Pre-Calc   Name __KEY_____

Practice Test – Chapter 2 (Non–Calculator Portion)

YOU MUST SHOW ALL YOUR WORK TO RECEIVE CREDIT!

Find the coordinates of the vertex for the parabola defined by the given quadratic function.

1) $f(x) = -x^2 + 12x - 6$

1) __$(6, 30)$__

$$h = \frac{-12}{2(-1)} = 6 \qquad k = -(6)^2 + 12(6) - 6$$
$$= -36 + 72 - 6$$
$$= 30$$

Find the axis of symmetry of the parabola defined by the given quadratic function.

2) $f(x) = -7(x - 5)^2 - 9$

AOS: $x = 5$

2) _____

$$h = 5$$

Find the domain and range of the quadratic function whose graph is described.

3) The vertex is $(1, 9)$ and the graph opens up.

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

3) Range: $[9, \infty)$

Use the vertex and intercepts to sketch the graph of the quadratic function.

4) $f(x) = 3(x + 6)^2 + 1$

4) _____
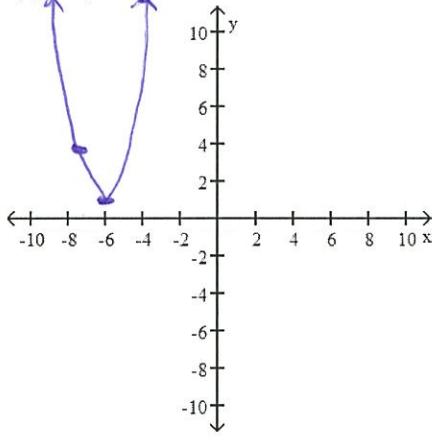
① Vertex: $(-6, 1)$

② X-Int: none

③ Y-Int: $f(0) = 3(0+6)^2 + 1$
$$= 3(6)^2 + 1$$
$$= 109$$
$$(0, 109)$$

④ Additional Points

x	y
-2	+9
-4	13
-7	4

5) $f(x) = -2x - 8 + x^2$

5) _____
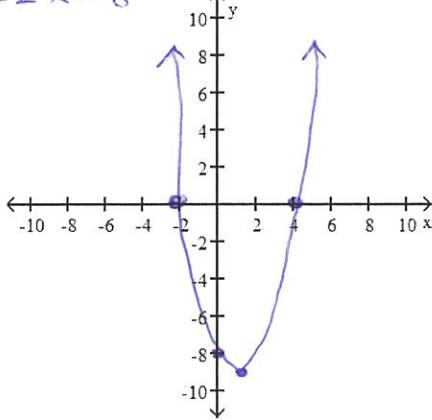
$$f(x) = x^2 - 2x - 8$$

① Vertex

$$h = \frac{2}{2(1)} = 1$$
$$k = 1^2 - 2(1) - 8 = -9$$
$$(1, -9)$$

② $x^2 - 2x - 8 = 0$
$$(x - 4)(x + 2) = 0$$
$$x = 4 \quad x = -2$$

③ Y-Int

$$0^2 - 2(0) - 8$$
$$= -8$$
$$(0, -8)$$

1

Determine whether the given quadratic function has a minimum value or maximum value. Then find the coordinates of the minimum or maximum point.

6) $f(x) = -x^2 - 2x + 1$

maximum

opens down, ~~minimum~~ value

$h = \frac{2}{2(-1)} = -1$ $k = -(-1)^2 - 2(-1) + 1$

$= -1 + 2 + 1 = 2$

6) $\underline{\quad \begin{array}{c} \text{Max at} \\ (-1, 2) \end{array} \quad}$

Find the x–intercepts of the polynomial function. State whether the graph crosses the x–axis, or touches the x–axis and turns around, at each intercept.

7) $f(x) = 7x^2 - x^3$

$= x^2(7 - x)$

7) $\underline{\quad \begin{array}{c} 0 \text{ Turn} \\ 7 \text{ cross} \end{array} \quad}$

Determine the end behavior of the polynomial function.

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

Odd Neg

8)

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

Even Pos

9)
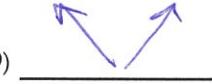
Find the zeros of the polynomial function.

