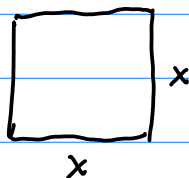


M242

§2.8 #1.

Square:



$$A(x) = x^2 \leftarrow 25 = x^2$$

$$\sqrt{25} = x$$

$$x = 5$$

$$\frac{d}{dt} [A = x^2]$$

$$\frac{dx}{dt} = 2$$

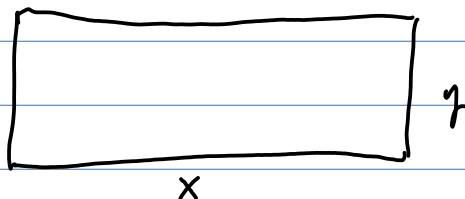
$$\frac{dA}{dt} = ?$$

$$A = 25$$

$$\frac{dA}{dt} = 2x \frac{dx}{dt}$$

$$\frac{dA}{dt} = 2 \cdot 5 \cdot 2 = 20 \text{ cm}^2/\text{s}$$

#2.



$$A = xy$$

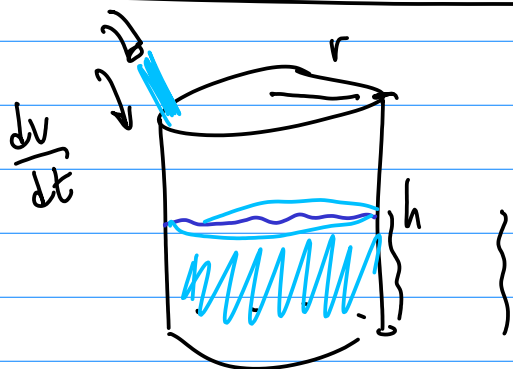
$$\frac{d}{dt} [A = xy]$$

$$\frac{dx}{dt} = 8, \frac{dy}{dt} = 9, x = 11, y = 7$$

$$\frac{dA}{dt} = \frac{dx}{dt} y + x \frac{dy}{dt}$$

$$\frac{dA}{dt} = 8 \cdot 7 + 11 \cdot 9 = 56 + 99 = 155 \frac{\text{cm}^2}{\text{s}}$$

3.



$$\frac{dV}{dt} = 4 \frac{\text{m}^3}{\text{min}} \quad r = 3 \text{ m}$$

$$V = \pi r^2 h$$

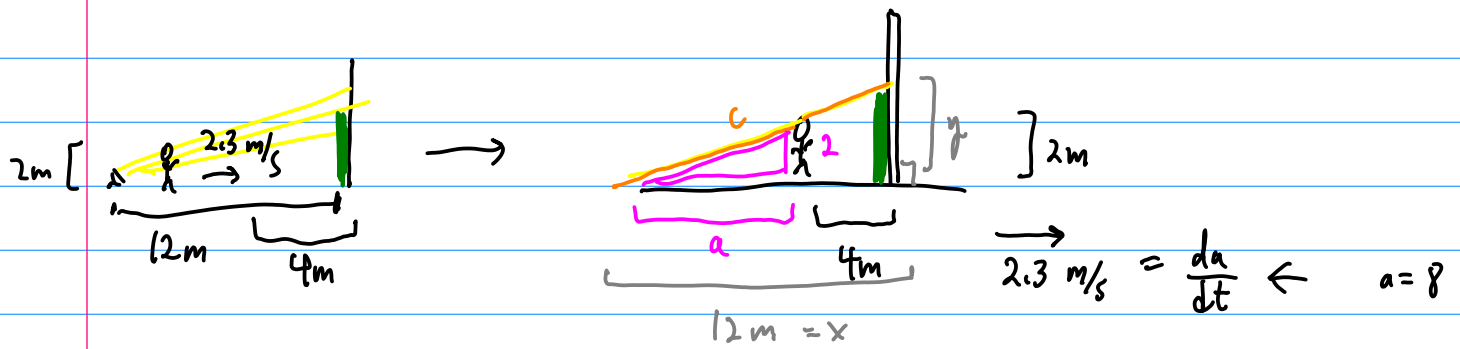
$$\frac{dV}{dt} = \pi r^2 \frac{dh}{dt}$$

$$\pi \approx 3.14159 \dots$$

$$11 \overline{) 3355} \rightarrow$$

$$\frac{355}{113} \approx 3.141592 \dots$$

NOT π but close.



$$x^2 + y^2 = c^2$$

$$\frac{D}{A} = \frac{O}{A}$$

$$\frac{2}{a} = \frac{y}{12}$$

Find $\frac{dy}{dt}$ when $a=8$, $\frac{da}{dt} = 2.3$.

$$y = \frac{24}{a}$$

$$\frac{dy}{dt} = \frac{-24}{a^2} \frac{da}{dt} = \frac{-24}{64} \frac{2.3}{10} = -0.8625 \text{ m/s}$$

§2.9 #1.

$$L(x) = f(a) + f'(a)(x-a)$$

$\frac{\sqrt{3}}{2}$ $\frac{1}{2}$ $\uparrow \pi/3$

$$f(x) = \sin x$$

$$a = \pi/3$$

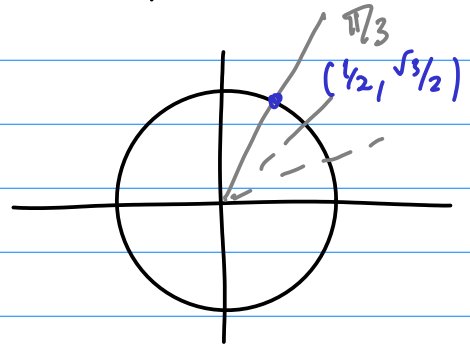
$$f(\pi/3) = \sin(\pi/3) = \frac{\sqrt{3}}{2}$$

$$f'(x) = \cos x$$

$$f'(\pi/3) = \cos(\pi/3) = \frac{1}{2}$$

$$L(x) = \frac{\sqrt{3}}{2} + \frac{1}{2}(x - \pi/3)$$

$$= \frac{1}{2}x - \pi/6 + \frac{\sqrt{3}}{2} = \frac{1}{2}x + \frac{2\sqrt{3} - \pi}{6}$$



#9. $f(x) = 5 \tan x$

Find dy

$$\frac{dy}{dx} = f'(x) \Rightarrow dy = \underbrace{f'(x)} dx$$

$$\text{So, } dy = 5 \sec^2 x dx$$