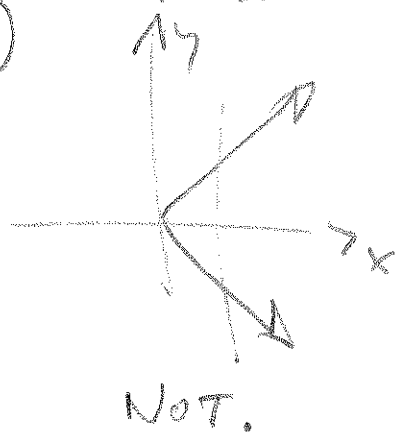
'21 §2.1 #s 5,6,17,19,21,23-29 odds, 55,57, 61, 69, 71, 77, 83, 87, 89, 91, 95

(5) $\frac{f(x+h)-f(x)}{h}$ is the difference quotient.

(6) (x_1,y_1) & (x_2,y_2) are two ordered pairs of a function, then $\frac{y_2-y_1}{x_2-x_1}$ is the AVERAGE SLOPE.

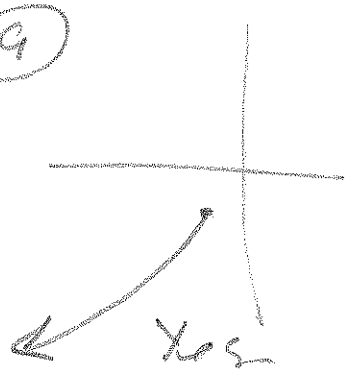
IS/ISN'T Function?

(17)



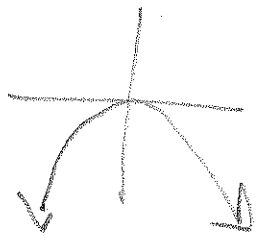
NOT.

(19)



Yes

(21)



Yes

(23) #s 23-42 Determine if the relation/equation define a function!

(23) $\{(-1,-1),(2,2),(3,3)\}$ Yes

(25) $\{(25,5),(25,-5),(0,0)\}$ No

(27)

x	y
3	6
4	8
3	12

Yes

(29)

x	y
-1	1
1	1
-5	1
5	1

Yes.

~~20~~ 12) S^W Q) #s 1, 55, 61, 69, 71, 77, 83, 87, 89, 91, 95

#s 43-54 Determine the domain and range

(51) $y = \sqrt{x-4}$

$\mathcal{D}$: Need $x-4 \geq 0$

$\Rightarrow \mathcal{D} = \{x \mid x \geq 4\}$

$= [4, \infty)$

#s 55-64

$f = \{(2,6), (3,8), (4,5)\}$ & $g(x) = 3x+5 \Longrightarrow$

(55) $f(2) = 6$

(61) $g(x) = 26$ when $3x+5 = 26$

$3x = 21$

$x = 7$

#s 65-76 $f(x) = 3x^2 - x$ & $g(x) = 4x-2$

$\Longrightarrow$

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

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

$= 3x^2 + 6x + 3 - x - 1$

$= 3x^2 + 5x + 2$

(71) $g(x+h) = 4(x+h) - 2$

$= 4x + 4h - 2$

(77) Mustang is worth \$20,000 new.

In 5 years, it's worth \$8,000. What is the average rate of change of its value?

$(x_1, y_1) = (0, 20)$

$(x_2, y_2) = (5, 8)$

$\Rightarrow m = \frac{y_2 - y_1}{x_2 - x_1} = \frac{20-8}{0-5} = \frac{12}{-5} = -2.4$ thousand dollars per year

121 S' 2.1 #s 83, 87, 89, 91, 95

#s 83–98 Find the difference quotient.

(83) $f(x) = 4x \Longrightarrow \dfrac{f(x+h)-f(x)}{h} = \dfrac{4(x+h)-4x}{h}$

$= \dfrac{4x+4h-4x}{h} = \dfrac{4h}{h} = \boxed{4}$

(87) $y = x^2+x = f(x) \Longrightarrow \dfrac{f(x+h)-f(x)}{h}$

$= \dfrac{(x+h)^2+(x+h)-(x^2+x)}{h} = \dfrac{x^2+2xh+h^2+x+h-x^2-x}{h}$

$= \dfrac{2xh+h^2+h}{h} = \dfrac{h(2x+h+1)}{h} = \boxed{2x+h+1}$

(89) $y = -x^2+x-2 \longrightarrow \dfrac{f(x+h)-f(x)}{h} =$

$\dfrac{-(x+h)^2+(x+h)-2-(-x^2+x-2)}{h} =$

$= \dfrac{-(x^2+2xh+h^2)+x+h-2+x^2-x+2}{h}$

$= \dfrac{-x^2-2xh-h^2+h+x^2}{h}$

$= \dfrac{-2xh-h^2+h}{h} = \dfrac{h(-2x-h+1)}{h} = \boxed{-2x-h+1}$

121 §2.1 #s 91, 95

(91) $g(x) = 3\sqrt{x} \Longrightarrow$

$$\frac{g(x+h)-g(x)}{h} = \frac{3\sqrt{x+h} - 3\sqrt{x}}{h}$$

$$= \frac{3\sqrt{x+h} - 3\sqrt{x}}{h} \cdot \frac{3\sqrt{x+h} + 3\sqrt{x}}{3\sqrt{x+h} + 3\sqrt{x}}$$

$$= \frac{(3\sqrt{x+h})^2 - (3\sqrt{x})^2}{h(3\sqrt{x+h} + 3\sqrt{x})} = \frac{9(x+h) - 9x}{h(3\sqrt{x+h} - 3\sqrt{x})}$$

$$= \frac{9x + 9h - 9x}{h(3\sqrt{x+h} - 3\sqrt{x})} = \frac{9h}{h(3\sqrt{x+h} - 3\sqrt{x})}$$

$$= \frac{9}{3(\sqrt{x+h} - \sqrt{x})} = \boxed{\frac{3}{\sqrt{x+h} + \sqrt{x}}}$$

(95) $g(x) = \frac{1}{x} \Longrightarrow \frac{g(x+h)-g(x)}{h} = \frac{1}{h}\left[g(x+h) - g(x)\right]$

$$= \frac{1}{h}\left[\frac{1}{x+h} - \frac{1}{x}\right] = \frac{1}{h}\left[\frac{1}{x+h} \cdot \frac{x}{x} - \frac{1}{x} \cdot \frac{x+h}{x+h}\right]$$

$$= \frac{1}{h}\left[\frac{x - (x+h)}{x(x+h)}\right] = \frac{1}{h}\left[\frac{x - x - h}{x(x+h)}\right] = \frac{-h}{h(x(x+h))}$$

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