

Welcome Back MYP Math 9!

	Assignment Effort Grade (Circle One)	Comments (What was interesting or challenging?)
Monday Date: 12/4 Topic: No homework - Quiz 3.2 on Friday	0 1 2	
Tuesday Date: _____ Topic: _____	0 1 2	
Wednesday Date: _____ Topic: _____	0 1 2	
Thursday Date: _____ Topic: _____	0 1 2	
Friday Date: _____ Topic: _____	0 1 2	

Class Plan

1. Warm-up

2. "Cat in a Tree" Application Problem

3. Using Trigonometry ...

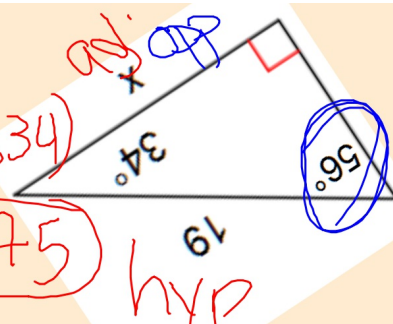
"Create Your Own Real Life Application"



Warm-up: Solve for x .

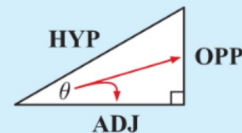
$$\cos(34) = \frac{x}{19} \quad x = 19(\cos 34) \\ x \approx 15.75$$

$$\sin(56) = \frac{x}{19} \quad x = 19(\sin 56) \approx 15.75$$



In any right angled triangle with one angle θ , we have:

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





Max & Charlie

Ferris



Charlie

Cat in a Tree

On a nice sunny day, Ms. Berg decided to take her cat Zoey on a walk. It was a lovely walk with frequent breaks to roll, lay, and soak up the fall day. Suddenly, Zoey jumped up and bolted, so Ms. Berg lost control of the leash! Then, Zoey ran up a tree!

Ms. Berg could see her kitty, but did not know how high up Zoey was, or how long of a ladder she would need to reach her. She was able to use an *inclinometer*, and measure the angle from the ground to where Zoey was in the tree. The angle was 72 degrees. Then she used a measuring tape to measure the 6.5 foot distance from where she stood to the base of the tree.

Diagram



Questions:

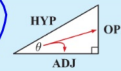
1. How high up is Zoey in the tree?
2. How long of a ladder is needed to get her down?
3. Why are you able to use your methods of solving?
4. Is this a realistic method of solving?
5. Is your solution accurate?
6. Does your solution make sense in the real life context?

Questions 3-6

Zoey ran up a tree!

In any right angled triangle with one angle θ , we have:

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



Ms. Berg measured the angle from the ground to where Zoey was. The angle was 72° .

She used a measuring tape to measure the 6.5 ft distance from where she stood to the base of the tree.

1. How high up is Zoey?

Diagram



$$\begin{aligned} & \text{(opp)} h \\ & \begin{array}{c} \text{72}^\circ \\ \text{6.5 (adj)} \end{array} \\ \tan(\theta) &= \frac{h}{6.5} \end{aligned}$$

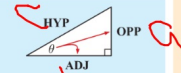
$$h = 6.5(\tan(72)) \approx \boxed{20 \text{ ft}}$$



Zoey ran up a tree!

In any right angled triangle with one angle θ , we have:

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



Ms. Berg measured the angle from the ground to where Zoey was. The angle was 72° .

She used a measuring tape to measure the 6.5 ft distance from where she stood to the base of the tree.

