[2][a], $\frac{5\pi}{6}$ FROM UNIT CIRCLE OR

$\cos\theta = -\frac{\sqrt{3}}{2}$ AND $\theta \in [0, \pi]$ IE. θ IN Q_1 OR Q_2

$\cos\theta < 0$

SO θ IN Q_2

$\cos\theta_{REF} = \frac{\sqrt{3}}{2} \longrightarrow \theta_{REF} = \frac{\pi}{6}$

$\theta = \pi - \frac{\pi}{6} = \frac{5\pi}{6}$

[b] $y = \arctan\sqrt{x} \rightarrow \tan y = \sqrt{x}$ AND $y \in (-\frac{\pi}{2}, \frac{\pi}{2})$ — 2

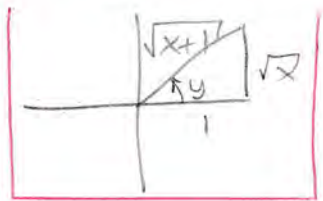
IE. y IN Q_1 OR Q_4

$\tan y \geq 0$

SO, y IN Q_1 — 1

WANT $\cos y$

$= \frac{1}{\sqrt{x+1}} = \frac{\sqrt{x+1}}{x+1}$ — 1½



2

[c] $\frac{\sqrt{11}}{3} > \frac{3}{3} = 1$ → $\arcsin\frac{\sqrt{11}}{3}$ DNE, so, $\sin(\arcsin\frac{\sqrt{11}}{3})$ DNE

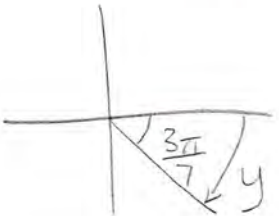
[d] $\tan y = \tan \frac{18\pi}{7}$ AND $y \in (-\frac{\pi}{2}, \frac{\pi}{2})$ IE. y IN Q_1 OR Q_4 (2)

$\frac{18\pi}{7} = 2\frac{4}{7}\pi$, COTERMINAL WITH $\frac{4\pi}{7}$ IN Q_2 (1)

SO $\tan \frac{18\pi}{7} < 0$ AND $\tan y < 0$ (1)

SO y IN Q_4 (1)

REFERENCE ANGLE FOR $\frac{4\pi}{7}$ IS $\pi - \frac{4\pi}{7} = \frac{3\pi}{7}$ (1)



$y = -\frac{3\pi}{7} = \tan^{-1}(\tan \frac{18\pi}{7})$ (1½)

[e] $\cos^{-1}\left(\csc\frac{3\pi}{2}\right) = \cos^{-1}(-1) = \pi$ FROM UNIT CIRCLE

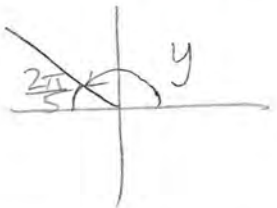
[f] $\cos y = \cos \frac{27\pi}{5}$ AND $y \in [0, \pi]$ IE. y IN Q_1 OR Q_2 (2)

$\frac{27\pi}{5} = 5\frac{2}{5}\pi$, COTERMINAL WITH $1\frac{2}{5}\pi$ IN Q_3 (1)

SO $\cos \frac{27\pi}{5} < 0$ AND $\cos y \geq 0$ (1)

SO y IN Q_2 (1)

REFERENCE ANGLE FOR $1\frac{2}{5}\pi$ IS $1\frac{2}{5}\pi - \pi = \frac{2\pi}{5}$ (1)



$y = \pi - \frac{2\pi}{5} = \frac{3\pi}{5}$ (1½)

[g] $\frac{\pi}{2} > \frac{3}{2} > 1 \longrightarrow \arccos \frac{\pi}{2}$ DNE, so $\cos(\arccos \frac{\pi}{2})$ DNE

[h] $y = \sin^{-1}\left(-\frac{3}{7}\right) \rightarrow \sin y = -\frac{3}{7}$ AND $y \in \left[-\frac{\pi}{2}, \frac{\pi}{2}\right]$ (2)

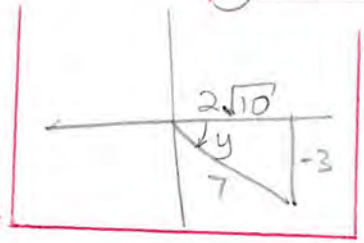
IE y IN Q_1 OR Q_4

$\sin y < 0$

SO y IN Q_4 (1)

