

Welcome Back MYP Math 9!

	Assignment Effort Grade (Circle One)	Comments (What was interesting or challenging?)
Monday Date: <u>11/13</u> Topic: <u>20E Problem Solving</u>	0 1 2	
Tuesday Date: <u>11/14</u> Topic: <u>Quiz 3.1 Review</u>	0 1 2	
Wednesday Date: <u>11/15</u> Topic: <u>Quiz 3.1 - No homework</u>	0 1 2	
Thursday Date: <u>11/16</u> Topic: <u>13A Parts of a right triangle</u>	0 1 2	
Friday Date: _____ Topic: _____	0 1 2	

ADVISORY BELL SCHEDULE (w/3 lunches)

Lunch A		
1st Hour	8:05-8:48	43 minutes
2nd Hour	8:53-9:36	43 minutes
Advisory	9:41-10:25	44 minutes
3rd Hour	10:30-11:13	43 minutes
Lunch A	11:18-11:48	30 minutes
4th Hour (Late)	11:53-12:36	43 minutes
5th Hour (Late)	12:41-1:24	43 minutes
6th Hour	1:29-2:12	43 minutes
7th Hour	2:17-3:00	43 minutes

Lunch B		
1st Hour	8:05-8:48	43 minutes
2nd Hour	8:53-9:36	43 minutes
Advisory	9:41-10:25	44 minutes
3rd Hour	10:30-11:13	43 minutes
4th Hour (Early)	11:18-12:01	43 minutes
Lunch B	12:06-12:36	30 minutes
5th Hour (Late)	12:41-1:24	43 minutes
6th Hour	1:29-2:12	43 minutes
7th Hour	2:17-3:00	43 minutes

Lunch C		
1st Hour	8:05-8:48	43 minutes
2nd Hour	8:53-9:36	43 minutes
Advisory	9:41-10:25	44 minutes
3rd Hour	10:30-11:13	43 minutes
4th Hour (Early)	11:18-12:01	43 minutes
5th Hour (Early)	12:06-12:49	43 minutes
Lunch C	12:54-1:24	30 minutes
6th Hour	1:29-2:12	43 minutes
7th Hour	2:17-3:00	43 minutes

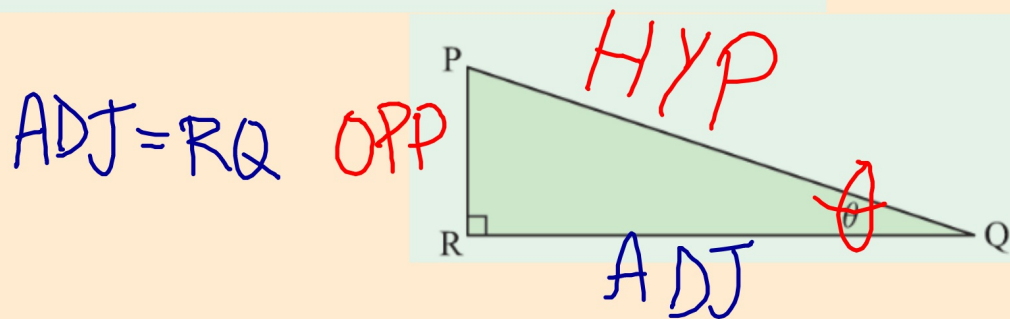
Class Plan:

1. Warm-up
2. Investigate Trigonometry Ratios
3. Joke Break
4. Practice!

Warm-up

For the triangle alongside, name the:

- a** hypotenuse PQ **b** side opposite angle θ PR






What else can we name??

Investigate!

1) Whole group, 1 - 3

2) **Do:** Part 4 (Complete **table 1**)

Table 1 Most common Trigonometric Ratios			
$\frac{\textit{opposite}}{\textit{hypotenuse}}$			
$\frac{\textit{adjacent}}{\textit{hypotenuse}}$			
$\frac{\textit{opposite}}{\textit{adjacent}}$			

3) **Part 5:** Whole Group: Define ratios

4) Practice, Apply trigonometric ratios!