2. How long must the ladder be?

Diagram



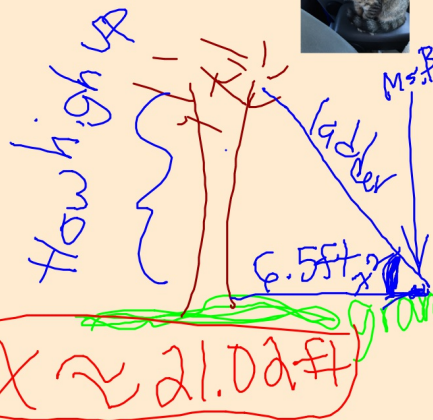
(opp) h
 20

ladder x

72°

6.5 (adj)

$$6.5^2 + 20^2 = x^2$$
$$42.25 + 400 = x^2$$
$$442.25 = x^2$$



$x \approx 21.02 \text{ ft}$

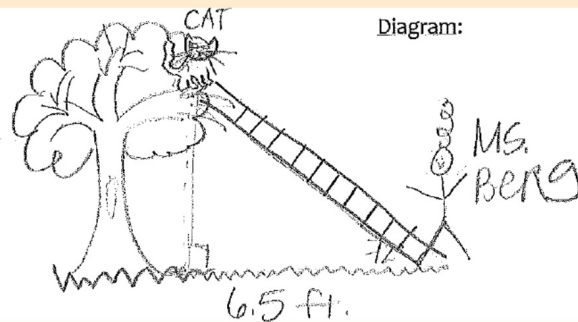
Standard Exemplar

Cat in a Tree

EXEMPLAR

On a nice sunny day, Ms. Berg decided to take her cat Zoey on a walk. It was a lovely walk with frequent breaks to roll, lay, and soak up the fall day. Suddenly, Zoey jumped up and bolted, so Ms. Berg lost control of the leash! Then, Zoey ran up a tree!

Ms. Berg could see her kitty, but did not know how high up Zoey was, or how long of a ladder she would need to reach her. She was able to use an *inclinometer*, and measure the angle from the ground to where Zoey was in the tree. The angle was 72 degrees. Then she used a measuring tape to measure the 6.5 foot distance from where she stood to the base of the tree.

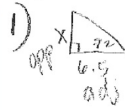


Standard Exemplar

Questions:

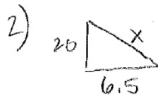
Solving

1. How high up is Zoey in the tree?
2. How long of a ladder is needed to get her down?
3. Why are you able to use your methods of solving?
4. Is this a realistic method of solving for real life?
5. Is your solution accurate?
6. Does your solution make sense in the real life context?



$$\tan 72^\circ = \frac{x}{6.5} \quad x = 6.5 \cdot \tan 72^\circ$$
$$x \approx 20 \text{ feet}$$

Zoey is approx. 20 feet up the tree.



$$20^2 + 6.5^2 = x^2$$
$$400 + 42.25 = x^2$$
$$\sqrt{442.25} = \sqrt{x^2}$$
$$\boxed{21 \text{ ft} \approx x}$$

The ladder must be about 21 ft long.

Standard Exemplar

3. I used right triangle trigonometric ratios because a right triangle was formed (trees typically grow perpendicular, or at a 90° angle) with the ground. I specifically used the tangent ratio, as the height of the tree is opposite the given angle, and the distance from Ms. Berg to the tree is adjacent (next to) the angle.

Standard Exemplar

4. IF I HAD AN ANGLE MEASURING DEVICE,
THIS METHOD IS POSSIBLE. THERE ARE
PHONE APPLICATIONS OF INCLINOMETERS.
THERE IS ALWAYS HUMAN ERROR! (I WOULD
PROBABLY CALL THE FIRE DEPT.)

5. IF MS. BERG'S ACCURATELY MEASURED -
THE SOLUTIONS SHOULD BE FAIRLY ACCURATE.
HOWEVER, I DID ROUND MY SOLUTIONS.

Check work with a calculator.

Standard Exemplar

6. I believe a cat could climb 20 feet. That is failure tall for a tree (over 3 times my height). Twenty one feet is a long ladder - I would not want to be this high up.