WANT $\sec y$

$= \frac{7}{2\sqrt{10}} = \frac{7\sqrt{10}}{20}$ (1½)



(2)

$x^2 + (-3)^2 = 7^2$

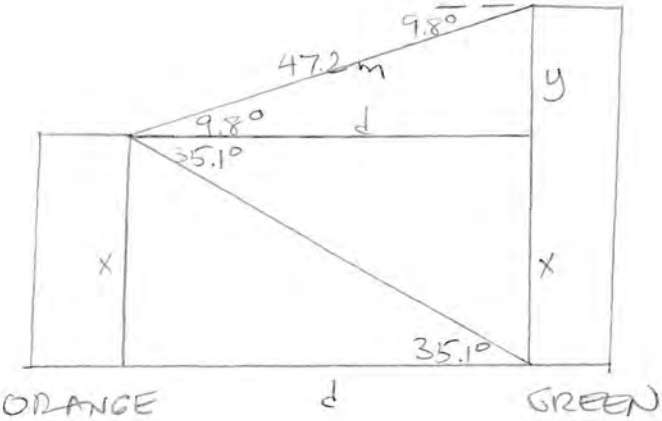
$x^2 + 9 = 49$

$x^2 = 40$

$x = 2\sqrt{10}$

$[i]_1 \quad -\frac{\pi}{3}$ FROM UNIT CIRCLE

[3]



[a] $\cos 9.8° = \frac{d}{47.2\text{m}} \rightarrow d = 47.2 \cos 9.8°$ m

$\tan 35.1° = \frac{x}{d} \rightarrow x = d \tan 35.1°$

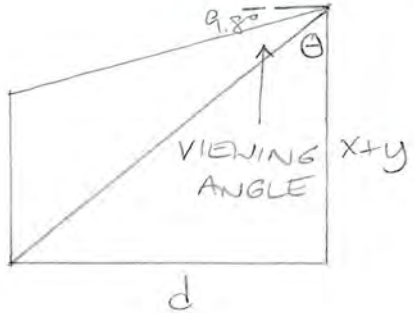
$= 47.2 \cos 9.8° \tan 35.1°$ m

$\sin 9.8° = \frac{y}{47.2\text{m}} \rightarrow y = 47.2 \sin 9.8°$ m

THE ORANGE DORM IS $47.2 \cos 9.8° \tan 35.1°$ m TALL.

THE GREEN DORM IS $47.2 \cos 9.8° \tan 35.1° + 47.2 \sin 9.8°$ m TALL

[b]



$$\tan\theta = \frac{d}{x+y} \quad 1$$

$$\theta = \tan^{-1}\frac{d}{x+y}$$

$$= \tan^{-1}\frac{47.2\cos 9.8^\circ}{47.2\cos 9.8^\circ \tan 35.1^\circ + 47.2\sin 9.8^\circ} \quad 1$$

$$= \tan^{-1}\frac{\cos 9.8^\circ}{\cos 9.8^\circ \tan 35.1^\circ + \sin 9.8^\circ} \quad 1$$

$$\text{VIEWING ANGLE} = 90^\circ - 9.8^\circ - \theta \quad 2$$

$$= 80.2^\circ - \tan^{-1}\frac{\cos 9.8^\circ}{\cos 9.8^\circ \tan 35.1^\circ + \sin 9.8^\circ} \quad 1$$

[C] ORANGE DORM IS 32.7 m TALL

GREEN DORM IS 40.7m TALL

VIEWING ANGLE IS 31.4°

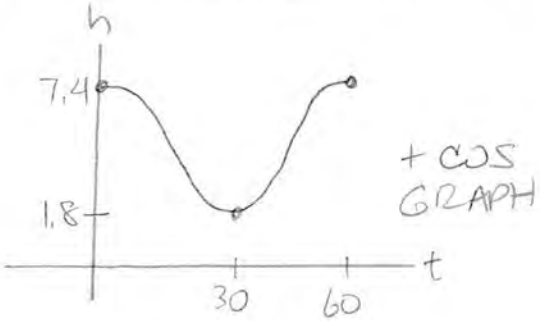
[4][a] MINUTE HAND ONLY DEPENDS ON MINUTES PAST THE HOUR

$t=0 \rightarrow h=7.4$ (MAX h) 1

$t=30 \rightarrow h=1.8$ (MIN h) 1

MID $h = \frac{7.4+1.8}{2} = 4.6$ 1

AMP $= \frac{7.4-1.8}{2} = 2.8$ 1



PERIOD $= 60 \rightarrow \frac{2\pi}{B} = 60 \rightarrow B = \frac{2\pi}{60} = \frac{\pi}{30}$ 1