10) $f(x) = x^3 - 2x^2 - 9x + 18$

$(x^3 - 2x^2) + (-9x + 18)$

$x^2(x - 2) - 9(x - 2)$

$(x^2 - 9)(x - 2)$

$x^2 = 9 \qquad x - 2 = 0$

$x = \pm 3 \qquad x = 2$

10) $\underline{\quad \begin{array}{c} 3 \text{ cross} \\ -3 \text{ cross} \\ 2 \text{ cross} \end{array} \quad}$

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

$x - 4 = 0 \qquad x + 2 = 0$

$x = 4 \qquad x = -2$

11) $\underline{\quad \begin{array}{c} 4 \text{ cross} \\ -2 \text{ Turn} \end{array} \quad}$

2

Graph the polynomial function.

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

① Neg, Even ↙ ↘

② $-x^2(x^2 - 4)$

$\downarrow$ ± 2
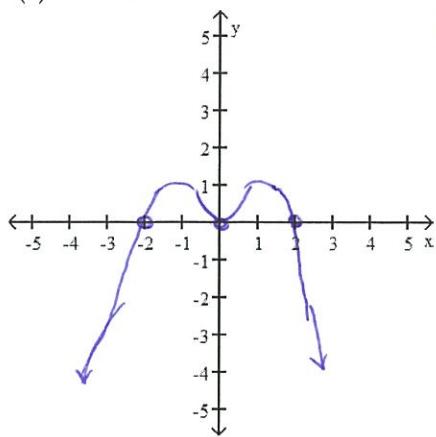
0 Cross

Turn

③ $(0, 0)$

12) _____

13) $f(x) = x^3 + 5x^2 - x - 5$
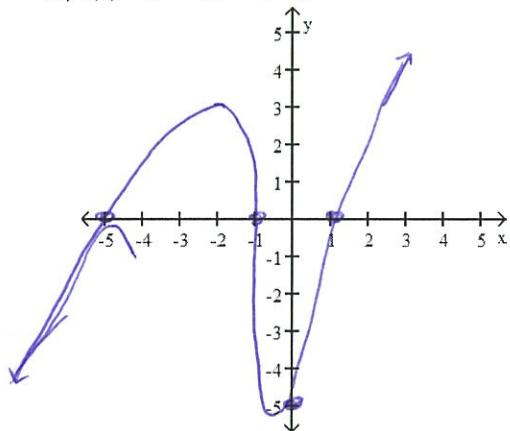
① Pos, odd ↙↗

② $x^2(x+5) - 1(x+5)$

$(x^2 - 1)(x+5)$

± 1 -5

cross   cross

③ $(0, -5)$

13) _____

Solve the problem.

14) Solve the equation $3x^3 - 32x^2 + 73x + 28 = 0$; given that 4 is a zero.

14) $\left\{ -\frac{1}{3}, 4, 7 \right\}$

$4 | 3 \quad -32 \quad 73 \quad 28$

$\downarrow \quad 12 \quad -80 \quad -28$

$3 \quad -20 \quad -7 \quad 0$

$3x^2 - 20x - 7$

15) Solve the equaton $2x^3 + 3x^2 - 14x - 15 = 0$; given x+3 is a factor of the polynomial

15) $\left\{ \frac{5}{2}, -1, -3 \right\}$

3

Find the domain of the rational function.

16) $g(x) = \dfrac{8x^2}{(x+9)(x-2)}$

16) $(-\infty, -9) \cup (-9, 2) \cup (2, \infty)$

17) $g(x) = \dfrac{x+9}{x^2 + 16}$

17) $(-\infty, \infty)$

Find the vertical asymptotes, if any, of the graph of the rational function.

18) $g(x) = \dfrac{x}{x^2 - 16}$

18) $x = \pm 4$

19) $\dfrac{x - 81}{x^2 - 8x + 15}$

19) $x = 5, x = 3$

Find the horizontal asymptote, if any, of the graph of the rational function.

20) $f(x) = \dfrac{8x}{2x^2 + 1}$

20) $y = 0$

21) $h(x) = \dfrac{10x^3}{5x^2 + 1}$

21) No H.A.

22) $g(x) = \dfrac{3x^2 - 7x - 5}{2x^2 - 4x + 9}$

22) $y = \dfrac{3}{2}$

Find the slant asymptote, if any, of the graph of the rational function.

23) $f(x) = \dfrac{2x^2}{8x^2 + 7}$

23) No S.A.

24) $f(x) = \dfrac{x^2 - 4}{x}$

24) $y = x$

Graph the rational function.

