

27, 37, 39, 51, 63, 67, 81, 93, 109, 113

HW written

5.1

(27) $17^{\circ}34'$ $17 + \frac{34}{60} = 17.5667$ $\boxed{17.5667^{\circ}}$

(37) $75^{\circ} = \frac{75}{180} \pi = \frac{25}{60} \pi = \boxed{\frac{5\pi}{12}}$

(39) $-210^{\circ} = -\frac{210}{180} \pi = -\frac{21}{18} \pi = \boxed{-\frac{7\pi}{6}}$

(51) $-\frac{2\pi}{5} = -\frac{2 \times 36}{5 \times 36} = -\frac{72}{180} = \boxed{-72^{\circ}}$

(63) $-\frac{3\pi}{2} = -\frac{3}{2} = -\frac{270}{180} = -270^{\circ}$
 $-270 + 360 = 90$
 $-\frac{90}{180} = -\frac{1}{2} = \boxed{-\frac{\pi}{2}}$

(67) $\frac{17\pi}{4} = \frac{17 \times 45}{4 \times 45} = \frac{765}{180}$
 $765 - 360 = 405 - 360 = 45$
 $\frac{45}{180} = \frac{1}{4} = \boxed{\frac{\pi}{4}}$

(81) ~~(45.2°N, 77.6°W) NC~~ ~~(37.5°N, 77.5°W) NC~~
 (35.8°N, 78.6°W) NC (0.3°S, 78.6°W) Ecuador

~~$35.8 + 1.3 = 37.1$~~ ~~$\theta = 35.5^{\circ} \cdot \frac{\pi}{180} \approx 0.61959$~~

~~$\theta = 35.5^{\circ} \cdot \frac{\pi}{180} \approx 0.62430$~~

~~$s = r\theta = (3960)(0.62430) \approx 2472$~~

$35.8 + 1.3 = 36.1$

$\theta = 36.1^{\circ} \cdot \frac{\pi}{180} \approx 0.63006$

$s = r\theta = (3960)(0.63006) \approx \boxed{2495 \text{ mi}}$

- (93) A wheel has 2.5 ft tires (diameter)
a) distance w/ one rotation?

$$2.5(\pi) \approx 7.853 \approx \boxed{7.9 \text{ ft}}$$

- b) 10,000 rotations?

$$2.5(10,000) = 25,000 \quad 25,000(\pi) = 78,539.8 \approx \boxed{78,539 \text{ ft}}$$

- c) if wheels turn at 672 rpm angular speed?

$$\omega = \frac{\theta}{t} \quad \frac{672 \text{ rev}}{\text{min}} \cdot \frac{2\pi \text{ rad}}{\text{rev}} = 1344\pi \text{ rad/min} \approx \boxed{1344\pi \text{ rad/min}}$$

- d) 672 rpm linear speed? ft per min

$$672 \cdot 2.5\pi = 1680\pi \text{ ft/min} \approx \boxed{5278 \text{ ft/min}}$$

- e) 672 rpm linear speed mph? 1 mi = 5280 ft 1 hr = 60 min

$$5278 \times 60 = 316680 \div 5280 = 59.97 \approx \boxed{60 \text{ mph}}$$

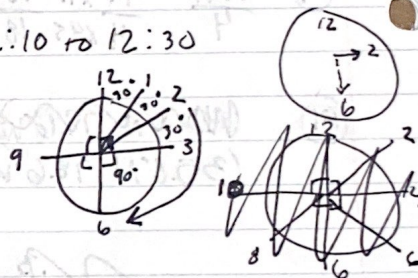
- (109) minute hand on clock moves from 12:10 to 12:30

- a) how many degrees does it move?

$$\boxed{120^\circ}$$

- b) how many radians?

$$\frac{120}{180} = \boxed{\frac{2\pi}{3}}$$



- c) second hand 10 in. distance traveled?

$$10 \left(\frac{2\pi}{3} \right) = \boxed{\frac{20\pi}{3} \text{ in} \approx 20.94 \text{ in}}$$

- e) area?

$$A = \frac{1}{2} r^2 \theta$$

- d) determine exact angular speed in rad/sec.

$$\omega = \frac{\theta}{t} \quad \frac{\frac{20\pi}{3}}{20} \cdot \frac{1}{20} = \boxed{\frac{\pi}{30} \text{ rad/sec}}$$

$$\frac{1}{2}(10)^2 \frac{2\pi}{3}$$

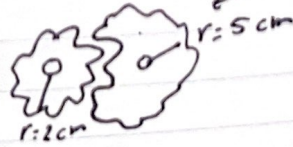
$$\frac{1}{2} 100 \frac{2\pi}{3}$$

$$\boxed{\frac{100\pi}{3} \approx 105 \text{ in}^2}$$

- e) linear speed?

$$\frac{20\pi}{3} \cdot \frac{1}{20} = \boxed{\frac{\pi}{3} \text{ in/sec}}$$

(113) two gears are calibrated so that smaller gear drives the larger gear. for each rotation of smaller gear, how many degrees will large one rotate? (very accurate drawing of gears)



i don't get it.

