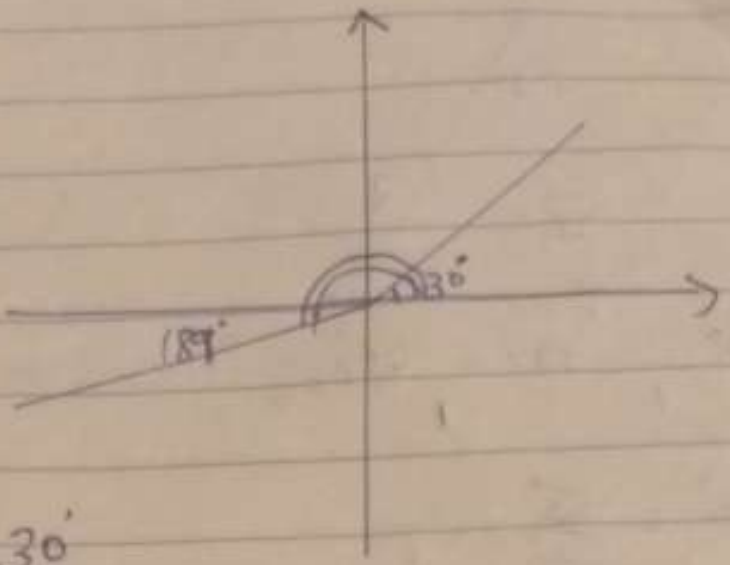
1) 1 radian = 57.296°

a) $\frac{\pi}{6}$ rad = ?

$\frac{3.142}{6} = 0.5236$

0.5236 rad = ?

$\left(\frac{0.5236 \text{ rad} \times 57.296}{1 \text{ rad}}\right) = 30°$



b) 1 rad = 57.296°

3.3 rad = ?

$\left(\frac{3.3 \times 57.296}{1 \text{ rad}}\right) = 189.08°$

a) $1\ rad = 57.296^\circ$

$? = 66^\circ$

$$\frac{66 \times 1\ rad}{57.296} = \underline{1.152\ rad}$$

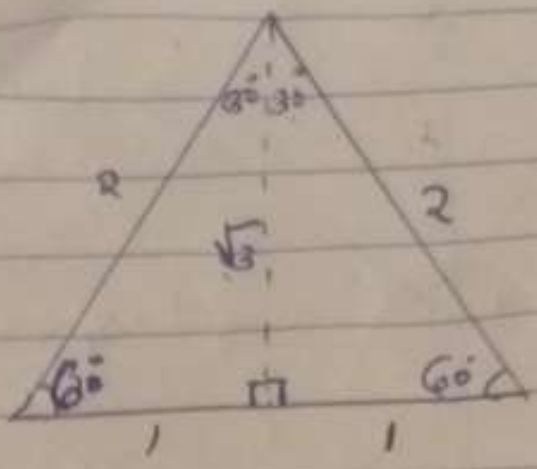
b) $1\ rad = 57.296^\circ$

$? = 337^\circ$

$$\frac{337 \times 1\ rad}{57.296} = \underline{5.882\ rad}$$

3

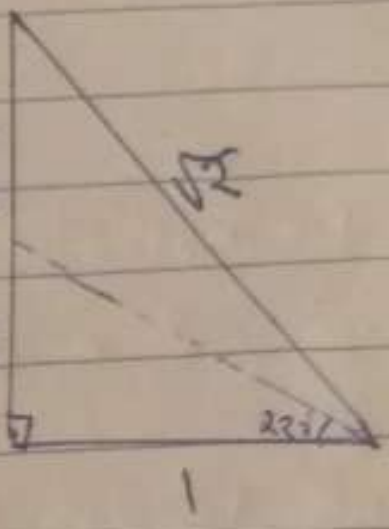
a)



$$\cos 30^\circ = \frac{\sqrt{3}}{2}$$

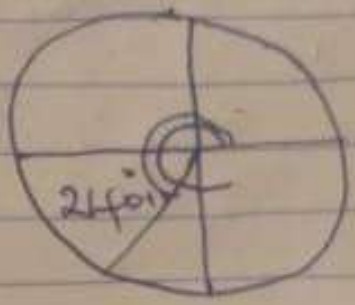
b) $\cot = \frac{3\pi}{4}$

$$\frac{1}{\tan 22.5 = \frac{1/2}{1}}$$



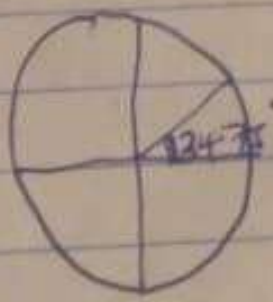
4 a) $\csc \frac{4\pi}{3} = \frac{1}{\sin}$

