Chapter 1 Review

1 a) $y = \sqrt{x+2} + 3$

B) $y = \sqrt{\frac{1}{4}(x-1)}$

c) $y = \sqrt{-x} - 8$

D) $y = -\frac{1}{4}\sqrt{x+6}$ or $\frac{-\sqrt{x+6}}{4}$

2 $f(x) = x^2 + \sqrt{\frac{x}{4} - 3}$

$\frac{x}{4} - 3 \geq 0$

$\frac{x}{4} \geq 3$ $\quad x \geq 12$

Domain: $[12, \infty)$

Range $[144, \infty)$

$f(12) = 12^2 + \sqrt{\frac{12}{4} - 3}$

$f(12) = 144$

3 $-5 < -3(x+2) \leq 10$

$-5 < -3x - 6 \leq 10$

$+6 \quad +6 \quad +6$

$1 < -3x \leq 16$

$-\frac{1}{3} > x \geq -16/3$ $\quad [-16/3, -1/3)$

4 $\frac{x+1}{2x^2+7x+3}$

$2x^2 + 7x + 3 = 0$

$x^2 + 7x + 6 = 0$ $\quad x = -3, -1/2$

$(x + \frac{6}{2})(x + \frac{1}{2}) = 0$

Domain: $(-\infty, -3) \cup (-3, -1/2) \cup (-1/2, \infty)$

5 Increasing: $(3, 5)$

Decreasing: $(-3, -1) \cup (1, 3)$

Constant: $(-1, 1)$

6a) Extremas: local min: $(-1.3, -4.3)$ local max: $(1.3, 4.3)$

B) $\lim_{x \to \infty} f(x) = -\infty$ $\quad \lim_{x \to -\infty} f(x) = \infty$

c) Not Banded

7. $\frac{4x+2}{3} - \frac{x}{2} = \frac{5x}{4}$

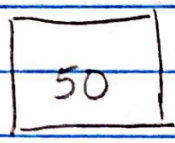
$4(4x+2) - 6x = 15x$

$16x + 8 - 6x = 15x$

$10x + 8 = 15x$

$8 = 5x$

$x = 8/5$

8. 

$x(2x) = 50$

$2x^2 = 50$

$x^2 = 25$

$x = 5$

$2(10) + 2(5) =$

$20 + 10 =$

30ft

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

10. $(fg)(x) = (x^2 - 3x)(x+2) = x^3 - x^2 - 6x$

11. $(f \circ g)(x) = (x+2)^2 - 3(x+2) = x^2 + 4x + 4 - 3x - 6 = x^2 + x - 2$

12 $(g \circ f)(-6) = x^2 - 3x + 2 = (-6)^2 - 3(-6) + 2 = 56$

13 $(f-g)(3) = x^2 - 3x - (x+2) = x^2 - 4x - 2 = 3^2 - 4(3) - 2 = -5$

14a. $f(g(1)) = f(-1) = 6$

b) $g(f(2)) = g(-3) = -2$

c) $g(f(2)) = -2$

15 R: $L=13$, $W=9$, $h=x$, $V=117x$ S: $L=8$, $W=8$, $h=2x$, $V=128x$ Square cake

16 $f(x)=(x+1)^2+3$ $h(x)=(x-6)^2+8$

right 7 up 5

17 $f(x)=\sqrt{2x-10}+3 \longrightarrow f(x)=\sqrt{x}-2$

$f(x)=\sqrt{2(x-5)}+3$

horizonal Shrink of $\frac{1}{2}$

right 5 units

up 5 units

18 $g\circ f(x)=2x^2+12x+18$ $2(x^2+6x+9)$

$g(x)=2x$

$f(x)=x^2+6x+9$

19 $f(x)=\frac{x+2}{x}$ $x=\frac{y+2}{y}$ $xy=y+2$

$xy-y=2$

$y(x-1)=2$

$y=\frac{2}{x-1}$

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

D: $(-\infty,1)\cup(1,\infty)$

20 $f(x)=\frac{x^3}{4-x^2}$ $\frac{(-x)^3}{4-(-x)^2}=\frac{-x^3}{4-x^2}$ odd

Symmetry: orgin

21. $\frac{(x^{-5}y^{2})^{-3}}{y^{-2}x^{4}} = \frac{x^{15}y^{-6}}{y^{-2}x^{4}} = \frac{x^{15}y^{2}}{y^{6}x^{4}} = \boxed{\frac{x^{11}}{y^{4}}}$

23. $f(x) = \frac{2x+3}{x} + 5 \qquad g(x) = \frac{x}{2} - 3$

$f(g(x)) = \frac{2(\frac{x}{2}-3)+3}{\frac{x}{2}-3} + 5 = \frac{x-6+3}{\frac{x}{2}-\frac{3}{1}} = \frac{x-3}{\frac{x-6}{2}}$

$x-3 \cdot \frac{2}{x-6} = \frac{2x-6}{x-6} + \frac{5(x-6)}{x-6} = \frac{2x-6+5x-30}{x-6}$

$\frac{7x-36}{x-6}$ NO

22. $f(x) = -4x+2 \qquad g(x) = \frac{-x+2}{4} - 3$

$f(g(x)) = -4\left(\frac{-x+2}{4} - 3\right) + 2 = x - 2 + 12 + 2$

NO

23. $f(x) = x^2 - 2x - 2 \qquad (-x)^2 - 2(-x) - 2$

$x^2 + 2x - 2$ Neither

24. $6x^2 + 2x - 8 \qquad 2(x^2 + x - 12)$

$2(3x^2 + x - 4) \qquad 2(x - \frac{3}{3})(x + \frac{4}{3})$

$\boxed{2(x-1)(3x+4)}$

25. $g(f(x)) = \frac{3x+15}{4x+20} - 2 \qquad g(x) = \frac{3x}{4x} - 2$

$g(f(x)) = \frac{3(x+5)}{4(x+5)} - 2 \qquad f(x) = x+5$

26. A) $-f(2x-7)$ B) $f(-(x+2)) + 2$ or $f(-x-2) + 2$ C) $5f(x+3) - 1$