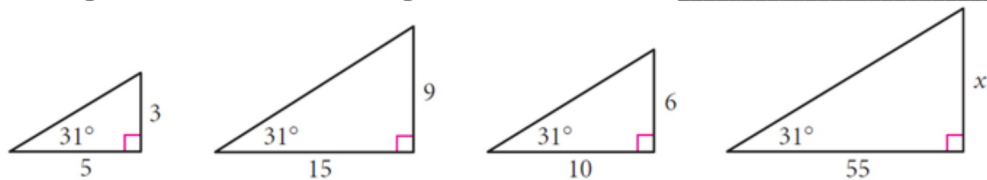
Investigate!

1) Whole group, 1 - 3

MYP 9 Trigonometric Ratios

Investigation

Name _____



1. The four triangles above are similar. Which corresponding pairs of angles show the similarity?

31° and 90°

2. What is a fair approximation of x? Explain your reasoning.

$$\frac{10}{55} \neq \frac{6}{x}$$

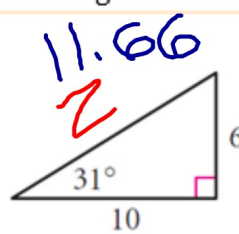
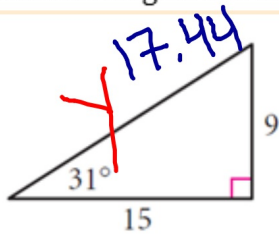
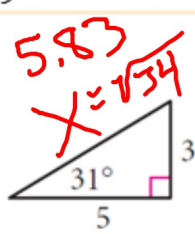
$$10x = 55(6)$$
$$\frac{10x}{10} = \frac{330}{10}$$

$$x = 33$$

Investigate!

1) Whole group, 1 - 3

3. Solve for the hypotenuse lengths and label the triangles in the table below.

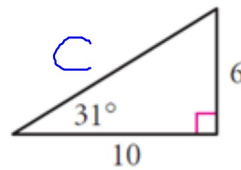
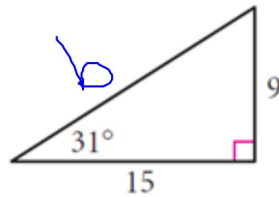
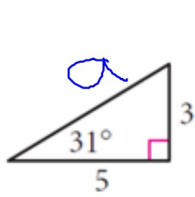


$$3^2 + 5^2 = X^2$$
$$9 + 25 = X^2$$
$$34 = X^2$$

Investigate!(Solutions)

1) Whole group, 1 - 3

3. Solve for the hypotenuse lengths and label the triangles in the table below.



$$\begin{aligned}a^2 &= 3^2 + 5^2 \\a^2 &= 9 + 25 \\a^2 &= 34 \\a &= \sqrt{34}\end{aligned}$$

$$a \approx 5.83$$

$$\begin{aligned}b^2 &= 9^2 + 15^2 \\b^2 &= 81 + 225 \\b^2 &= 306 \\b &= \sqrt{306}\end{aligned}$$

$$b \approx 17.49$$

$$\begin{aligned}c^2 &= 6^2 + 10^2 \\c^2 &= 36 + 100 \\c^2 &= 136 \\c &= \sqrt{136}\end{aligned}$$

$$c \approx 11.66$$

Investigate (Solutions)

Using exact radicals for the hypotenuses!

M.P. 9 Trigonometric Ratios Investigation Name _____

1. The four triangles above are similar. Which corresponding pairs of angles show the similarity?

$\angle 31^\circ = \angle 31^\circ$ $90^\circ = 90^\circ$

2. What is a fair approximation of x ? Explain your reasoning.

$\frac{3}{5} = \frac{x}{55}$ $5x = 3(55)$ $5x = 165$ $x = 33$

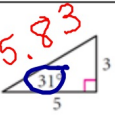
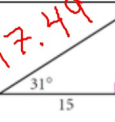

3. Solve for the hypotenuse lengths and label the triangles in the table below.
 [Challenge: Write the hypotenuses in **exact radical form**. What patterns do you notice?]

$a = \sqrt{3^2 + 5^2}$	$c = \sqrt{6^2 + 10^2}$	$d = \sqrt{55^2 + 33^2}$	} All multiples of $\sqrt{34}$!
$a = \sqrt{34}$	$c = \sqrt{36 + 100}$	$d = \sqrt{3025 + 1089}$	
$b = \sqrt{9^2 + 15^2}$	$c = \sqrt{136}$	$d = \sqrt{4114}$	
$b = \sqrt{81 + 225}$	$c = \sqrt{4 \cdot 34}$	$d = \sqrt{121 \cdot 34}$	
$b = \sqrt{306} = 3\sqrt{34}$	$c = 2\sqrt{34}$	$d = 11\sqrt{34}$	

Investigate!