SHIFT $= 0$

$h = 2.8\cos\frac{\pi}{30}t + 4.6$ $5\frac{1}{2}$

[b] $h = 2.8\cos\frac{\pi}{30}(40)+4.6 = 2.8\cos\frac{4\pi}{3}+4.6$ (1)

$= 2.8\left(-\frac{1}{2}\right)+4.6 = 3.2$ FT (1) $\frac{1}{2}$

[5][a] MID = $\frac{4}{1}$ MAX = $4+3=7$ 1

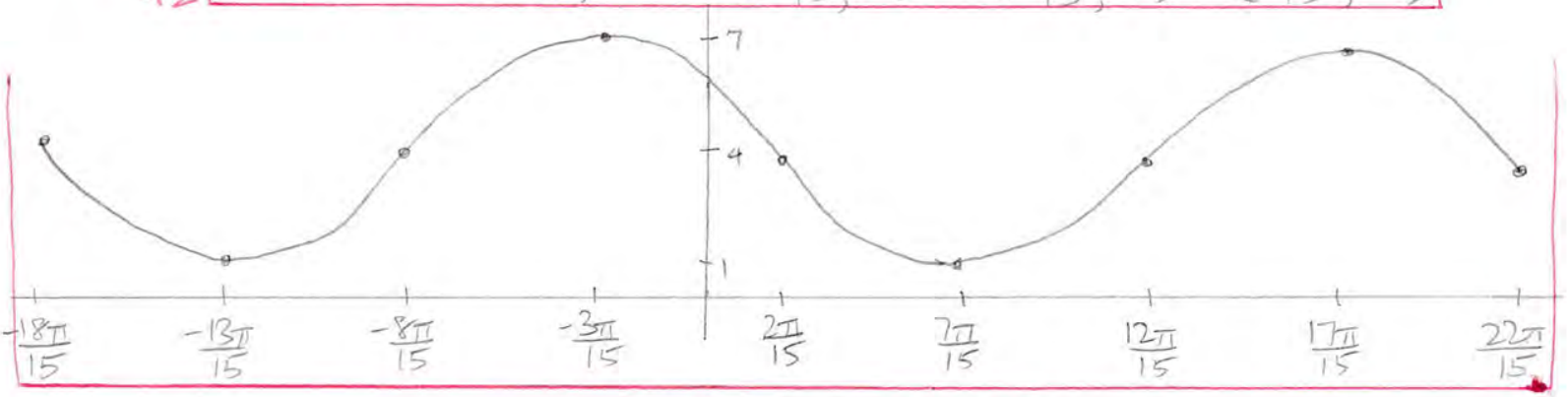
AMP = $|-3| = \frac{3}{1}$ MIN = $4-3=1$ 1

PERIOD = $\frac{2\pi}{\frac{3}{2}} = 2\pi \cdot \frac{2}{3} = \frac{4\pi}{3}$ 1 $\quad \frac{1}{4}\text{PERIOD} = \frac{\pi}{3} = \frac{5\pi}{15}$ 1

SHIFT $\frac{3}{2}x + \frac{9\pi}{5} = 0 \rightarrow$ 1½ $\quad \frac{3}{2}x = -\frac{9\pi}{5} \rightarrow x = -\frac{9\pi}{5} \cdot \frac{2}{3} = -\frac{6\pi}{5} = -\frac{18\pi}{15}$ 1½

4½ $\left(-\frac{18\pi}{15}, 4\right)$ $\left(-\frac{13\pi}{15}, 1\right)$ $\left(-\frac{8\pi}{15}, 4\right)$ $\left(-\frac{3\pi}{15}, 7\right)$

$\left(\frac{2\pi}{15}, 4\right)$ $\left(\frac{7\pi}{15}, 1\right)$ $\left(\frac{12\pi}{15}, 4\right)$ $\left(\frac{17\pi}{15}, 7\right)$ $\left(\frac{22\pi}{15}, 4\right)$



