

## Welcome Back MYP Math 9!

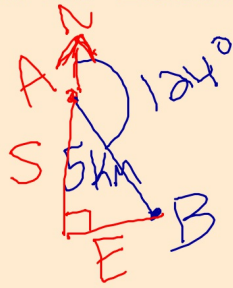
Reflect on last night's exercises.

	Assignment Effort Grade (Circle One)	Comments (What was interesting or challenging?)
<b>Monday</b> Date: <u>11/27</u> Topic: <u>13F Bearings &amp; Trigonometry</u>	0 1 2	
<b>Tuesday</b> Date: _____ Topic: _____	0 1 2	
<b>Wednesday</b> Date: _____ Topic: _____	0 1 2	
<b>Thursday</b> Date: _____ Topic: _____	0 1 2	
<b>Friday</b> Date: _____ Topic: _____	0 1 2	

## Warm-up:

Emma is kayaking from Island to Island. To island B from island A, she travels on a bearing of  $124^\circ$  for 5 km.  $S \approx 2.8 \text{ km}$   $E \approx 4.2 \text{ km}$

a) How far East and South did she travel? km



$$\cos 56 = \frac{S}{5}$$

$$S = 5 \cos 56^\circ$$

$$S \approx 2.8 \text{ km}$$

$$\tan 34 = \frac{2.8}{E}$$

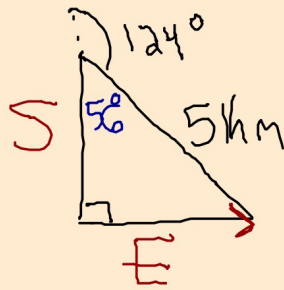
$$E = \frac{2.8}{\tan 34} \approx 4.2$$



## Warm-up:

Emma is kayaking from Island to Island. To island B from island A, she travels on a bearing of  $124^\circ$  for 5 km.

a) How far East and South did she travel?



$$\sin 56 = \frac{E}{5}$$

$$E = 5 \sin 56^\circ$$

$$\cos 56 = \frac{S}{5}$$

$$S = 5 \cos 56$$

South  $\approx 2.8$  km

East  $\approx 4.2$  km



## Class Plan:

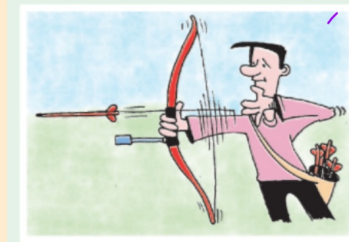
1. Warm-up
2. Mathematician Monday
3. Homework Questions?
4. Trigonometry Applications
5. Handback Quiz 3.1 - Similarity

## Unit 3: Similarity & Trigonometry

### Do: Review Set A/B WS

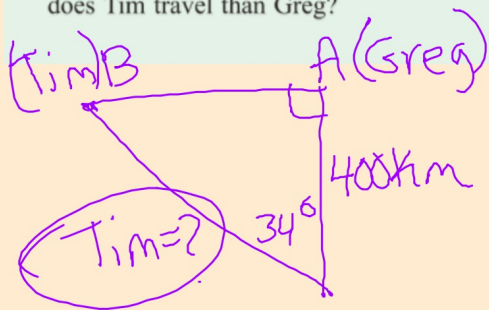
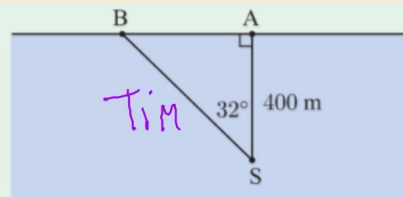
Get back into the swing of things!

We will come back together with  
15-20 minutes left to go over the  
Similarity Quiz.



Done? Work on other exercises.

- 8 Two sea kayakers Greg and Tim start 400 m from shore, at point S. Greg kayaks directly to the shore at point A, while Tim travels at an angle of  $32^\circ$  to reach the shore at point B. How much further does Tim travel than Greg?

