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

HW written

5.1

(27) $17°34'$ $17 + \frac{34}{60} = .5666 = \boxed{17.5667°}$

(37) $75°$ $\frac{75}{180} \cdot \pi \quad \frac{25}{60} = \boxed{\frac{5\pi}{12}}$

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

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

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

$-270 - 360 = -630$ $-\frac{630}{180} = -\frac{21}{6} \boxed{-\frac{7\pi}{2}}$

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

$\frac{45}{180} = \frac{1}{4} = \boxed{\frac{\pi}{4}}$

(81) ~~(35.8°N, 78.6°W) NY (37.5°N, 77.5°W) VA~~

(35.8°N, 78.6°W) NC (0.3°S, 78.6°W) Ecuador

~~35.8 + .3 = 35.7° = 135.7~~ $\theta = 35.5° \cdot \frac{\pi}{180} \approx .61959$

~~$\theta = 35.7° \cdot \frac{\pi}{180} \approx .62330$~~

$s = r\theta$

~~$s = r\theta \quad s = (3960)(.62330) \approx 2472$~~ $(3960)(.61959)$

≈ 2453

$35.8 + .3 = 36.1$

$\theta = 36.1° \cdot \frac{\pi}{180} \approx .63006$

$s = r\theta \quad (3960)(.63006) \approx \boxed{2495 \text{ mi}}$

A truck has 2.5 ft tires (diameter)

(93) a) distance by one rotation?

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

b) 10,000 rotations?

$2.5(10{,}000) = 25{,}000 \qquad 25{,}000(\pi) = 78539.8 \approx \boxed{78{,}539 \text{ ft}}$

c) if wheels turn at 672 rpm angular speed?

$\omega = \frac{\theta}{t} \qquad \frac{672 \text{ rev}}{\text{min}} \cdot \frac{2\pi}{\text{rev}} = 1680 \text{ rad/min} \qquad \boxed{1344\pi \text{ rad/min}}$

d) 672 rpm linear speed? ft per min

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

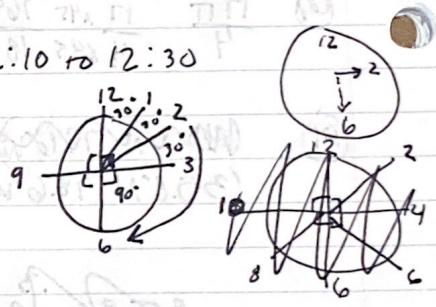
e) 672 rpm linear speed mph? 1 mi = 5280 ft 1 hr = 60 min

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

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

a) how many degrees does it move?

$\boxed{120°}$



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?

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

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

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

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

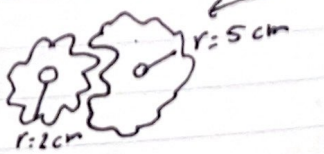
d) determine exact angular speed in rad/sec.

$\omega = \frac{\theta}{t} \qquad \frac{\frac{20\pi}{3}}{20} \qquad \frac{20\pi}{3} \cdot \frac{1}{20} = \boxed{\frac{\pi}{3}}$

e) linear speed?

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

(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)



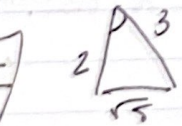
i don't get it.

HW written 27, 41, 47, 65, 83, 89

5.2

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

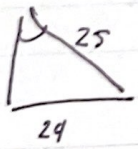
$\sec\theta = \frac{hyp}{adj}$ $\sin\theta = \frac{opp}{hyp}$



$2^2 + b^2 = 3^2$
$4 + b^2 = 9$
$b^2 = 5$
$b = \sqrt{5}$

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

$\cos\theta = \frac{adj}{hyp}$ $\sin\theta = \frac{opp}{hyp}$



$7^2 + b^2 = 25^2$
$49 + b^2 = 625$
$b^2 = 576$
$b = 24$

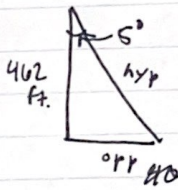
(47) $\tan^2\theta + 1 = \sec^2\theta$ derive from: $\sin^2\theta + \cos^2\theta = 1$

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

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

(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?

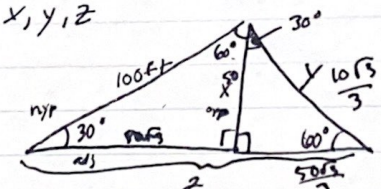


$\tan 5° = \frac{x}{462}$ $x = 462\tan 5$
≈ 40.4 ft

~~$462^2 + 462^2 = c^2$~~
~~$213444 + 1000 = c^2$~~
~~$214844 = c^2$~~

~~$\cos 5° = \frac{462}{x}$~~
$\sec 5° = \frac{x}{462}$
$x = 462\sec 5$

(83) find exact lengths x, y, z



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

$\sin 30 = \frac{x}{100}$
$x = 100\sin 30$
$x = 50$

~~$\frac{50\sqrt{3}}{\sqrt{3}}$~~

$\tan 30 = \frac{x}{50}$ $x = 50\tan 30$ $x = \frac{50\sqrt{3}}{3}$

$50\sqrt{3} + \frac{50\sqrt{3}}{3}$

$\frac{200\sqrt{3}}{3}$

$x = 50$ ft $y = \frac{10\sqrt{3}}{3}$ $z = \frac{200\sqrt{3}}{3}$

$50^2 + \frac{50\sqrt{3}}{3}^2 = c^2$

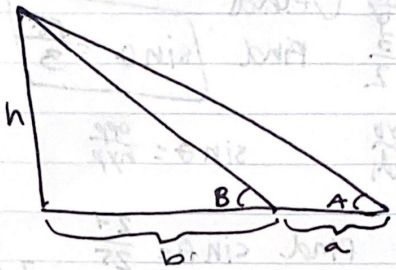
$2500 + \frac{2500}{3} = c^2$

$\frac{1000}{\sqrt{3}} = c^2$

$\frac{10\sqrt{30}}{3} = c$

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

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



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

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

I don't know how to word it.