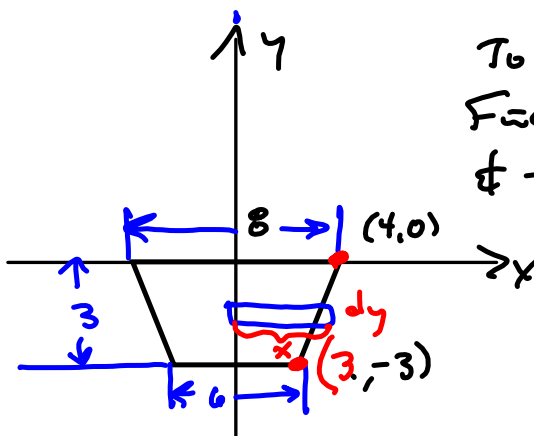


Trapezoidal Plate



To find the force,
Find force on $\frac{1}{2}$ of it
& then double it.

Build the eq'n of the
line.

$$(x_1, y_1) = (4, 0)$$

$$(x_2, y_2) = (3, -3)$$

$$m = \frac{y_2 - y_1}{x_2 - x_1} = \frac{-3 - 0}{3 - 4} = \frac{-3}{-1} = 3$$

$$y = m(x - x_1) + y_1$$

$$y = 3(x - 4) + 0 = 3x - 12$$

$$y = 3(x - 3) - 3 = 3x - 9 - 3 = \underline{\underline{3x - 12}}$$

$$y = 3x - 12$$

want x as $f(y)$

$$3x = y + 12$$

$$x = \frac{y + 12}{3} = \frac{1}{3}y + 4$$

9.4 # 7

$$P_0 = 1000$$

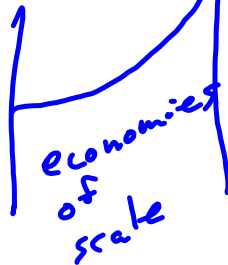
$$M = 10000$$

$$y' = KP \left(1 - \frac{P}{10000} \right)$$

§ 9.4 1, 4, 7, 10

$$P(1) = 2500$$

$$P(3) = ?$$



$$2xy' + y = 2\sqrt{x} \quad y' + P(x)y = Q(x)$$
$$y' + \frac{1}{2x}y = \frac{2\sqrt{x}}{2x} = \frac{1}{\sqrt{x}} \quad I = e^{\int P(x)}$$
$$I = e^{\int \frac{1}{2x} dx} = e^{\frac{1}{2} \int \frac{dx}{x}} = e^{\frac{1}{2} \ln|x|} = e^{\frac{1}{2} \ln x}$$

$$ds = \sqrt{1+(y')^2} dx \quad y = f(x) \text{ sitch}$$

or

$$ds = \sqrt{1+(x')^2} dy \quad x = g(y) \text{ sitch}$$

$$y = 2 \ln \left(\sin \left(\frac{x}{2} \right) \right)$$

$$y' = 2 \left(\frac{\cos(\frac{x}{2}) \cdot \frac{1}{2}}{\sin(\frac{x}{2})} \right) = \cot \left(\frac{x}{2} \right), \text{ idiot.}$$

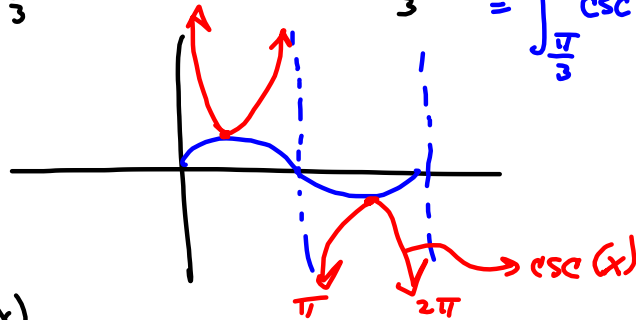
$$(y')^2 = \cot^2 \left(\frac{x}{2} \right)$$

$$1+(y')^2 = 1 + \cot^2 \left(\frac{x}{2} \right) = \csc^2 \left(\frac{x}{2} \right)$$

on $\left[\frac{11}{3}, \pi \right]$

$$\int_{\frac{11}{3}}^{\pi} \sqrt{\csc^2 \left(\frac{x}{2} \right)} dx = \int_{\frac{11}{3}}^{\pi} |\csc \left(\frac{x}{2} \right)| dx$$

$$= \int_{\frac{11}{3}}^{\pi} \csc \left(\frac{x}{2} \right) dx$$



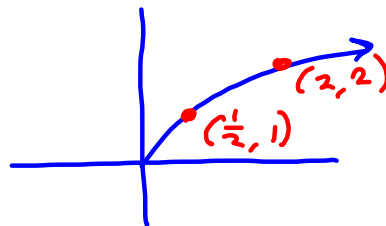
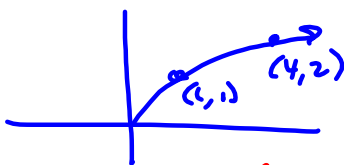
To go from
 $f(x)$ to $f(bx)$,
 (x, y) to $(\frac{1}{b}x, y)$