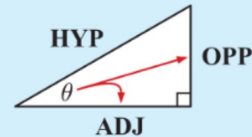


$$\cos 32 = \frac{400}{X}$$

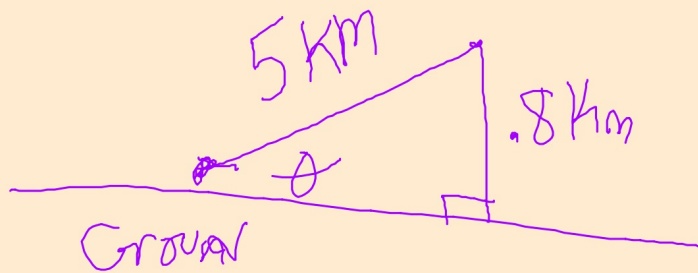
$$\frac{400}{\cos 32} = \frac{X(\cos 32)}{\cos 32}$$

In any right angled triangle with one angle  $\theta$ , we have:

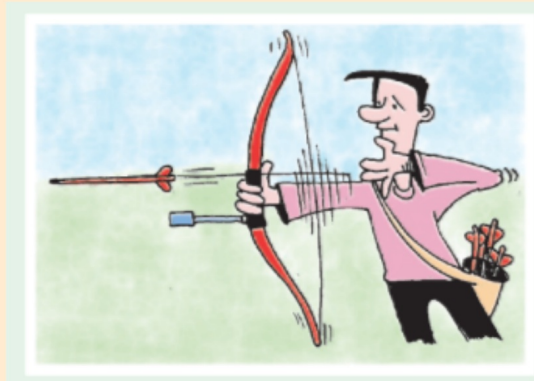
$$\sin \theta = \frac{\text{OPP}}{\text{HYP}}, \quad \cos \theta = \frac{\text{ADJ}}{\text{HYP}}, \quad \tan \theta = \frac{\text{OPP}}{\text{ADJ}}$$



- 9 A cyclist travels for 5 km up a steady incline. In that time she climbs a vertical distance of 800 m. Find the angle of the incline.

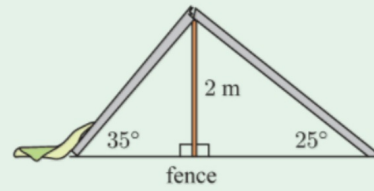


- 10** An archer standing 30 m away from a target, fires an arrow at the bullseye, but misses to the right by 20 cm. By what angle was the archer off target?

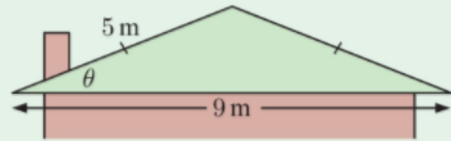




- 11** During a storm, a flagpole falls and breaks over a fence, as shown. How tall was the flagpole?



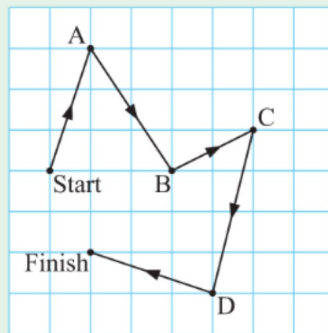
**7** Find the pitch  $\theta$  of the roof alongside.



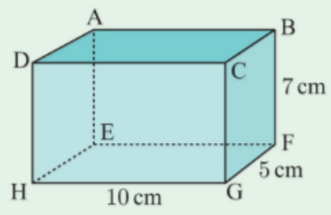
**12** A boat sails 50 km on the bearing  $054^\circ$ . How far is the ship north of its starting point?

**13** The course for a yachting race is shown alongside. Each grid unit represents 1 km. Find the distance and true bearing from:

- a** the start to A
- b** A to B
- c** B to C
- d** C to D
- e** D to the finish.



