

11.-/ Area of a Sector, One-to-one Functions

1. a) Sec area = $\frac{1}{2} r^2 \theta$

$$= \frac{1}{2} (10^2) (2.5)$$

$$= 125$$

Sec area = $\frac{1}{2} ar$

$$125 = \frac{1}{2} a \cdot 10$$

$$125 = 5a$$

$$25 = a \quad 25 \text{ cm}$$

b) Sec area = $\frac{1}{2} ar$

$$= \frac{1}{2} (12) (10)$$

$$= 60$$

Sec area = $\frac{1}{2} r^2 \theta$

$$60 = \frac{1}{2} (10^2) \theta$$

$$120 = 100 \theta$$

$$1.2 = \theta$$

c) Sec area = $\frac{1}{2} ar$

$$= \frac{1}{2} (20) (10)$$

$$= 100 \text{ cm}^2$$

d) Sec area = $\frac{1}{2} r^2 \theta$

$$= \frac{1}{2} (10^2) \frac{2\pi}{3}$$

$$= \frac{100\pi}{3} \text{ cm}^2$$

2. Sec area = $\frac{1}{2} ar$

$$\pi r = \frac{1}{2} a r^3$$

$$\pi = \frac{1}{2} ar$$

$$\frac{\pi}{3} \text{ cm} = a$$

arc length

Sec area = $\frac{1}{2} r^2 \theta$

$$\pi = \frac{1}{2} (6^2) \theta$$

$$\pi = \frac{1}{2} (36) \theta$$

$$\pi = 18 \theta$$

$$\theta = \frac{\pi}{18}$$

11-1 cont.

3. a) $x = y^2$ not a function because y is squared

b) $y = x^2 + x$ function - parabola


c) $x + 2y = 3$ function - linear

d) $3y - x \geq 6$ not a function because it has shading so it doesn't pass the vertical line test.

4. a) $f(x) = x + 1$ 1-1 - linear

b) $g(x) = |x|$ not 1-1 - absolute value are V-shaped so does not pass the horizontal test

c) $y = 3 - 2x$ 1-1 - linear

d) $F(x) = \frac{1}{x^2}$, not 1-1 - inverse of a parabola so does not pass the horizontal line test 

5. a) $y = \frac{1}{2}(x-7)$

b) $y = 5x^3 - 6$

inverse: $x = \frac{1}{2}(y-7)$

$$\begin{aligned} 2x &= y - 7 \\ 2x + 7 &= y \end{aligned}$$

inverse: $x = 5y^3 - 6$

$$\begin{aligned} x + 6 &= 5y^3 \\ \frac{x+6}{5} &= y^3 \\ \sqrt[3]{\frac{x+6}{5}} &= y \end{aligned}$$

11-1 cont.

5. c) $y = \sqrt{x-3}$

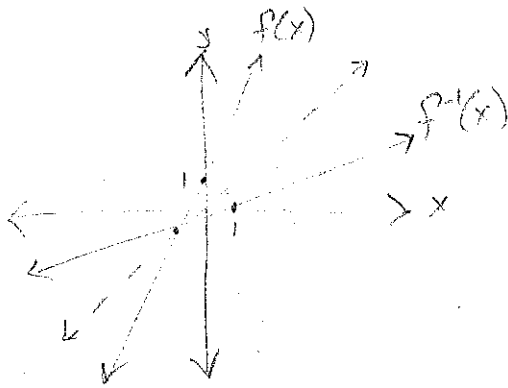
inverse: $x = \sqrt{y-3}$
 $x^2 = y-3$
 $x^2 + 3 = y$

d) $y = \frac{1-x}{1+x}$

inverse: $x = \frac{1-y}{1+y}$

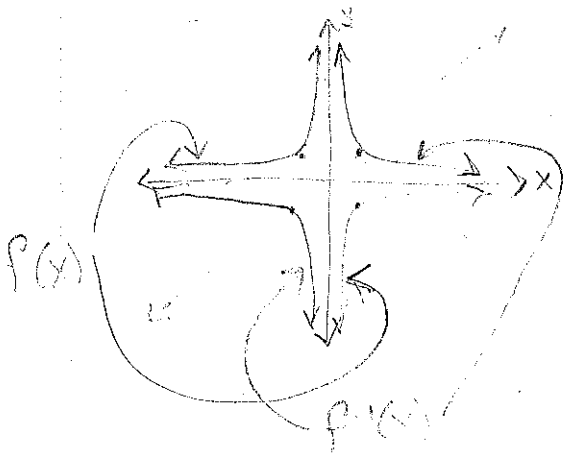
$$\begin{aligned}x(1+y) &= 1-y \\x + xy &= 1-y \\xy + y &= 1-x \\y(x+1) &= 1-x \\y &= \frac{1-x}{x+1}\end{aligned}$$

b. a) $f(x) = 2x+1$



$$\begin{aligned}x &= 2y+1 \\x-1 &= 2y \\ \frac{x-1}{2} &= y \\ f^{-1}(x) &= \frac{x-1}{2}\end{aligned}$$

b) $f(x) = \frac{1}{x}$



$$\begin{aligned}x &= \frac{1}{y} \\xy &= 1 \\y &= \frac{1}{x} \\ f^{-1}(x) &= \frac{1}{x}\end{aligned}$$