25) $f(x) = \dfrac{4x^2}{x^2 - 1}$

VA: $x = \pm 1$
HA: $y = 4$

25) _____
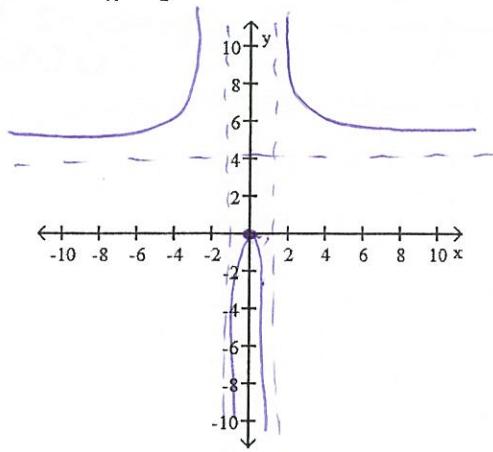

26) $f(x) = \dfrac{-4x}{x - 1}$

VA: $x = 1$
HA: $y = -4$

26) _____
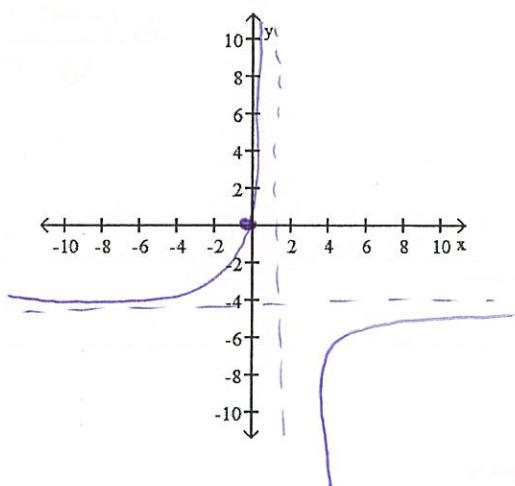
27) $f(x) = \dfrac{x - 2}{x^2 - x - 12}$

$(x - 4)(x + 3)$

y-int: $\dfrac{-2}{-12} = \dfrac{1}{6}$

27) _____
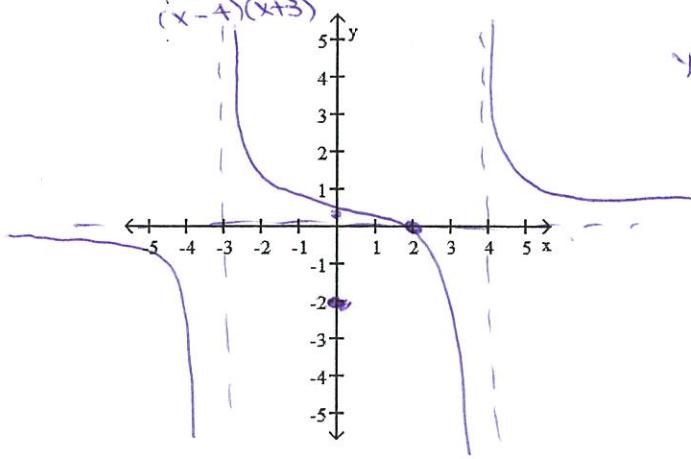
Solve the polynomial inequality.

28) $x^2 - 2x \geq 8$

28) $\underline{(-\infty, -2] \cup [4, \infty)}$

Solve the rational inequality.

29) $\dfrac{12 - 2x}{2x + 7} \leq 0$

29) $\underline{(-\infty, -\frac{7}{2}) \cup [6, \infty)}$

Name_____

Practice Test – Chapter 2.5 (Calculator Portion)

YOU MUST SHOW ALL YOUR WORK TO RECEIVE CREDIT!

Solve the polynomial.

1) $x^3 - 6x^2 + 7x + 2 = 0$

$$\begin{array}{r|rrrr} 2 & 1 & -6 & 7 & 2 \\ & & 2 & -8 & -2 \\ \hline & 1 & -4 & -1 & 0 \end{array}$$

$x^2 - 4x - 1$

$$\frac{4 \pm \sqrt{16 - 4(1)(-1)}}{2}$$

$$\frac{4 \pm \sqrt{20}}{2} = \frac{4 \pm 2\sqrt{5}}{2}$$

1) $\{2 \pm \sqrt{5}, 2\}$

2) $x^4 - 5x^3 + 28x^2 - 70x - 104 = 0$

$-1\rfloor$

2) $\{-1, 4, 1 \pm 5i\}$

3) $x^3 + 7x^2 - 16x + 18 = 0$

3) $\{-9, 1 \pm i\}$

4) $x^4 + 2x^3 - 10x^2 - 14x - 3 = 0$

4) $\{-1, 3, -2 \pm \sqrt{3}\}$

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