

Final Review Part 1

Name Key Hr _____

1-4, Solve the following polynomial, rational or absolute inequalities. Write the solution set in interval notation.

1. $-16 \leq -2x + 4 \leq 12$
 $-20 \leq 2x \leq 8$
 $10 \geq x \geq -4$
 $[-4, 10]$

3. $3|5-x| \geq 12$
 $5-x \geq 4$ $5-x \leq -4$
 $-x \geq -1$ $-x \leq -9$
 $x \leq 1$ $x \geq 9$
 $(-\infty, 1]$ or $[9, \infty)$

2. $\frac{x+6}{x^2+8x+15} < 0$
 $\frac{x+6}{(x+3)(x+5)} < 0$

4. $8|x+4| + 10 < 2$
 $|x+4| < -1$
no solutions

Find the domain of the following functions:

5. $f(x) = \frac{2+x}{7-x}$
all reals except 7

$(-\infty, -6)$ or $(-5, -3)$

6. $f(x) = \sqrt{x-14}$
 $x-14 \geq 0$
 $x \geq 14$
 $[14, \infty)$

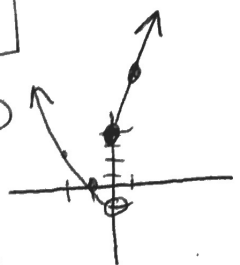
7. $f(x) = 5x + 2.1$
 $(-\infty, \infty)$

For the function: $f(x) = 5x^2 + 2x - 4$,

8. Find $f(3)$ $f(3) = 5(3)^2 + 2(3) - 4 = 45 + 6 - 4 = \boxed{47}$

9. Find $f(2h)$ $f(2h) = 5(2h)^2 + 2(2h) - 4 = 20h^2 + 4h - 4$

10. Graph the following piecewise function: $f(x) = \begin{cases} x^2 - 1, & x < 0 \\ 3x + 4, & x \geq 0 \end{cases}$



For 11-15 use, $f(x) = 3x - 2$ and $g(x) = x^2 + 1$. Find the following operation and their domain.

11. $(f+g)(x) = x^2 + 3x - 1$

14. $(\frac{f}{g})(x) = \frac{3x-2}{x^2+1}$

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

15. $(f \circ g)(x) =$

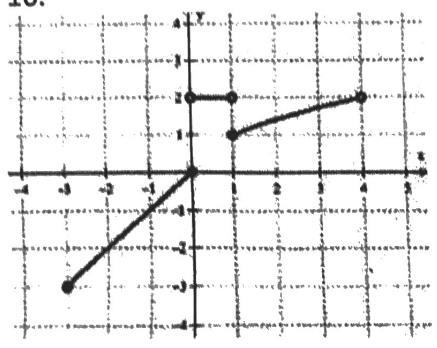
13. $(f \cdot g)(x) = \boxed{3x^3 - 2x^2 + 3x - 2}$

$3(x^2+1) - 2 = 3x^2 + 3 - 2 = \boxed{3x^2 + 1}$

$3x^3 + 3x - 2x^2 - 2$

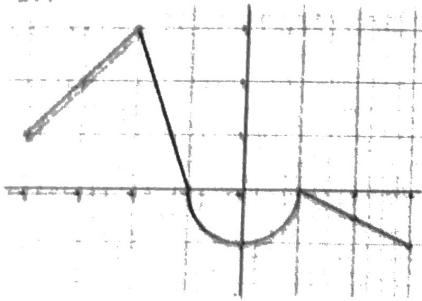
State the Domain and Range and then state the intervals where the function is increasing, decreasing or constant. Find $f(0)$ and $f(-2)$.

16.



Domain: $[-3, 4)$
 Range: $[-3, 0] \cup [1, 2]$
 Increasing: $(1, 4)$ $(-3, 0)$
 Decreasing: none
 Constant: $(0, 1)$
 $f(0) = 0$
 $f(-2) = -2$

17.



Domain: $[-4, 3]$
 Range: $[-1, 4]$
 Increasing: $(-4, -2)$ $(0, 1)$
 Decreasing: $(-2, 0)$ $(1, 3)$
 Constant: none
 $f(0)$: -1
 $f(-2)$: 4

18-19 Change the following functions from Standard Form to Vertex Form.

18. $f(x) = x^2 - 6x - 10$

$$\frac{b}{2a} = 3$$

$$(x-3)^2 - 6(x-3) - 10$$

$$= x^2 - 6x + 9 - 6x + 18 - 10$$

$$= x^2 - 12x + 17$$

ANSWER: $(x-3)^2 - 19$

19. $g(x) = -x^2 + 6x + 7$

$$\frac{b}{2a} = 3$$

$$-9 + 18 + 7$$

ANSWER: $-1(x-3)^2 + 16$

20-21 Change the following functions from Vertex Form to Standard Form.

20. $f(x) = (x+2)^2 - 22$

ANSWER: $x^2 + 4x - 18$

21. $g(x) = -3(x-2)^2 + 7$

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

ANSWER: $-3x^2 + 12x - 5$

22-23 Identify the transformation of the quadratics. Hint: You will need to put them in vertex form.

22. $m(x) = -x^2 + 12x + 1$

$$-(x-6)^2 + 37$$

ANSWER: flip over x

right 6, up 37

23. $t(x) = 2x^2 + 12x - 1$

$$2(x+3)^2 - 19$$

ANSWER: stretch vertically 2

left 3, down 19

24. A pie is launched at a velocity of 32 feet per second into the air from a platform 8 feet above a circus clown. The following equation represents the height of the pie from the clown's head, $h(t) = -16t^2 + 32t + 8$ where t is time in seconds. What is the max height the pie could reach?

$$\frac{-32}{(-16)(2)} = 1$$

$$h(1) = -16 + 32 + 8$$

$$= 16 + 8$$

Max Height: 24 feet

Find the inverses for the following

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

$$f^{-1}(x) = \sqrt{\frac{x+3}{7}}$$

26. $f(x) = \frac{2}{x-8}$

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

$$x = \frac{2}{y-8}$$

$$y-8 = \frac{2}{x}$$