

# Test 2 Form B

1. a) opens down b/c leading coefficient is negative

b)  $(-b/2a, f(-b/2a))$

$-4/2(2) = -1$   $f(1) = -2 + 4 + 6 = 8$  vertex =  $(1, 8)$

c)  $f(0) = 6$

2.  $f(x) = a(x-h)^2 + k$   $(h, k) = (1, -3)$

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

Use  $(3, 5)$  to find  $a$

$5 = a(3-1)^2 - 3$

$5 = 4a - 3$

$8 = 4a$   $a = 2$

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

3. a) 7

b) 4

c)  $4x^7$

d)  $\frac{1}{x}$

e)

Zero	Multiplicity	Touch or cross
7	1	cross
-1	4	touch
-3	2	touch

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

5. a) VA: need to check  $(3x-1)(x+2) = 0$   $x = 1/3, x = -2$

$f(1/3) = \frac{(1/3)^2 + 1/3 - 2}{0} = \frac{1/9 + 1/3 - 2}{0} = \frac{-4/9}{0} \Rightarrow x = 1/3$  is a VA

$f(-2) = \frac{4 - 2 - 2}{0} = \frac{0}{0}$  so  $x = -2$  is not a VA.

b) HA: degree numerator = 2 = n  
 degree denominator = 2 = m  
 $n = m$  so HA @  $y = 1/3$

$$6. \textcircled{1} \frac{x+4}{x-2} \geq 1 \quad \frac{x+4}{x-2} - 1 \geq 0 \quad \frac{x+4 - (x-2)}{x-2} \geq 0 \quad \frac{x+4-x+2}{x-2} \geq 0 \quad \frac{6}{x-2} \geq 0$$

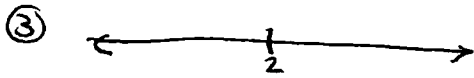
$$\textcircled{2} \frac{6}{x-2} \neq 0 \quad \text{use } f(x) = \frac{6}{x-2} \quad \frac{6}{x-2} \text{ undefined at } x=2$$

$$\textcircled{3} (-\infty, 2) \quad (2, \infty)$$

Check  $x=2$

$$\frac{2+4}{2-2} = \frac{6}{0} \text{ undefined}$$

$$\text{Answer: } (-\infty, 2) \cup (2, \infty)$$



$$\textcircled{4} \text{Interval } (-\infty, 2) \quad (2, \infty)$$

#	0	3
+ or -	-	+

$$7. \textcircled{a} \frac{\pm 1, \pm 2}{\pm 1, \pm 2, \pm 4} \quad \pm 1, \pm 2, \pm \frac{1}{2}, \pm \frac{1}{4}$$

$$\textcircled{b} \begin{array}{r} \parallel \quad -4 \quad 1 \quad 1 \quad 2 \\ \quad \quad \downarrow \quad -4 \quad -3 \quad -2 \\ \hline -4 \quad -3 \quad -2 \quad \textcircled{1} \end{array} \text{ so } x-1 \text{ is a factor}$$

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

$$\textcircled{c} f(-2) = -4(-2)^3 + (-2)^2 - 2 + 2 = 32 + 4 - 2 + 2 = 36$$

Remainder is 36 by remainder theorem  
 $x+2$  is not a factor

$$8. 5-4i$$

$$9. \textcircled{a} R = xP = x(-\frac{1}{3}x + 100) = -\frac{1}{3}x^2 + 100x$$

$$\textcircled{b} \frac{-b}{2a} = \frac{-100}{2(-\frac{1}{3})} = 150$$

$$\textcircled{c} R(150) = \$7500$$