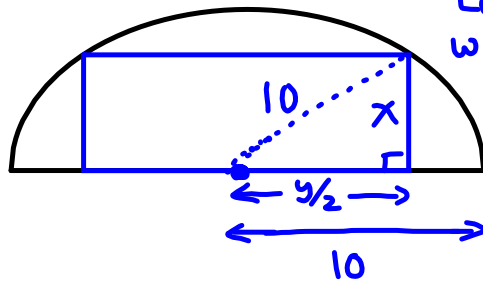


p146 #10.
 Let A be area
 Area = xy ①



Let x be rectangle width (units).
 Let y be length of rectangle (units).

$$10^2 = x^2 + \left(\frac{y}{2}\right)^2$$

$$100 = x^2 + \frac{y^2}{4}$$

$$400 = 4x^2 + y^2$$

$$\pm \sqrt{400 - 4x^2} = y$$

$$\textcircled{2} \quad \sqrt{400 - 4x^2} = y$$

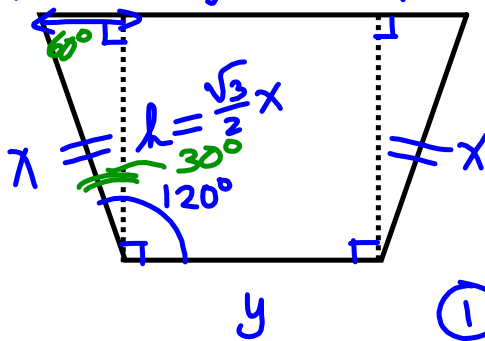
sub ② into ①: $A(x) = x \cdot \sqrt{400 - 4x^2}$ ①

Domain

$$\{x \in \mathbb{R} \mid 0 < x < 10\}$$

⋮

13: Let h be height of trapezoid.



Let x be one of the equal lengths in the isosceles trapezoid.
 Let y be the shorter length of the non-equal side lengths.
 (All in cm.)

① Area = 2 triangles' area + rect. area

② $2x + y = 60$

In both triangles,

③

$\sin 60^\circ = \frac{h}{x}$

$\cos 60^\circ = \frac{\text{base}}{x}$

$\frac{\sqrt{3}}{2} = \frac{h}{x}$

$\frac{1}{2}x = \text{base}$

$\frac{\sqrt{3}}{2}x = h$

Rewrite ② :

$y = 60 - 2x$

sub ② and ③ into ① :

$A(x) = \frac{1}{2} \cdot \frac{1}{2}x \cdot \frac{\sqrt{3}}{2}x \cdot 2 + (60 - 2x) \cdot \frac{\sqrt{3}}{2}x$

Domain $\{x \in \mathbb{R} \mid 0 < x < 30\}$

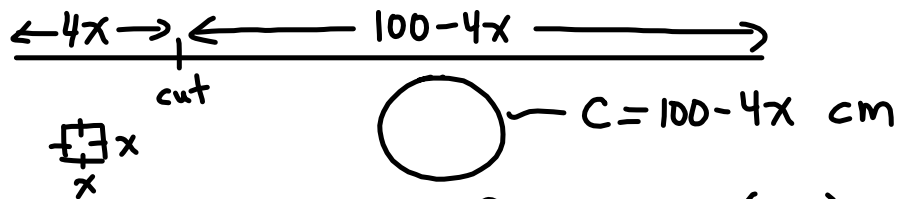
right-endpoint

As $y \rightarrow 0$

$60 - 2x \rightarrow 0$

$\therefore x \rightarrow 30$

19/



Let x be side length for square (cm).

Area = square area + circle area

$$\text{circle area} = \pi r^2$$

$$\text{circumference} = 2\pi r$$

$$\frac{100-4x}{2\pi} = r$$

$$\frac{50-2x}{\pi} = r$$

$$A(x) = x^2 + \pi \left(\frac{50-2x}{\pi} \right)^2$$

Domain

$$\left\{ x \in \mathbb{R} \mid 0 < x < 25 \right\}$$

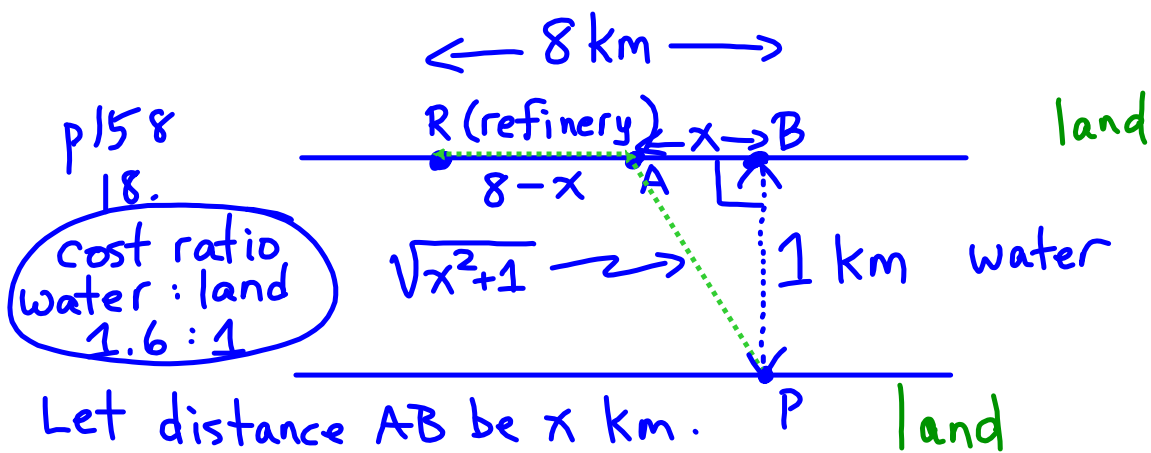
Right-endpoint

As x grows,
so does $4x$

Thus

$$100 - 4x \rightarrow 0$$

$$\text{OR } x \rightarrow 25$$



$$C(x) = \underbrace{1(8-x)}_{\text{land cost}} + \underbrace{1.6(\sqrt{x^2+1})}_{\text{water cost}}$$

$$\text{Domain : } x \in \mathbb{R} [0, 8]$$