**14**

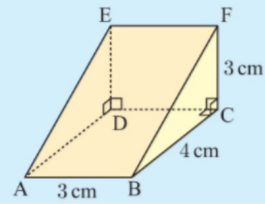


- a** Find the length of [EG].
- b** Find the angle between [AG] and [EG].

**Example 9**

The figure alongside shows a triangular prism.

- a Find the length of  $[AC]$ .
- b Find the angle between  $[AC]$  and  $[AF]$ .



## Answers

$7 \approx 0.585 \text{ m}$

$8 \approx 71.7 \text{ m}$

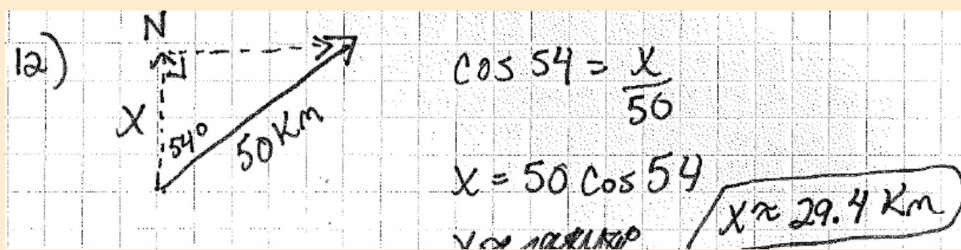
$9 \approx 9.21^\circ$

$10 \approx 0.382^\circ$

$11 \approx 8.22 \text{ m}$

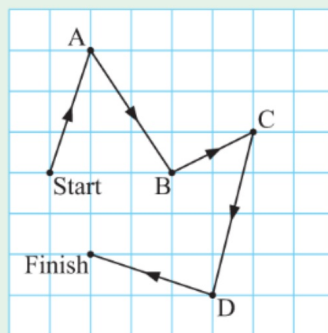
$12 \approx 29.4 \text{ km}$

**12** A boat sails 50 km on the bearing 054°. How far is the ship north of its starting point?



**13** The course for a yachting race is shown alongside. Each grid unit represents 1 km. Find the distance and true bearing from:

- a** the start to A
- b** A to B
- c** B to C
- d** C to D
- e** D to the finish.



$$13) \overline{SA} = \sqrt{10} \approx 3.16 \text{ Km}$$

$$\theta = \tan^{-1}\left(\frac{1}{3}\right) \approx 18^\circ$$

$$\overline{AB} = \sqrt{13} \approx 3.61$$

$$\theta = \tan^{-1}\left(\frac{3}{2}\right) + 90^\circ \approx 146^\circ$$

$$\overline{BC} = \sqrt{5} \approx 2.24 \text{ Km}$$

$$\theta = \tan^{-1}(2) \approx 63^\circ$$

$$\overline{CD} = \sqrt{17} \approx 4.12 \text{ Km}$$

$$\theta = \tan^{-1}\left(\frac{1}{4}\right) + 180^\circ \approx 194^\circ$$

$$\overline{DF} = \sqrt{10} \approx 3.16 \text{ Km} \quad \theta = \tan^{-1}\left(\frac{1}{4}\right) + 180^\circ$$

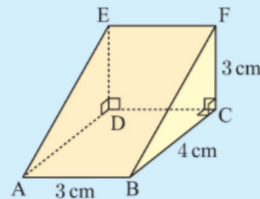
$$\theta = 270^\circ + \tan^{-1}\left(\frac{1}{3}\right) \approx 288^\circ$$



### Example 9

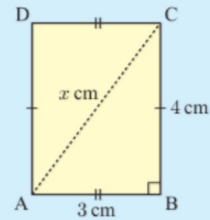
The figure alongside shows a triangular prism.

- Find the length of [AC].
- Find the angle between [AC] and [AF].



- Consider the base ABCD.  
Let [AC] have length  $x$  cm.

