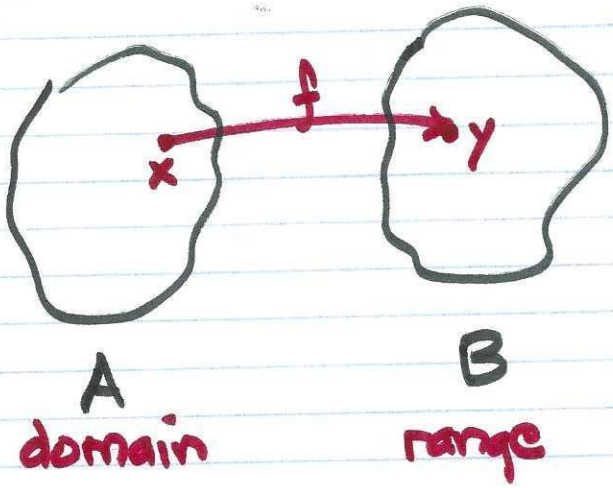
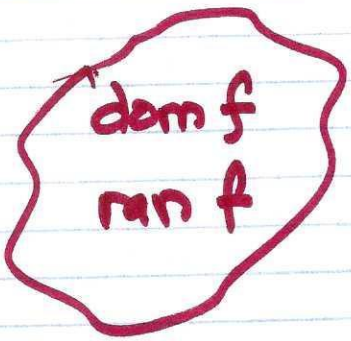
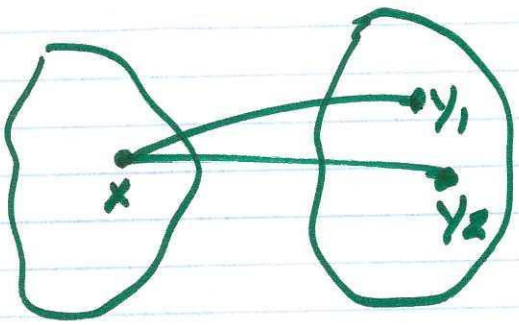
8/22