HW written

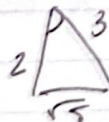
27, 41, 47, 65, 83, 89

S.2

(27) if $\sec \theta = \frac{3}{2}$ find $\sin \theta = \frac{\sqrt{5}}{3}$

$$\sec \theta = \frac{\text{hyp}}{\text{adj}}$$

$$\sin \theta = \frac{\text{opp}}{\text{hyp}}$$

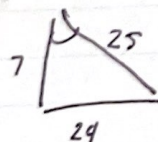


$$\begin{aligned} z^2 + b^2 &= 3^2 \\ 4 + b^2 &= 9 \\ b^2 &= 5 \\ \sqrt{b^2} &= \sqrt{5} \\ b &= \sqrt{5} \end{aligned}$$

(41) given $\cos \theta = \frac{7}{25}$ find $\sin \theta = \frac{24}{25}$

$$\cos \theta = \frac{\text{adj}}{\text{hyp}}$$

$$\sin \theta = \frac{\text{opp}}{\text{hyp}}$$



$$\begin{aligned} 7^2 + b^2 &= 25^2 \\ 49 + b^2 &= 625 \\ b^2 &= 576 \\ \sqrt{b^2} &= \sqrt{576} \\ b &= 24 \end{aligned}$$

(47) $\tan^2 \theta + 1 = \sec^2 \theta$

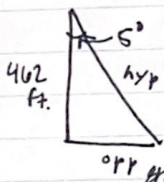
derive from: $\sin^2 \theta + \cos^2 \theta = 1$

$$\frac{\sin^2 \theta}{\cos^2 \theta} + \frac{\cos^2 \theta}{\cos^2 \theta} = \frac{1}{\cos^2 \theta}$$

$$\tan^2 \theta + 1 = \sec^2 \theta$$

(65) An observer @ 462 ft measures angle from top of cliff to a point on the ground to be 5° . What is the distance from the base of the cliff to the point on the ground?

i don't get it?



$$\tan 5^\circ = \frac{x}{462} \quad x = 462 \tan 5^\circ$$

$$\approx 40.4 \text{ ft}$$

$$\begin{aligned} 462^2 + 40.4^2 &= c^2 \\ 213444 + 1632.16 &= c^2 \\ 215076.16 &= c^2 \end{aligned}$$

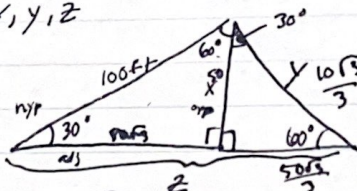
$$\begin{aligned} \cos 5^\circ &= \frac{462}{c} \\ \sec 5^\circ &= \frac{c}{462} \end{aligned}$$

$$\begin{aligned} x &= 462 \sec 5^\circ \\ y &= \frac{10\sqrt{3}}{3} \\ z &= \frac{200\sqrt{3}}{3} \end{aligned}$$

(83) Find exact lengths x, y, z

$$\begin{aligned} 50^2 + b^2 &= 100^2 \\ 2500 + b^2 &= 10000 \\ b^2 &= 7500 \\ b &= 50\sqrt{3} \end{aligned}$$

$$\begin{aligned} \sin 30^\circ &= \frac{x}{100} \\ x &= 100 \sin 30^\circ \\ x &= 50 \end{aligned}$$



$$\begin{aligned} \tan 30^\circ &= \frac{x}{50} \quad x = 50 \tan 30^\circ \\ x &= \frac{50\sqrt{3}}{3} \end{aligned}$$

$$\begin{aligned} 50\sqrt{3} + \frac{50\sqrt{3}}{3} &= c \\ \frac{200\sqrt{3}}{3} &= c \end{aligned}$$

$$\begin{aligned} 50^2 + \frac{50\sqrt{3}}{3}^2 &= c^2 \\ 2500 + \frac{2500}{3} &= c^2 \end{aligned}$$

$$\begin{aligned} \frac{1000}{3} &= c^2 \\ \sqrt{\frac{1000}{3}} &= c \end{aligned}$$

P8, E8, 20, 14, 14, 15

HW Math

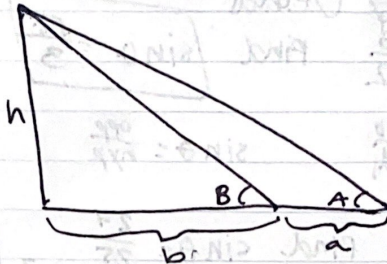
1.2

(89) show that $a = h \cot A - h \cot B$

$$\cot = \frac{\text{adj}}{\text{opp}}$$

$$\cot A = \frac{a+b}{h}$$

$$\cot B = \frac{b}{h}$$

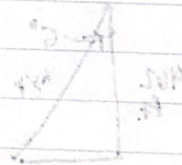


if don't know how to word it.

$$\begin{aligned} 1 &= \cot A - \cot B \\ \frac{a+b}{h} &= \frac{a}{h} - \frac{b}{h} \\ a+b &= a-b \\ 2b &= -a \\ b &= -\frac{a}{2} \end{aligned}$$

(92) An observer at point A on the ground is looking at a point B on a hill. The angle of elevation from A to B is 30° . The angle of depression from B to the ground is 15° . The horizontal distance from A to the base of the hill is 100 feet. Find the height of the hill.

Let x be the height of the hill.



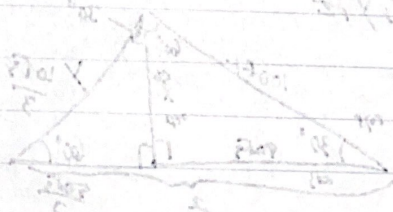
$$\frac{x}{100} = \tan 30^\circ$$

$$x = 100 \tan 30^\circ$$

$$x = 100 \cdot \frac{1}{\sqrt{3}}$$

$$x = \frac{100}{\sqrt{3}}$$

$$x \approx 57.74$$



$$\frac{x}{100} = \tan 15^\circ$$

$$x = 100 \tan 15^\circ$$

$$x \approx 26.8$$

$$x \approx 26.8$$