavior.

D: 3 odd

L.C.: 1 pos

c) Find the y intercept by plugging in zero for x.

(0, 0)

d) Plug in x to find two additional points.

$(1)^3 - 7(1)^2 + 10(1)$

$1 - 7 + 10$

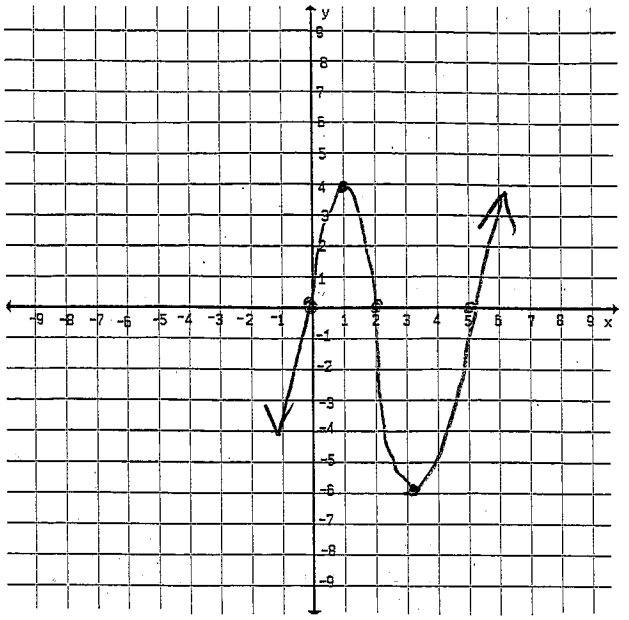
$4 \quad (1, 4)$

$(3)^3 - 7(3)^2 + 10(3)$

$27 - 7(9) + 30$

$27 - 63 + 30 = -6 \quad (3, -6)$

e) Graph the polynomial function



8.) $p(x) = x(x-2)^2(x+4)$

a) Find the zeros and state the multiplicity of each.

$x = 0$ odd mult. cross

$x = 2$ even mult. t&t

$x = -4$ odd mult. cross

b) Determine start and end behavior.

D: 4 even

L.C.: 1 pos

c) Find the y intercept by plugging in zero for x.

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

(0, 0)

d) Plug in x to find 2 additional points.

$-2(-2-2)^2(-2+4)$

$-2(-4)^2(2)$

$-2(16)(2) = -64 \quad (-2, -64)$

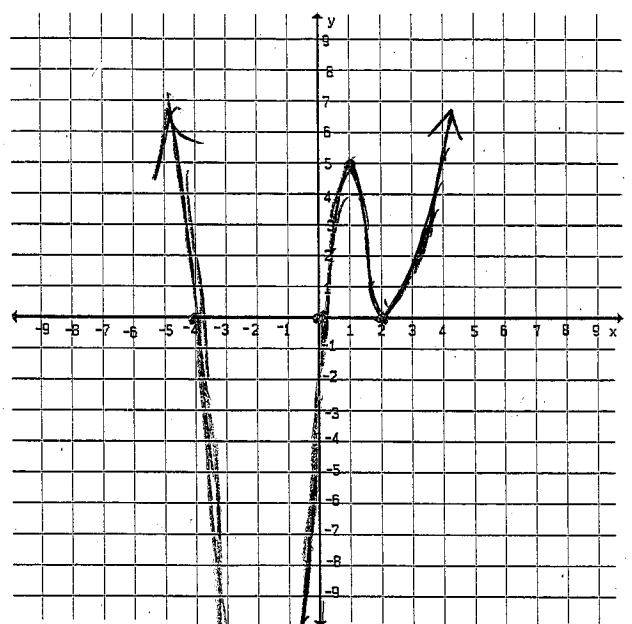
$1(1-2)^2(1+4)$

$(1)^2(5)$

5

$(1, 5)$

e) Graph the polynomial function



9) When a football is kicked, the height of the football, in feet, can be modeled by $f(x) = -0.01x^2 + 1.18x + 2$, where x is the horizontal distance, in feet, from the point of impact with the kickers foot. What is the maximum height of the punt and how far from the point of impact does this occur? If the ball is not blocked, how far down the field will it go before hitting the field?

Vertex

y-value

Max Height: 36.81 ft

$x = \frac{-1.18}{2(-0.01)} = \frac{-1.18}{-0.02} = 59$

$f(x) = -0.01(59)^2 + 1.18(59) + 2$

$-0.01(3481) + 69.62 + 2$

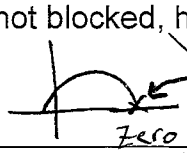
$-34.81 + 69.62 + 2$

36.81

x-value

How far from impact did it occur? 59 ft from impact

If not blocked, how far down field?



Zero

Use quadratic formula

$x = \frac{-(1.18) \pm \sqrt{(1.18)^2 - 4(-0.01)(2)}}{2(-0.01)}$

$x = \frac{-1.18 \pm 1.2134}{-0.02}$

$\frac{-1.18 + 1.21}{-0.02} = \cancel{-1.5}$

$\frac{-1.18 - 1.21}{-0.02} = 119.5$ ft

119.5 ft down field