HW #10 (2.1) 18, 22, 26, 28, 34, 48, 58, 62, 72, 78

18) $f(x) = x^3 + 2x$ $\quad f(-2), f(1), f(0), f(\frac{1}{3}), f(0.2)$

$f(-2) = (-2)^3 + 2(-2) = -12$

$f(1) = (1)^3 + 2(1) = 3$

$f(0) = 0^3 + 2(0) = 0$

$f(\frac{1}{3}) = (\frac{1}{3})^3 + 2(\frac{1}{3}) = \frac{19}{27}$

$f(0.2) = (0.2)^3 + 2(0.2) = .408$

22) $h(t) = t + \frac{1}{t}$ $\quad h(1), h(-1), h(2), h(\frac{1}{2}), h(x), h(\frac{1}{x})$

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

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

$h(2) = 2 + \frac{1}{2} = 2.5 = \frac{5}{2}$

$h(\frac{1}{2}) = \frac{1}{2} + \frac{1}{\frac{1}{2}} = 2.5$

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

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

26) $f(x) = \frac{|x|}{x}$ $\quad f(-2), f(-1), f(0), f(5), f(x^2), f(\frac{1}{x})$

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

$f(-1) = \frac{|-1|}{-1} = \frac{1}{-1} = -1$

$f(0) = \frac{|0|}{0}$ $x \neq 0$ $= DNE$

$f(5) = \frac{|5|}{5} = \frac{5}{5} = 1$

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

$f(\frac{1}{x}) = \frac{|\frac{1}{x}|}{\frac{1}{x}} = |\frac{1}{x}| \cdot x = \frac{x}{|x|}$

28) $f(x) = \begin{cases} 5 & \text{if } x \leq 2 \\ 2x-3 & \text{if } x > 2 \end{cases}$ $\quad f(-3), f(0), f(2), f(3), f(5)$

$f(-3) = 5$

$f(0) = 5$

$f(2) = 5$

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

$f(5) = 2(5) - 3 = 7$

34) $f(x) = 6x - 18$ $\quad f(\frac{x}{3}), \frac{f(x)}{3}$

$f(\frac{x}{3}) = 6(\frac{x}{3}) - 18 = 2x - 18$

$(\frac{1}{3})f(x) = (\frac{1}{3})(6x - 18) = 2x - 6$

48, 56, 62, 72, 78

48) $f(x) = \frac{1}{3x-6}$ Find domain

$3x - 6 \neq 0$

$3x \neq 6 \Rightarrow$ $x \neq 2$ $\quad \{x \mid x \neq 2\}$ $\quad (-\infty, 2) \cup (2, \infty)$

58) $g(x) = \frac{\sqrt{x}}{2x^2 + x - 1}$ Find Domain

$2x^2 + x - 1 \neq 0$

$(2x - 1)(x + 1) \neq 0$

$2x - 1 \neq 0 \quad x + 1 \neq 0$

$x \neq \frac{1}{2} \quad x \neq -1$

$\sqrt{x} \leq 0$

$x \leq 0$

so domain is $[0, \frac{1}{2}) \cup (\frac{1}{2}, \infty)$

62) $f(x) \frac{x^2}{\sqrt{6-x}}$ Find Domain

$\sqrt{6-x} \neq 0 \Rightarrow 6 - x > 0$

$6 > x$ so Domain is $(-\infty, 6)$

72) $D(h) = \sqrt{2rh + h^2}$

a) $D(0.1) = \sqrt{2(3960)(0.1) + (0.1)^2} = \sqrt{792.01}$ ≈ 28.1 miles

$D(0.2) = \sqrt{2(3960)(0.2) + (0.2)^2} = \sqrt{1584.04}$ ≈ 39.2 miles

b) $1135 ft = \frac{1135 ft}{5280 ft}$ miles ≈ 0.215 miles

$D(0.215) = \sqrt{2(3960)(0.215) + (0.215)^2} = \sqrt{1702.846}$ ≈ 41.3 miles

c) $D(7) = \sqrt{2(3960)(7) + (7)^2} = \sqrt{55489}$ ≈ 235.6 miles

78) $T(x) = \begin{cases} 75x & \text{if } 0 \leq x \leq 2 \\ 50x + 50, & \text{if } x > 2 \end{cases}$

b) $T(2) = 75(2) = 150$

$T(3) = 50(3) + 50 = 200$

$T(5) = 50(5) + 50 = 300$

c) The total costs of the lodgings