$= \frac{4\pi}{\sin 3} = 240.11^{\circ}$



b) $\sec \frac{11\pi}{6} = \frac{1}{\cos}$

$= \frac{11\pi}{\cos 6} = 34.75^{\circ}$



5

5 $y = 8\cos(\pi x) + 24$

(a) Similarities btwn $f(x) = \sec\theta$ and $g(x) = \csc\theta$.

i Cosec is the reciprocal of the Sine. Also Sec is the reciprocal of the Cosine

ii Period of secant and Cosecant are the same as the period of Cosine and sine.

(b) Differences btwn $f(x) = \sec\theta$ and $g(x) = \csc\theta$.

i From the graph, We see that Sec is an even function and Cosec is an odd function.

ii The Cosec is the reciprocal of the Sine while sec is the reciprocal of the Cosine.

7c $h(t) = -6\sin\left(\frac{\pi}{6}(t-6)\right) + 1.5$

When $t = 6$,

rate of change $= -6\sin\left(\frac{\pi}{6}(6-6)\right)$

rate of change $= 0$

Instantaneous rate of change represent zero metre upward and zero metre downward.

7d Between 5 seconds and 6 seconds

In between $5 = -6\sin\left(\frac{\pi}{6}(-1)\right) + 1.5 = 5.6$ m

In 6 seconds $= -6\sin\left(\frac{\pi}{6}(0)\right) + 1.5 = 5.5$ m

so between 5 seconds and 6 seconds.

7a

Maximum Height	Amplitude	Equation of the Axis	Period
6	6	$y = mx + c$	$\frac{2\pi}{\pi} \times 6 = 12.$
-6	-6		

Question 8.

$y = \cos\theta$	$y = 6\cos(5\theta+\pi)-4$	$(\theta, y) \to ($
$y = \sin\theta$		$(\theta, y) \to (5\theta+6, -8y+21)$
$y = \tan\theta$	$y = -4\tan\left(\frac{1}{5}(\theta-\frac{\pi}{3})+2\right)$	$(\theta, y) \to ($

Solution:

object $y = \cos\theta$

image $y = 6\cos(5\theta+\pi)-4$

1 → amplitude; 5 → frequency; $+\pi$ → horizontal shift; -4 → vertical shift

Mapping $(\theta, y) \to \left(\frac{5}{5}\theta+\pi, 6y-4\right)$

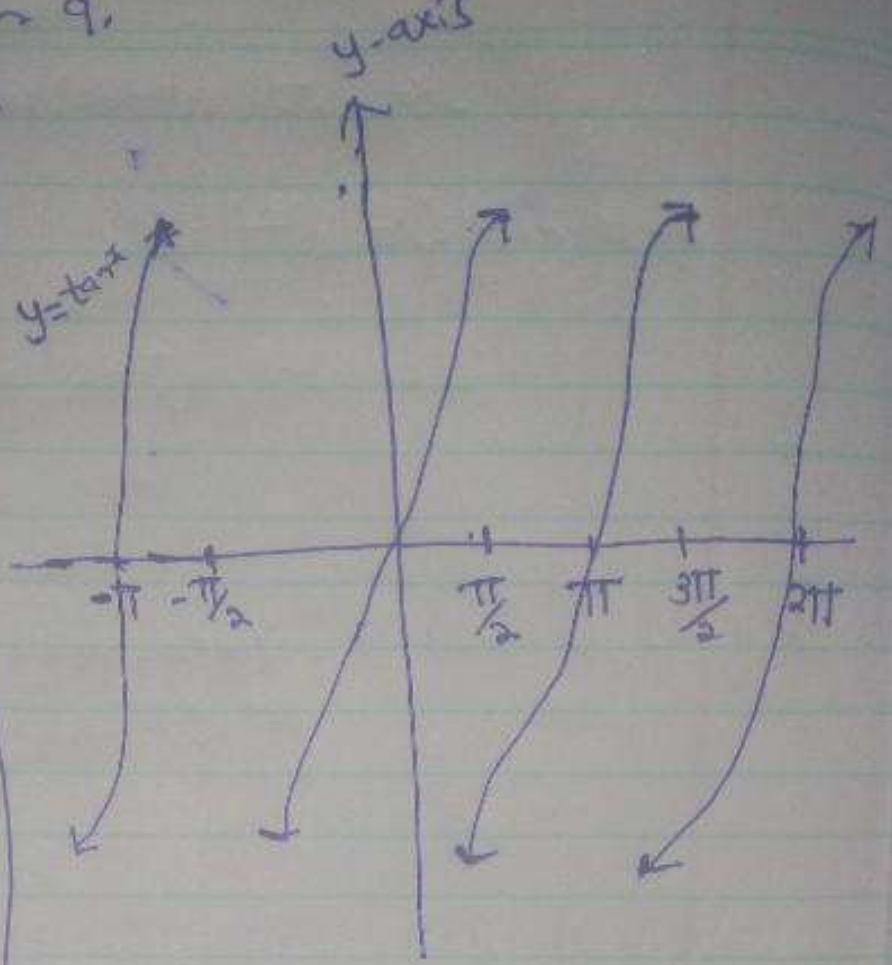
$y = \sin\theta$ $\quad y = -8\sin(5\theta+6)+21)$ $\quad (\theta, y) \to (5\theta+6, -8y+2)$

