Pg. 188

#2/ Minimize Sum $\left.\right\}$ $x - 1^{st}\#$, $y \to 2^{nd}\#$

$S = x + 2y$ $\quad\quad$ $xy = 200$

$y = \frac{200}{x}$

$S(x) = x + 2\left(\frac{200}{x}\right)$

$S(x) = x + 400x^{-1}$

$S'(x) = 1 - 400x^{-2}$

$0 = 1 - \frac{400}{x^2}$

$0 = x^2 - 400 \Longrightarrow \sqrt{400} = \sqrt{x^2}$

$0 = (x-20)(x+20)$ $\quad\quad$ $\pm 20 = x$

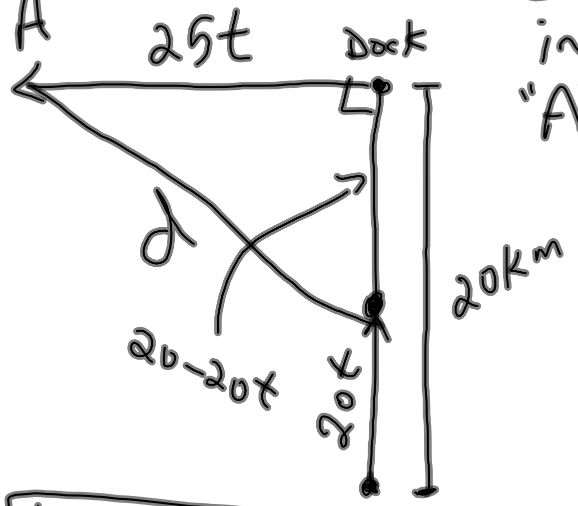
$x = \pm 20$

2 Positives $\therefore$ $x \neq -20$

$x = 20$

$y = \frac{200}{20} = 10$ $\left.\right\}$ 20 & 10

17/



Let "t" Rep time in hours after "A" leaves the dock

$d = st$

$$d = \sqrt{(25t)^2 + (20-20t)^2}$$

$$d' = \frac{1}{2}\left[625t^2 + (20-20t)^2\right]^{-\frac{1}{2}}\left[1250t + 2(20-20t)(-20)\right]$$

$$0 = \frac{\overset{625t - 20(20-20t)}{\cancel{1250t} - \cancel{40}(\cancel{20-20t})}}{\cancel{2}\sqrt{625t^2 + (20-20t)^2}}$$

$$0 = 625t - 400 + 400t$$

$$400 = 1025t$$

$$\frac{400}{1025} = t$$

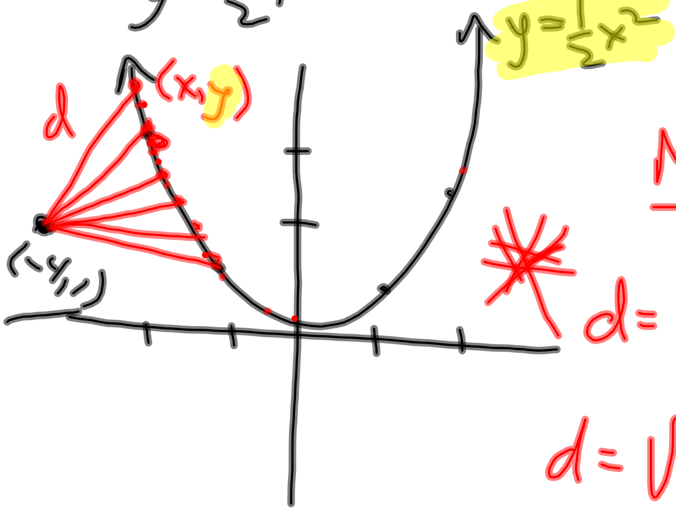
$$t = 0.39 \text{ hours} \times \frac{60 \text{ min}}{1 \text{ hr.}}$$

$$\doteq \underline{23 \text{ minutes}}$$

$\therefore$ Closest @ 12:23 PM

11. $2y = x^2 \quad (-4,1)$

$y = \frac{1}{2}x^2$



Minimize Distance

$$d = \sqrt{(x_2-x_1)^2+(y_2-y_1)^2}$$

$$d = \sqrt{(x+4)^2+(y-1)^2}$$

$$d = \sqrt{(x+4)^2+\left(\frac{1}{2}x^2-1\right)^2}$$

$$d' = \frac{1}{\cancel{2}}\left[\cancel{(x+4)^2+\left(\frac{1}{2}x^2-1\right)^2}\right]^{-1/2}\left[\cancel{2}(x+4)^1+\cancel{2}\left(\frac{1}{2}x^2-1\right)^1(x)\right]$$

$$0 = (x+4) + x\left(\frac{1}{2}x^2-1\right)$$

$$0 = \cancel{x}+4+\frac{1}{2}x^3-\cancel{x}$$

$$0 = 8 + x^3$$

$$-8 = x^3$$

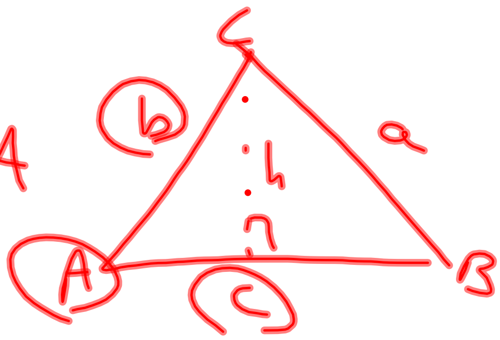
$$-2 = x$$

$$y = \frac{1}{2}(-2)^2 = 2$$

$\therefore (-2,2)$ is closest to $(-4,1)$

Law of Cosines

$$a^2 = b^2 + c^2 - 2bc\cos A$$

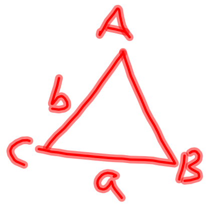


Law of Sines

$$\frac{a}{\sin A} = \frac{b}{\sin B}$$

Area of triangle

$$A = \frac{1}{2}bh$$



OR

$$A = \frac{1}{2}ab\sin C$$