Using Pythagoras' theorem,  $x^2 = 3^2 + 4^2$   
 $\therefore x^2 = 25$   
 $\therefore x = 5$  {as  $x > 0$ }  
 $\therefore AC = 5$  cm



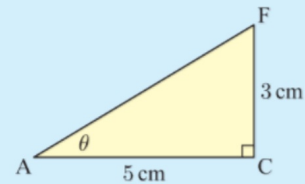
- Consider  $\triangle ACF$ .  
Let the angle between [AC] and [AF] be  $\theta$ .

Now  $\tan \theta = \frac{3}{5}$  {  $\tan \theta = \frac{\text{OPP}}{\text{ADJ}}$  }

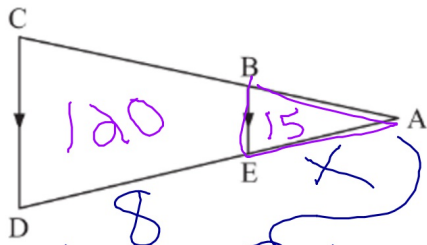
$$\therefore \theta = \tan^{-1} \left( \frac{3}{5} \right)$$

$$\therefore \theta \approx 30.96$$

$\therefore$  the angle between [AC] and [AF] is about  $31.0^\circ$ .



4. In the given figure,  $DE = 8$  m.  $\triangle BAE$  has area  $15 \text{ m}^2$ ,  $CBED$  has area  $120 \text{ m}^2$ . Find the length of  $AE$ .



Area of  $\triangle ADC$   
 $= 135 \text{ m}^2$

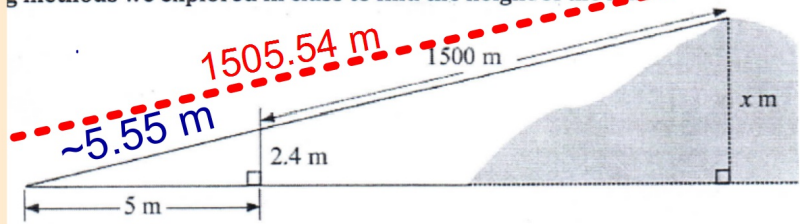
area  
 $\frac{15}{135} = \frac{1}{9}$

$\rightarrow$

Side
$\frac{1}{3} = \frac{x}{x+8}$

## What is the mistake?

... of the hill is 1500 m (as measured by laser equipment). Diagram NOT to scale.  
... g methods we explored in class to find the height of the hill.



$$\frac{1505.54}{1500.00} = \frac{x}{2.4}$$

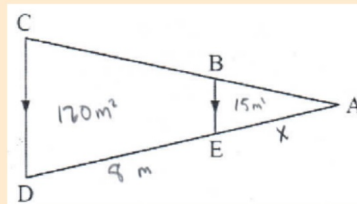
Should be 5.54  
(hypotenuse of  
**small**  $\Delta$ )

$$\frac{2.4}{5.55} = \frac{x}{1500}$$

Should be 1505.54  
(hypotenuse of  
**large**  $\Delta$ )

## What is the mistake?

4. In the given figure,  $DE = 8\text{ m}$ .  $\triangle BAE$  has area  $15\text{ m}^2$ ,  $CBED$  has area  $120\text{ m}^2$ .



$$\frac{15\text{ m}^2}{135\text{ m}^2} = \frac{x\text{ m}}{8+x\text{ m}}$$

$$\frac{\sqrt{15}}{\sqrt{135}} = \frac{3.87}{10.95}$$

$$\frac{8}{135} = \frac{x}{15}$$

Didn't take square root of  $15/135$ . Compared 2 dimensions with 1 dimension.

Didn't find area of large  $\triangle$ . Compared small  $\triangle$  with a trapezoid.

Didn't take square root of  $15/135$ . Didn't recognize the length of AD as " $x + 8$ ".

**Exercises:**

1) Correct mistakes from quiz  
(Exemplars are posted online)

**Quiz 3.2: Friday 12 - 1**

2) Finish Review set A/B  
handout