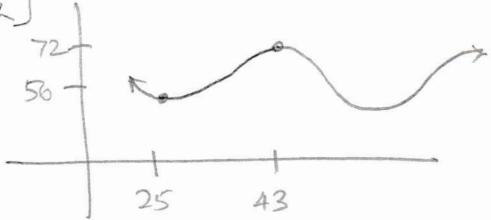
[2][a]



MID = $\boxed{\frac{1}{2}(72+56) = \frac{1}{2}\cdot 128 = 64}$ 1

AMP = $\boxed{\frac{1}{2}(72-56) = \frac{1}{2}\cdot 16 = 8}$ 1

PERIOD = $2(43-25) = 2(18) = 36 \rightarrow \boxed{\frac{2\pi}{B}}^{\frac{1}{2}} = \boxed{36}$ 1

SHIFT = $\boxed{25 \text{ OR } 43}$ 1

$B = \frac{2\pi}{36}$

$= \boxed{\frac{\pi}{18}}$ $\frac{1}{2}$

$\boxed{s = -8\cos\frac{\pi}{18}(t-25)+64 \quad \text{OR} \quad s = 8\cos\frac{\pi}{18}(t-43)+64}$ 5

[b] 8:01:22 am = $\boxed{82}$ 1 SECONDS AFTER 8:00 AM

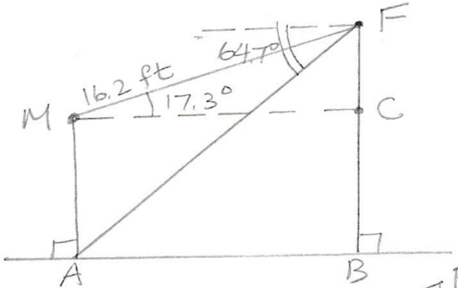
$s = 8\cos\frac{\pi}{\cancel{18}_{6}}(\cancel{39}^{13})+64 = \boxed{8\cos\frac{13\pi}{6}+64} = \cancel{8}^{4}\cdot\frac{\sqrt{3}}{\cancel{2}}+64 = \boxed{4\sqrt{3}+64}\ \boxed{\text{MPH}}$

$1\frac{1}{2}$ $1\frac{1}{2}$ 1

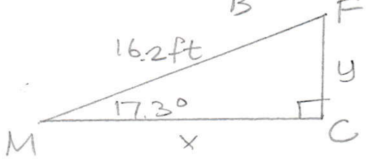
$\downarrow$

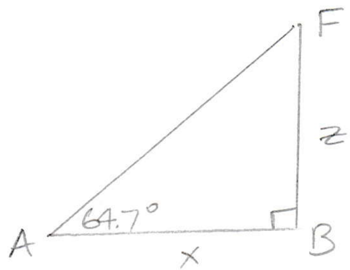
$2\frac{1}{6}\pi$ COTERMINAL WITH $\boxed{\frac{\pi}{6}}$ 1

[3]



[a]





$$\boxed{\cos 17.3° = \frac{x}{16.2\text{ft}} \longrightarrow x = 16.2\cos 17.3° \text{ ft}}$$ 3

$$\boxed{\sin 17.3° = \frac{y}{16.2\text{ft}} \longrightarrow y = 16.2\sin 17.3° \text{ ft}}$$ 3

$$\boxed{\tan 64.7° = \frac{z}{x} \longrightarrow z = x\tan 64.7°}$$ 3

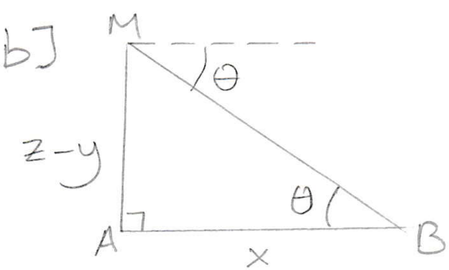
THE FLY IS $16.2\cos 17.3° \tan 64.7°$ FEET HIGH AND

1½

THE MOSQUITO IS $16.2\cos 17.3° \tan 64.7° - 16.2\sin 17.3°$ FEET HIGH

1½

[b]



$$\tan\theta = \frac{z-y}{x}$$

3

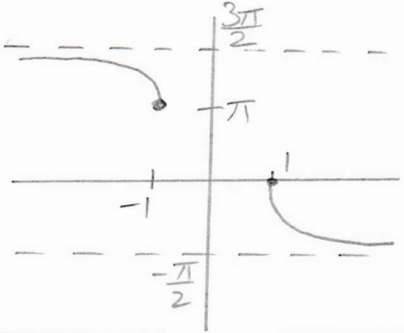
$$\theta = \tan^{-1}\frac{\cancel{16.2}\cos 17.3° \tan 64.7° - \cancel{16.2}\sin 17.3°}{\cancel{16.2}\cos 17.3°}$$

$$= \tan^{-1}(\tan 64.7° - \tan 17.3°)$$

[c] FLY: $\boxed{32.7}$ FT, MOSQUITO: $\boxed{27.9}$ FT, ANGLE: $\boxed{61°}$

1 1 1

[4] [a]