"Create Your Own Application"

Due: Wednesday Dec. 6th

Criterion D: Real Life

Create Your Own Real World Application

Task:

1. Create a scenario involving trigonometry. Include a diagram of the scenario.
2. Create questions involving your travels/your scenario... be creative!
 - a. Include right triangle trigonometry to find an unknown angle and unknown length or the Sine Rule to find an unknown angle and unknown length.
 - b. Reflection of methods used. *Are they realistic?*
 - c. Reflection of solution. *Is it accurate? Does it make sense in the real-life context?*
3. Create a key/solution to your problem

In short...

1. Create Triangle (in real life).
2. Write Questions.
3. Write Solutions to your questions!
(Use Exemplar & Crit. D Rubric to help you!)

When Done: Self Assess

Criterion	IB Level	IB Descriptors (from subject guide)	S	T	Task Descriptors
cs in real-life	0	<ul style="list-style-type: none"> has not reached a standard described by any of the descriptors given below 			<ul style="list-style-type: none"> Work is missing, or... has not reached a standard described by any of the descriptors given below
	1	<ul style="list-style-type: none"> i. identify some of the elements of the authentic real-life situation ii. <u>apply</u> mathematical strategies to find a solution to the authentic real-life situation, with limited success. 			<ul style="list-style-type: none"> Math strategies and the key (<i>solution</i>) is provided with many errors.
	2				<ul style="list-style-type: none"> There is an attempt to create a scenario and form questions.

<p>3</p> <p>4</p>	<ul style="list-style-type: none"> • identify the relevant elements of the authentic real-life situation • ii. select, with some success, adequate mathematical strategies to model the authentic real-life situation • iii. apply mathematical strategies to reach a solution to the authentic real-life situation • iv. <u>discuss</u> whether the solution makes sense in the context of the authentic real-life situation. 	<ul style="list-style-type: none"> • Math strategies include: <ul style="list-style-type: none"> -Create a scenario -Diagram Included -Write question from scenario that requires at least one of the following: <ul style="list-style-type: none"> a. Solving for unknown angle. b. Solving for unknown side length. c. Reflection of method and solution. • A key (<i>solution</i>) is provided with some error. • There is an attempt to explain why the method of solving is realistic. • There is an attempt to attempt to explain whether your scenario is realistic.
-------------------	--	--

5	<ul style="list-style-type: none"> i. identify the relevant elements of the authentic real-life situation ii. select adequate mathematical strategies to model the authentic real-life situation 	
6	<ul style="list-style-type: none"> iii. apply the selected mathematical strategies to reach a valid solution to the authentic real-life situation iv. explain the degree of accuracy of the solution v. explain whether the solution makes sense in the context of the authentic real-life situation. 	<ul style="list-style-type: none"> Math strategies include: <ul style="list-style-type: none"> -Create a scenario -Diagram Included -Write questions from scenario that require the following: <ol style="list-style-type: none"> Solving for unknown angle. Solving for unknown side length. Reflection of method and solution. A key (<i>solution</i>) is provided with little error. Explanation of why the method of solving is realistic. Explanation of whether the scenario is realistic.

7	<ul style="list-style-type: none"> i. identify the relevant elements of the authentic real-life situation ii. select appropriate mathematical strategies to model the authentic real-life situation 		<ul style="list-style-type: none"> Math strategies include: <ul style="list-style-type: none"> -Create a scenario -Diagram Included -Write questions from scenario that require the following: <ul style="list-style-type: none"> a. Solving for unknown angle. b. Solving for unknown side length. c. Reflection of method and solution. A key (<i>solution</i>) is provided without error. Thorough explanation of why the method of solving is realistic. Thorough justification of whether your scenario is realistic.
8	<ul style="list-style-type: none"> iii. Apply the selected mathematical strategies to reach a correct solution to the authentic real-life situation iv. justify the degree of accuracy of the solution v. justify whether the solution makes sense in the context of the authentic real-life situation. 		

Reflect & Self Assess your work

Your Level		Student Reflection:
---------------	--	----------------------------

Exercises...

- Criterion D: Create Your Own Application using Trigonometry

Your Application: Due Wednesday 12/6

Unit 3 Test: Friday 12/8