4½

[b] $\frac{3}{2}x + \frac{9\pi}{5} \neq k\pi$

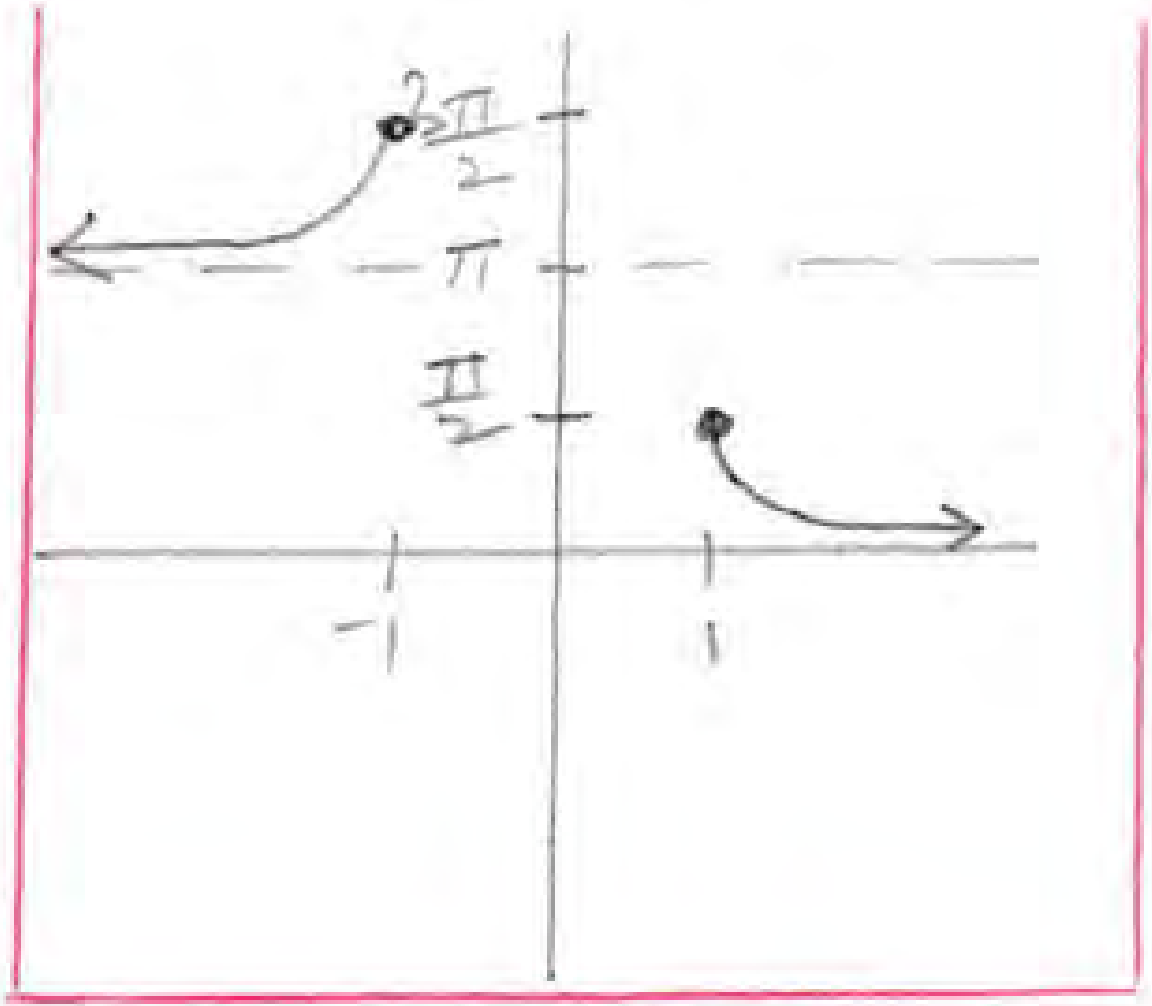
$\frac{3}{2}x \neq -\frac{9\pi}{5} + k\pi$

$x \neq \left(-\frac{9\pi}{5} + k\pi\right) \cdot \frac{2}{3}$ $\longrightarrow$ $x \neq -\frac{6\pi}{5} + \frac{2}{3}k\pi$ 2

SHIFT + ($\frac{1}{2}$ PERIOD) · k

[c] $(-\infty, 1] \cup [7, \infty)$,

[6] [a]



[b] DOMAIN OF g^{-1} = RANGE OF g = $(-\infty, -1] \cup [1, \infty)$ 2

[c] RANGE OF g^{-1} = DOMAIN OF g = $(0, \frac{\pi}{2}] \cup (\pi, \frac{3\pi}{2}]$ 2