$$f(x) \rightarrow f(bx)$$

$$(x, y) \rightarrow (\frac{1}{b}x, y)$$

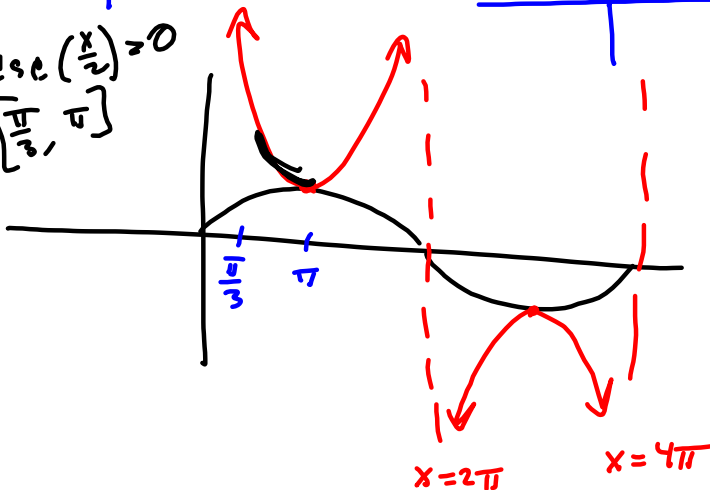
$$f(x) = \sqrt{x}$$

$$f(2x) = \sqrt{2x}$$



$\csc \left(\frac{x}{2} \right) = 0$

on $\left[\frac{11}{3}, \pi \right]$



$$\sqrt{x^2} = |x|$$

$$(\sqrt{x})^2 = x$$

$$\sqrt{(x+2)^2} = |x+2|$$

$$|x+2| = 1$$

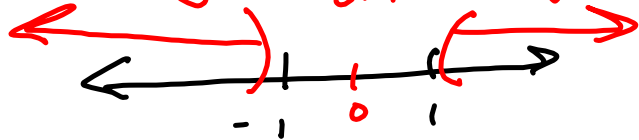
$$x+2 = \pm 1$$

$$x = -2 \pm 1$$

$$x+2=1 \text{ OR } x+2=-1$$

$x+2$ lives here

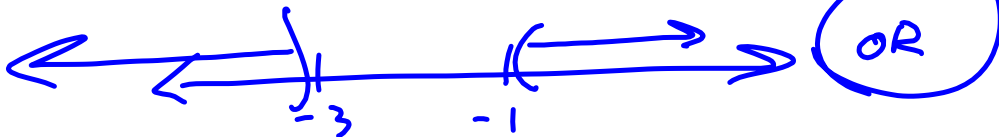
OR



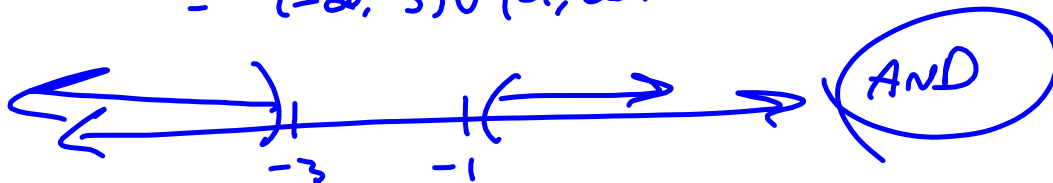
$$|x+2| > 1$$

$$x+2 > 1 \text{ OR } x+2 < -1$$

$$x > -1 \text{ OR } x < -3$$



$$= (-\infty, -3) \cup (-1, \infty)$$

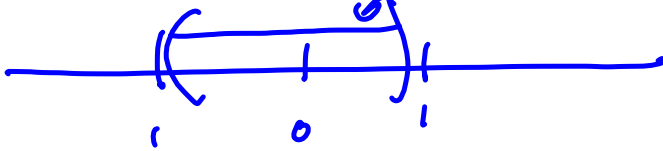


$$= \emptyset$$

$$|x+2| < 1$$

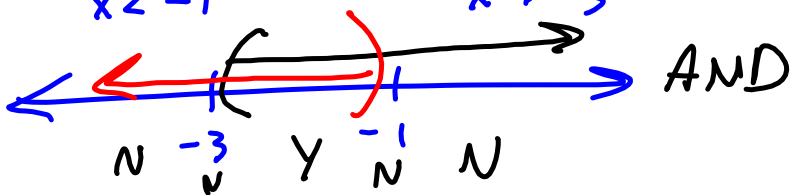
$$x+2 < 1 \text{ AND } x+2 > -1$$

x+2 lines here



$$x+2 < 1 \quad \text{and} \quad x+2 > -1$$

$$x < -1 \quad \quad \quad x > -3$$



$$= (-3, -1)$$