Function

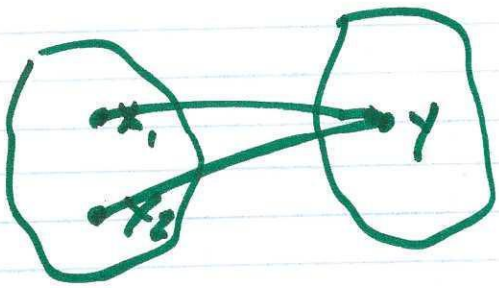




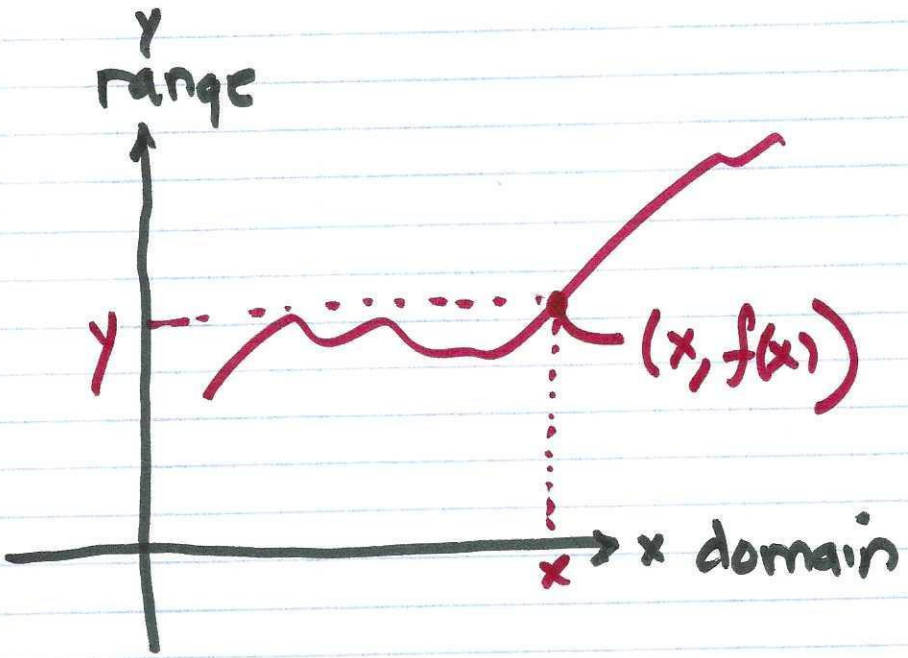
$f: A \to B$

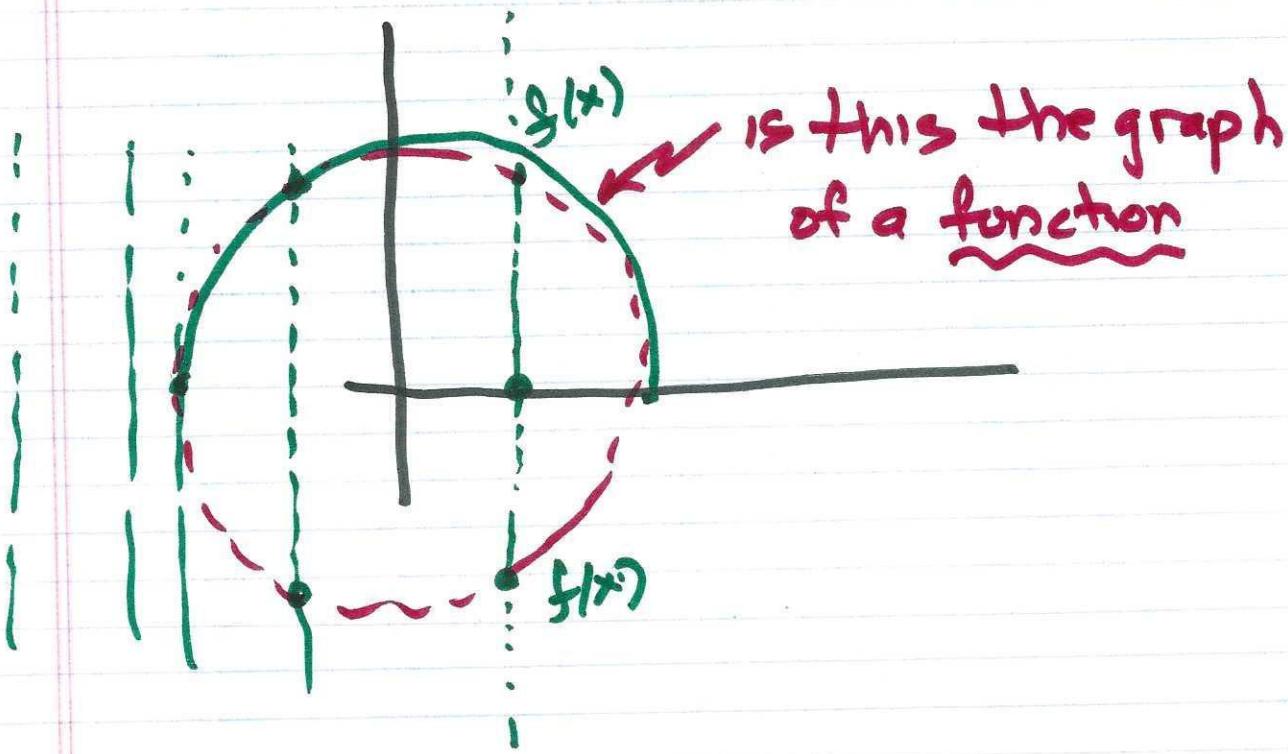


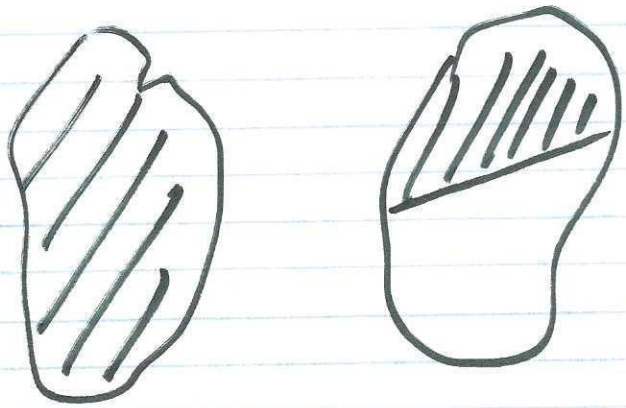
not a function



allowed


y
range
y
(x, f(x))
x
x domain


g(x)
f(x)
is this the graph
of a function



domain ↑ independent x

range ↑ dependent y

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① can't divide by zero $f(x) = \frac{1}{x-2}$

② can't take logarithm of a non-positive number $f(x) = \ln\left(\frac{1}{x-1}\right)$

③ can't take <u>even</u> roots of negative numbers $f(x) = \sqrt{x-1}$

#21 p.52 | $f(x) = 2x$ $\quad \text{dom } f = \mathbb{R}$

#23 | $f(x) = x^4$ $\quad \text{dom } f = \mathbb{R}$

#25 | $f(x) = \sqrt{4-x^2}$ $\quad \text{dom } f = \{x \mid x \leq 2\}$

#27 | $f(x) = (x-3)^{1/2}$ $\quad \text{dom } f = \{x \mid x \geq 3\}$

#29 | $f(x) = \frac{2}{1-x^2}$ $\quad \text{dom } f$ is $\mathbb{R} \setminus \{-1, 1\}$

