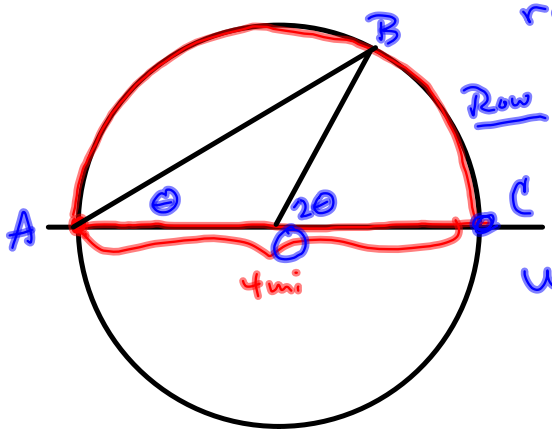
§2.7 #48




walks @ 4mph
rows @ 2mph

Row $t = \frac{D}{r} = \frac{4}{2} = 2$ hr.

walk:

Book answer is nuts!

Arc length $= r\theta = 2 \cdot \pi = D$

$t = \frac{D}{r} = \frac{2\pi}{4} = \frac{\pi}{2} \approx \frac{3.14}{2} = 1.57$hr

§3.7 #51

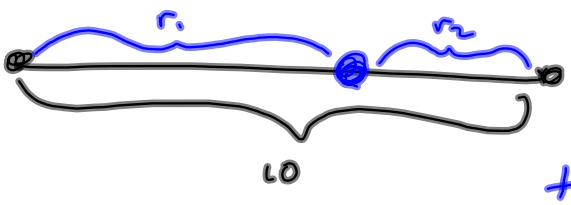
$L_1 = k\frac{I_1}{r_1^2}$

$I_1 = 3I_2$

$L_2 = k\frac{I_2}{r_2^2}$

want $L_1 = L_2$

I solved the problem trying to get same intensity from both directions.




Book asked us to minimize the illumination.

Want $L_1 = L_2$

$\frac{kI_1}{r_1^2} = \frac{kI_2}{r_2^2}$

$\frac{3I_2}{r_1^2} = \frac{I_2}{r_2^2}$

$\frac{3}{r_1^2} = \frac{1}{r_2^2}$

$3r_2^2 = r_1^2$

$r_1 = 10 - r_2$

$\frac{3}{r_1^2} = \frac{1}{r_2^2}$

$\frac{3}{(10-r_2)^2} = \frac{1}{r_2^2}$

$\sqrt{3}\, r_2 = r_1 = 10 - r_2$

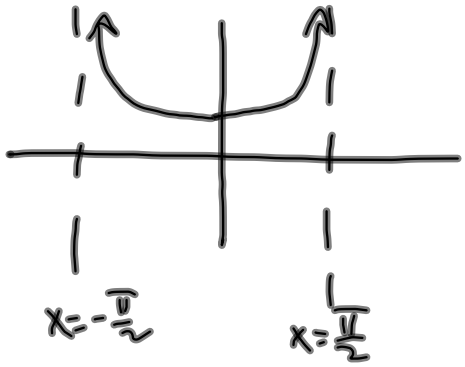
$(\sqrt{3}+1) r_2 = 10$

$r_2 = \frac{10}{\sqrt{3}+1} \approx 3.6$

$3r_2^2 = (10-r_2)^2$

$3r^2 - (10-r_2)^2 = 0$

(15) $h(\theta) = 2\sin\theta - \sec^2\theta = -2\cos\theta - \tan\theta + C$




This only works where both $\sin\theta$ and $\sec^2\theta$ are cont$\pm$.

So it's good on $(-\frac{\pi}{2}, \frac{\pi}{2}), (\frac{\pi}{2}, \frac{3\pi}{2}), \ldots$

$\left(\frac{k\pi}{2}, \frac{(k+2)\pi}{2}\right)$

where $k$ is odd, i.e., $k = 2n+1$ for some $n$.

$\left(\frac{(2n+1)\pi}{2}, \frac{(2n+3)\pi}{2}\right)$

ODDS:

$= \left(n\pi + \frac{\pi}{2}, n\pi + \frac{3\pi}{2}\right)$

$\left(n\pi - \frac{\pi}{2}, n\pi + \frac{\pi}{2}\right)$

$$g(t) = \frac{1+t+t^2}{\sqrt{t}} = \frac{1}{\sqrt{t}} + \frac{t}{\sqrt{t}} + \frac{t^2}{\sqrt{t}}$$

$$= t^{-\frac{1}{2}} + t^{\frac{1}{2}} + t^{\frac{3}{2}}$$

$$\Rightarrow G(t) = \frac{t^{\frac{1}{2}}}{\frac{1}{2}} + \frac{t^{\frac{3}{2}}}{\frac{3}{2}} + \frac{t^{\frac{5}{2}}}{\frac{5}{2}} + C$$

Spencer

$$= 2t^{\frac{1}{2}} + \frac{2}{3}t^{\frac{3}{2}} + \frac{2}{5}t^{\frac{5}{2}} + C$$

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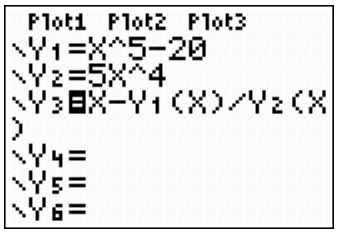
#11 $\sqrt[5]{20} = ?$

$f(x) = x^5 - 20 = 0$

$f'(x) = 5x^4$

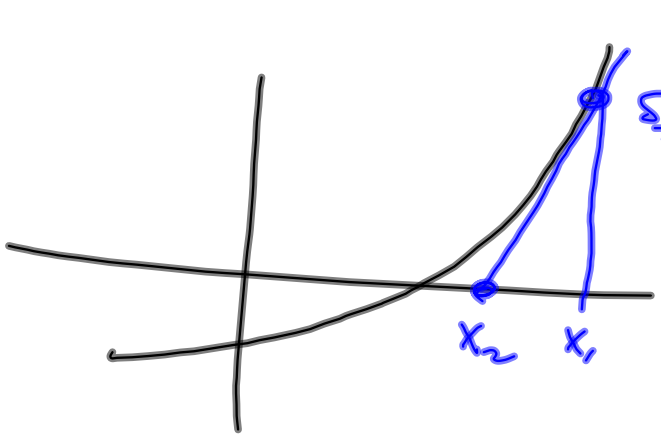
$$x_n = x_{n-1} - \frac{f(x_{n-1})}{f'(x_{n-1})}$$



Newton's question on test:

Derive Newton's Method!

(See my §3.8 Introduction.)




$y = f'(x_1)(x - x_1) + f(x_1)$

SET $= 0$ & solve for $x_2$ ...,

$x_2 = x_1 - \frac{f(x_1)}{f'(x_1)}$