2) Do: Part 4 (Complete table 1)

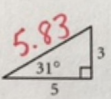
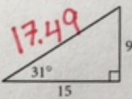
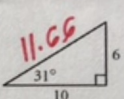
4. Solve for the ratios of the side lengths, in relation to the 31 degree angle. Round to the nearest 0.01

Table 1 Most common Trigonometric Ratios			
$\frac{\textit{opposite}}{\textit{hypotenuse}}$	$\frac{3}{5.83} \approx .51$		
$\frac{\textit{adjacent}}{\textit{hypotenuse}}$	$\frac{5}{5.83} \approx .86$		
$\frac{\textit{opposite}}{\textit{adjacent}}$	$\frac{3}{5} = .6$		

Investigate (Solutions)

2) Do: Part 4 (Complete table 1)

4. Solve for the ratios of the side lengths, in relation to the 31 degree angle. Round to the nearest 0.01

Table 1 Most common Trigonometric Ratios			
$\sin \theta = \frac{\text{opposite}}{\text{hypotenuse}}$	$\frac{3}{5.83} \approx .515$	$\frac{9}{17.49} \approx .515$	$\frac{6}{11.66} \approx .515$
$\cos \theta = \frac{\text{adjacent}}{\text{hypotenuse}}$	$\frac{5}{5.83} \approx .86$	$\frac{15}{17.49} \approx .86$	$\frac{10}{11.66} \approx .86$
$\tan \theta = \frac{\text{opposite}}{\text{adjacent}}$	$\frac{3}{5} = .6$	$\frac{9}{15} = .6$	$\frac{6}{10} = .6$

Investigate!

3) Part 5: Whole Group: Define ratios

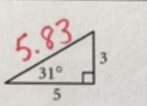
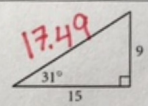
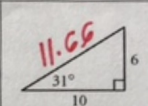
5. Use your resources to label sine, cosine, and tangent ratios in **column 1** of the table.

Name	Abbreviation	Ratio
Sine	Sin	$\text{Sin}\angle\theta = \frac{\text{Opposite}}{\text{Hypotenuse}}$ <i>opp hyp</i>
Cosine	Cos	$\text{Cos}\angle\theta = \frac{\text{Adjacent}}{\text{Hypotenuse}}$ <i>adj hyp</i>
Tangent	Tan	$\text{Tan}\angle\theta = \frac{\text{Opposite}}{\text{Adjacent}}$ <i>opp adj.</i>

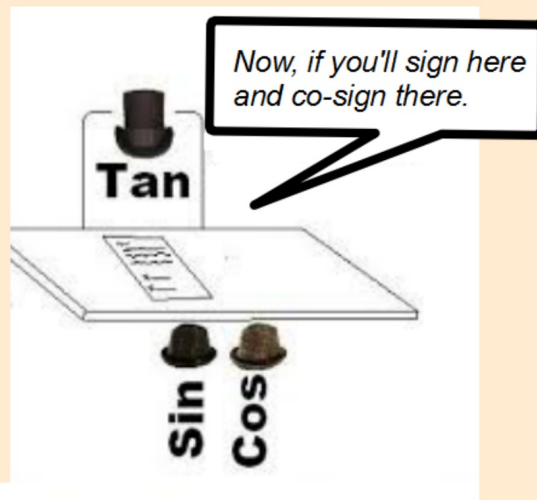
Investigate!(Solutions)

3) Label the ratios in the table(s) with the **correct** trig. ratio.

4. Solve for the ratios of the side lengths, in relation to the 31 degree angle. Round to the nearest 0.01

Table 1 Most common Trigonometric Ratios			
Sine = $\frac{\text{opposite}}{\text{hypotenuse}}$	$\frac{3}{5.83} \approx .515$	$\frac{9}{17.49} \approx .515$	$\frac{6}{11.66} \approx .515$
Cosine = $\frac{\text{adjacent}}{\text{hypotenuse}}$	$\frac{5}{5.83} \approx .86$	$\frac{15}{17.49} \approx .86$	$\frac{10}{11.66} \approx .86$
Tangent = $\frac{\text{opposite}}{\text{adjacent}}$	$\frac{3}{5} = .6$	$\frac{9}{15} = .6$	$\frac{6}{10} = .6$