5

[b] $\boxed{(-\infty, -1] \cup [1, \infty)}$ $1\frac{1}{2}$

[c] $\boxed{(-\frac{\pi}{2}, 0] \cup [\pi, \frac{3\pi}{2})}$ $1\frac{1}{2}$

[5] [a] $\boxed{\frac{4\pi}{7} \text{ SINCE } \frac{4\pi}{7} \in [0, \pi]}$ 2

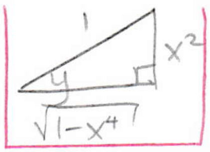
[b] $\boxed{\text{DNE SINCE } \frac{\sqrt{11}}{3} > 1, \text{ SO } \frac{\sqrt{11}}{3} \notin [-1, 1]}$ 2

[c] $\boxed{\frac{2\pi}{3} \text{ SINCE } \cos\frac{2\pi}{3} = -\frac{1}{2} \text{ AND } \frac{2\pi}{3} \in [0, \pi]}$ 2

[d] $y = \sin^{-1} x^2$

2 $\boxed{x^2 = \sin y}$ AND $y \in [-\frac{\pi}{2}, \frac{\pi}{2}]$ IE. Q_1, Q_4

$\sin y \geq 0 \rightarrow \boxed{y \in Q_1}$ 2

2 

$\cot y = \boxed{\frac{\sqrt{1-x^4}}{x^2}}$ 2

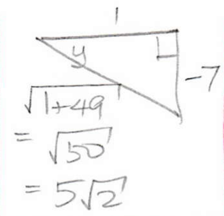
[e] $\sin^{-1}(\cot\frac{3\pi}{4}) = \boxed{\sin^{-1}(-1)}$ 1

$\boxed{= -\frac{\pi}{2} \text{ SINCE } \sin(-\frac{\pi}{2}) = -1 \text{ AND } -\frac{\pi}{2} \in [-\frac{\pi}{2}, \frac{\pi}{2}]}$ 2

[f] $y = \arctan(-7)$

2 $\boxed{-7 = \tan y}$ AND $y \in (-\frac{\pi}{2}, \frac{\pi}{2})$ IE. Q_1, Q_4

$\tan y < 0 \rightarrow \boxed{y \in Q_4}$ 2

2 

$\csc y = \boxed{-\frac{5\sqrt{2}}{7}}$ 2

[g] $\boxed{-\frac{\pi}{6} \text{ SINCE } \tan(-\frac{\pi}{6}) = -\frac{\sqrt{3}}{3} \text{ AND } -\frac{\pi}{6} \in (-\frac{\pi}{2}, \frac{\pi}{2})}$ 2

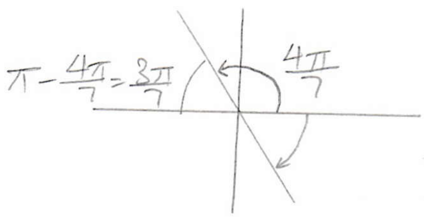
[h] $\boxed{-\frac{\pi}{6} \text{ SINCE } -\frac{\pi}{6} \approx -\frac{3}{6} = -\frac{1}{2} \text{ SO } -\frac{\pi}{6} \in [-1, 1]}$ 2

[i] $y = \arctan(\tan\frac{18\pi}{7})$

2 $\boxed{\tan\frac{18\pi}{7} = \tan y}$ AND $y \in (-\frac{\pi}{2}, \frac{\pi}{2})$ IE. Q_1, Q_4

$\downarrow$

$2\frac{4}{7}\pi$ COTERMINAL WITH $\boxed{\frac{4\pi}{7}}$ 1 IN Q_2 $\longrightarrow$ $\tan y < 0 \longrightarrow \boxed{y \in Q_4}$ 2



$y = \boxed{-\frac{3\pi}{7}}$ 2

[6] [a] MAX $\boxed{-1+6=5}$ 1 AMP $\boxed{6}$ 1

MID $\boxed{-1}$ 1 PERIOD $\boxed{\dfrac{2\pi}{\frac{3}{2}} = 2\pi\cdot\dfrac{2}{3} = \dfrac{4\pi}{3}}$ $1\frac{1}{2}$ $\quad \frac{1}{4}P = \frac{\pi}{3} = \frac{3\pi}{9}$

MIN $\boxed{-1-6=-7}$ 1 SHIFT $\boxed{\frac{3}{2}x + \frac{7\pi}{6} = 0}$ 1

$$\frac{3}{2}x = -\frac{7\pi}{6}$$

$$x = -\frac{7\pi}{\cancel{6}_{3}}\cdot\frac{\cancel{2}}{3} = \boxed{-\frac{7\pi}{9}} \quad 1$$

POINTS $\left(-\frac{7\pi}{9}, 5\right)\left(-\frac{4\pi}{9}, -1\right)\left(-\frac{\pi}{9}, -7\right)\left(\frac{2\pi}{9}, -1\right)\left(\frac{5\pi}{9}, 5\right)$

$\left(\frac{8\pi}{9}, -1\right)\left(\frac{11\pi}{9}, -7\right)\left(\frac{14\pi}{9}, -1\right)\left(\frac{17\pi}{9}, 5\right)$ 5

[b] $x \neq -\frac{4\pi}{9} + n\cdot 2\left(\frac{\pi}{3}\right)$ (FIRST MID + EVERY OTHER $\frac{1}{4}P$'s)

$\boxed{x \neq -\frac{4\pi}{9} + \frac{2n\pi}{3}}$ 3

[c] $\boxed{(-\infty, -7] \cup [5, \infty)}$ $1\frac{1}{2}$