

Test 2 Form A

1. a) opens up b/c leading coefficient is positive

b) $(-b/2a, f(-b/2a))$ $-6/3(2) = -1$ $f(-1) = 3 - 6 + 2 = -1$ vertex: $(-1, -1)$

c) $f(0) = 2$

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

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

$5 = a(3-1)^2 - 3 = 4a - 3$

$8 = 4a$ so $a = 2$

3. a. 6 b. -5 c. $-5x^6$ d. $\swarrow \searrow$

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

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

5. a) VA: Check where denom = 0 $(3x-1)(x+2) = 0$ $x = 1/3, x = -2$

$f(1/3) = \frac{(1/3)^2 + 1/3 - 2}{0} = \frac{1/9 + 1/3 - 2}{0} = \frac{-14/9}{0} \Rightarrow x = 1/3$ 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 is $y = 1/3$

6. ① $\frac{x+4}{x-2} \leq 1$ $\frac{x+4}{x-2} - 1 \leq 0$ $\frac{x+4 - (x-2)}{x-2} \leq 0$ so $\frac{6}{x-2} \leq 0$ Use $f(x) = \frac{6}{x-2}$.

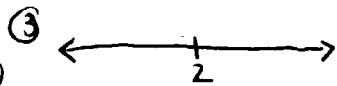
② $\frac{6}{x-2} \neq 0$, $\frac{6}{x-2}$ undef at $x = 2$

⑤ $(-\infty, 2)$

check $x = 2$

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

Answer: $(-\infty, 2)$



Interval	$(-\infty, 2)$	$(2, \infty)$
#	0	3
+ or -	-	+

7. a) $\frac{\pm 1, \pm 2}{\pm 1, \pm 2, \pm 4}$ so $\pm 1, \pm 2, \pm 1/2, \pm 1/4$

b)
$$\begin{array}{r} \underline{\underline{11}} \quad -4 \quad 1 \quad 1 \quad 2 \\ \quad \downarrow \quad -4 \quad -3 \quad -2 \\ \hline -4 \quad -3 \quad -2 \quad \textcircled{0} \end{array}$$
 ← Remainder
 so $x-1$ is
 a factor

$g(x) = (4x^2 - 3x - 2)(x - 1) + 0$

c) $g(-2) = -4(-2)^3 + (-2)^2 - 2 + 2 = 32 + 4 = 36 \neq 0$ so $x+2$ is not a factor by the factor theorem.
 The remainder is 36 by remainder theorem

8. $4-5i$

9. a) $R = xp = x(-1/3x + 100) = -1/3x^2 + 100x$

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

c) $R(150) = \$7500$