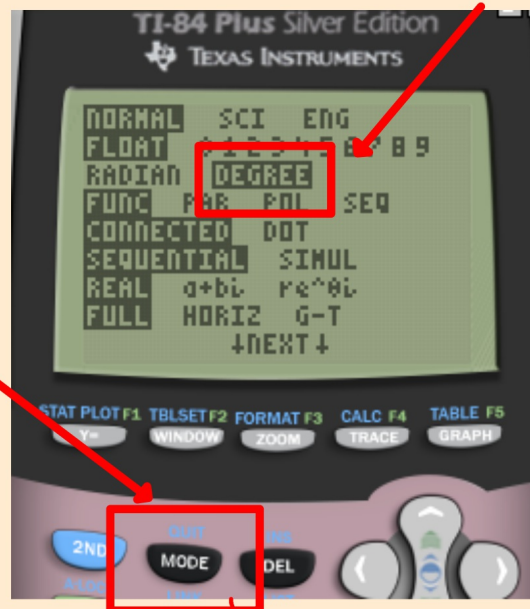
Joke break!



$$\frac{\sin(\text{gerine})}{\cos(\text{gerine})} = \text{orange}$$

Using Right Triangle Trigonometry

MODE: DEGREE



4) Practice, Apply trigonometric ratios!

1) Use your calculator. Find the sin, cos, and tan keys on your calculator.

a) Calculate: $\sin 31^\circ =$ _____

$\cos 31^\circ =$ _____

$\tan 31^\circ =$ _____

b) Defend the accuracy of your estimations of $\sin 31^\circ$, $\cos 31^\circ$, and $\tan 31^\circ$, calculated in the tables above.

4) Practice, Apply trigonometric ratios! Solutions

1) Use your calculator. Find the sin, cos, and tan keys on your calculator.

a) Calculate: $\sin 31^\circ = \underline{0.515}$

$\cos 31^\circ = \underline{0.857}$

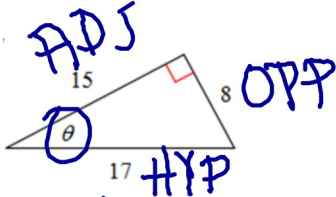
$\tan 31^\circ = \underline{0.601}$

b) Defend the accuracy of your estimations of $\sin 31^\circ$, $\cos 31^\circ$, and $\tan 31^\circ$, calculated in the tables above.

The values are the same!
The rounding reduces the accuracy, but values are REALLY close!

4) Practice, Apply trigonometric ratios!

a) Find the ratios of $\sin \theta$, $\cos \theta$, and $\tan \theta$

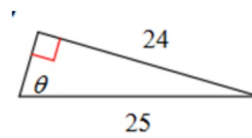


$$\sin \theta = \frac{\text{Opposite}}{\text{Hypotenuse}} = \frac{8}{17}$$

$$\cos \theta = \frac{\text{Adjacent}}{\text{Hypotenuse}} = \frac{15}{17}$$

$$\tan \theta = \frac{\text{Opposite}}{\text{Adjacent}} = \frac{8}{15}$$

b) **Challenge:** Solve for the missing **leg**. Then find $\sin \theta$, $\cos \theta$, and $\tan \theta$



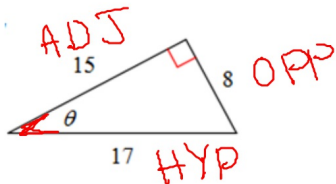
$$\sin \theta = \frac{\text{Opposite}}{\text{Hypotenuse}} = \frac{24}{25}$$

$$\cos \theta = \frac{\text{Adjacent}}{\text{Hypotenuse}} = \frac{7}{25}$$

$$\tan \theta = \frac{\text{Opposite}}{\text{Adjacent}} = \frac{24}{7}$$

4) Practice, Apply trigonometric ratios! Solutions

a) Find the ratios of $\sin \theta$, $\cos \theta$, and $\tan \theta$

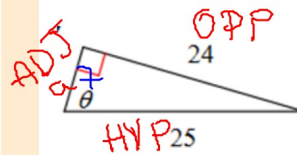


$$\sin \theta = \frac{8}{17}$$

$$\cos \theta = \frac{15}{17}$$

$$\tan \theta = \frac{8}{15}$$

b) **Challenge:** Solve for the missing **leg**. Then find $\sin \theta$, $\cos \theta$, and $\tan \theta$