#31 | $f(x) = -\sqrt{\frac{2}{x^2-16}}$ $\quad x \neq \pm 4$, $\underbrace{-4 \leq x \leq 4}_{\text{excluded}}$

$\text{dom } f = (-\infty, -4) \cup (4, \infty)$

#33 | $f(x) = \sqrt{x^2-4x-5}$

$= \sqrt{(x-5)(x+1)}$ $\quad$ If $x \geq 5$ OK

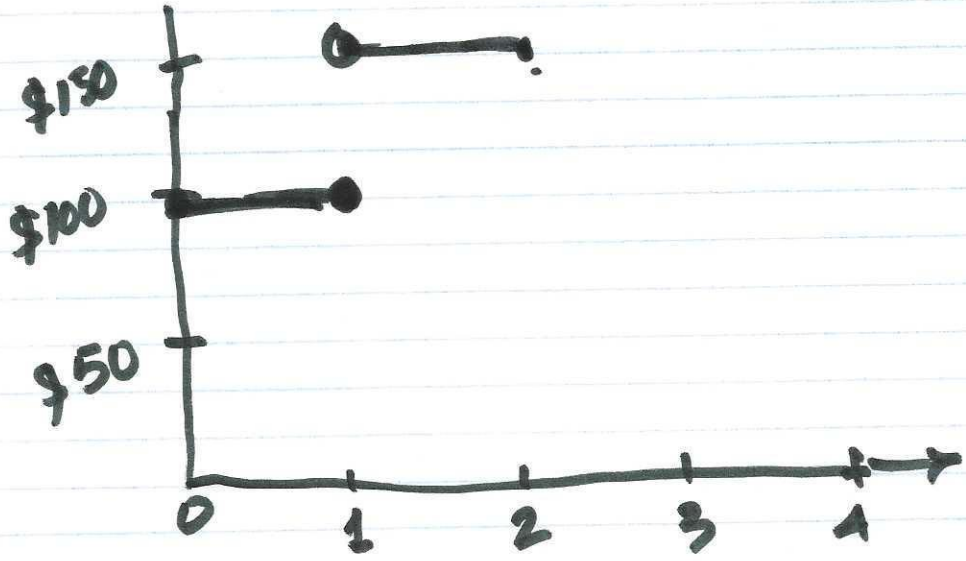
" $x \leq -1$ OK

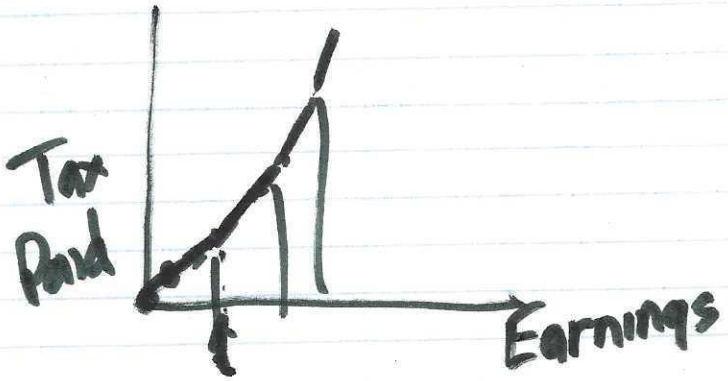
$\text{dom } f = \{x \mid x \geq 5 \text{ or } x \leq -1\}$

#36 $f(x) = \sqrt{\frac{x^2}{3-x}}$ $\text{dom } f = \{x \mid x < 3\}$

#77 $S(4.1) = (4+1)28 + 8 = \$148$

#78





Preview of exponents

Pick a "base" b^x $\quad b=2 \quad x=3$

$0<b \quad b \neq 1$ $\quad b^x = 2^3 = 8$

① $b^x \cdot b^y = (\underbrace{b \cdot b \cdot b \cdots b}_{x})(\underbrace{b \cdot b \cdot b \cdots b}_{y})$

$b^x \cdot b^y = b^{x+y}$

② $\frac{b^x}{b^y} \quad \frac{(b \cdot b \cdots b}{(b \cdot b \cdots b} \leftarrow x \text{ powers} \leftarrow y \text{ powers}$

$$\frac{b^x}{b^y} = b^{x-y}$$

③ $(b^x)^y$

$b \cdots b \leftarrow x$ b's

$b \cdots b \leftarrow$

$\vdots$

$b \cdots b$

y rows

$$(b^x)^y = (b^y)^x = b^{xy}$$

(7)

$$\sqrt[n]{b^x} := b^{\frac{x}{n}}$$