$y = \tan\theta$ $\quad y = -4\tan\left(\frac{1}{5}(\theta-\frac{\pi}{3})+2\right.$ $\quad (\theta, y) \to \left(\frac{1}{5}\theta-\frac{\pi}{15}\right) -4y+$

Question 9.

a) $f(x) = \tan x$

x	f(x)
$-\pi$	π
$-\pi/2$	$\pi/2$
$\pi/2$	$\pi/2$
π	π
$3\pi/2$	$3\pi/2$
2π	2π

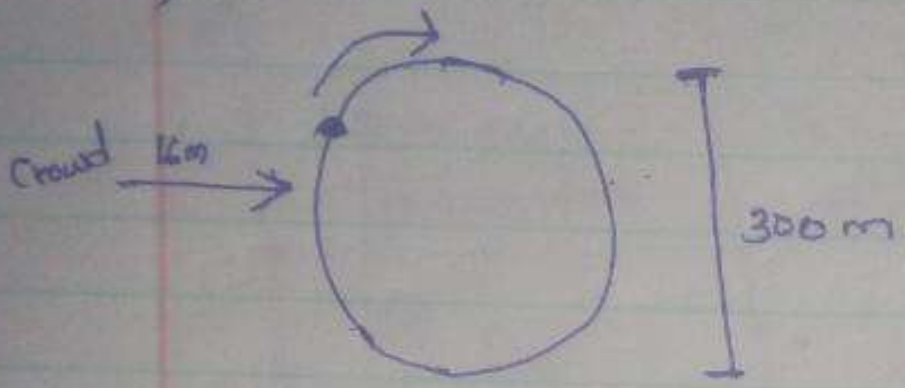


b)

x-intercept	Location of the vertical Asymptotes	interval when f(x)>0	interval of increase or decrease
$-\pi$	$(-\pi/2, -3\pi/2)$	$(-\pi/2, \pi/2)$	$(-\pi/2, \pi/2)$
0	$-\pi/2, \pi/2$	0	$-\pi/2, \pi/2$
π	$\pi/2, 3\pi/2$	0	$\pi/2, 3\pi/2$
2π	$5/2\pi, 3\pi/2$	0	$5/2\pi, 3\pi/2$

Question 10.

a)



The image below is d. given by function

$y = A \sin(B\theta + \pi) + h$

$y = A \cos(B\theta + \pi) - h$

$A = 300\,m$

$B = 16\,m$

horizontal shift = 200m

Vertical shift = 15 second

$= y = -300 \sin\left(300\theta + \frac{200}{\pi}\right) + 15$ //

$y = 300 \cos(300\theta + 200) - 15$ //

b)

The a. car moves 30m

30 m - interm of degrees

$30 \frac{\phi}{5\phi} = 12^\circ$

$\frac{180\phi}{30} = 6^\circ$

Question 11

11 a) $f(t) = 16\cos\left(\frac{\pi}{60}t\right) + 26$

Maximum Temperature	Minimum temperature	Period
$\frac{\pi}{60}$ 26	$\frac{26\pi}{60}$	16

11 (b) what are the first three times that the temperature of water being pumped into the pool is 10°C

since $f(t) = 16\cos\left(\frac{\pi}{60}t\right) + 26$

$T = 10°C$

$= f(10°C) = 16\cos\left(\frac{\pi}{60}(10)\right) + 26$

$= 16\cos\left(\frac{10\pi}{60}\right) + 26$

$16 \times 0.5 + 26$

$= 8 + 26 = 34$