$$a^2 + 24^2 = 25^2$$
$$a^2 + 576 = 625$$
$$a^2 = 49$$

$$a = 7$$

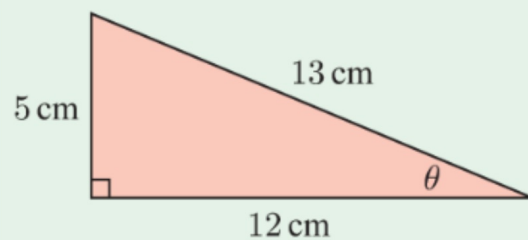
$$\sin \theta = \frac{24}{25}$$

$$\cos \theta = \frac{7}{25}$$

$$\tan \theta = \frac{24}{7}$$

Exit ticket: Show in notebook

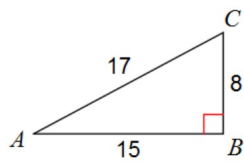
Find $\sin \theta$, $\cos \theta$, and $\tan \theta$ for the given triangle.



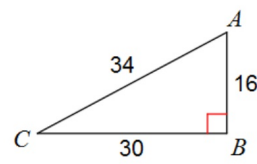
Exercises: Trigonometric
Ratios Worksheet
After-school help: W124

Find the value of each trigonometric ratio.

1) $\sin A$

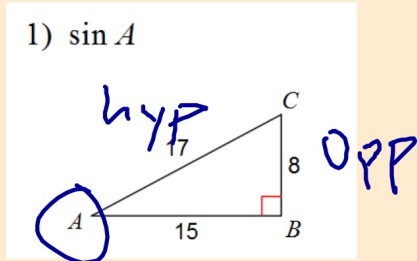


2) $\cos C$



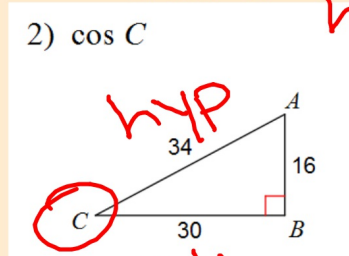
Find the value of each trigonometric ratio.

1) $\sin A$



$$\sin(A) = \frac{8}{17}$$

2) $\cos C$



adj

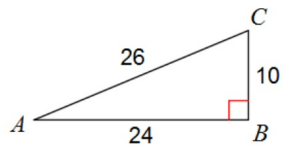
$$\cos C = \frac{30}{34}$$

$$\cos C = \frac{15}{17}$$

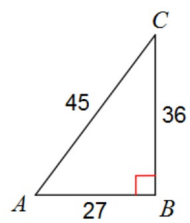
$$\cos C = \frac{\text{adj}}{\text{hyp}}$$

Find the value of each trigonometric ratio.

3) $\tan A$

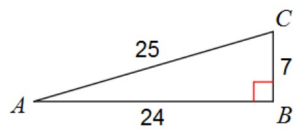


4) $\sin A$

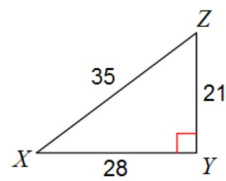


Find the value of each trigonometric ratio.

5) $\tan A$

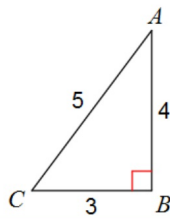


6) $\cos X$

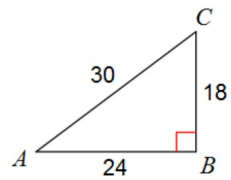


Find the value of each trigonometric ratio.

7) $\cos C$



8) $\sin A$



Find the value of each trigonometric ratio to the nearest ten-thousandth.

9) $\sin 11^\circ$

10) $\tan 26^\circ$

11) $\cos 86^\circ$

12) $\sin 58^\circ$

Trigonometric Ratios Solutions

Answers to Trigonometric Ratios (ID: 1)

1) $\frac{8}{17}$

2) $\frac{15}{17}$

3) $\frac{5}{12}$

4) $\frac{4}{5}$

5) $\frac{7}{24}$

6) $\frac{4}{5}$

7) $\frac{3}{5}$

8) $\frac{3}{5}$

9) 0.1908

10) 0.4877

11) 0.0698

12) 0.8480