Week 3	Sunday 1 September
Chapter Three:	Geometry and Trigonometry
Topic:	3.3 Applications of Trigonometry
IB Syllabus:	5.2
Lesson Obj:	Students will find solve problems related to angles of elevation and depression Students will apply principles of trigonometry to 2D figures.

Review and Intro:

0. Vocab on board: sine, cosine, tangent. Homework questions.
1. QUIZ

Core Lesson:

2. Shapes exploration
3. Elevation / Depression exploration

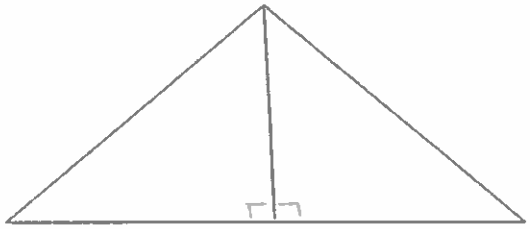
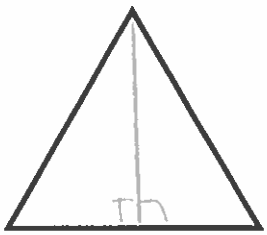
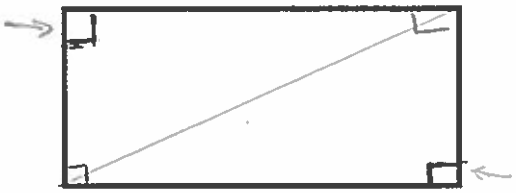
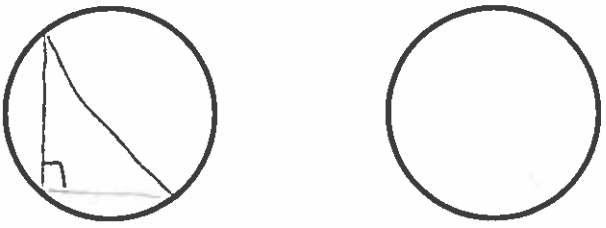
Check for Understanding:

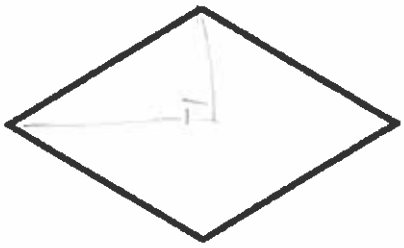
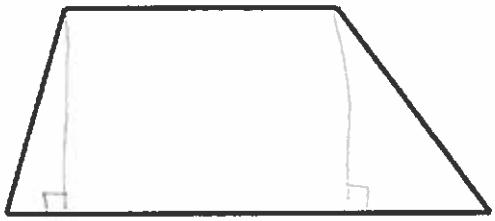
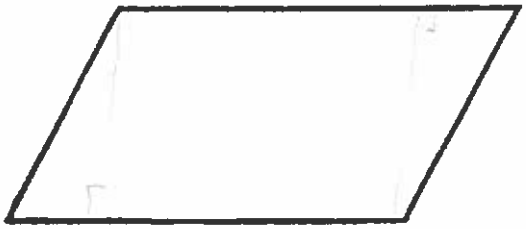
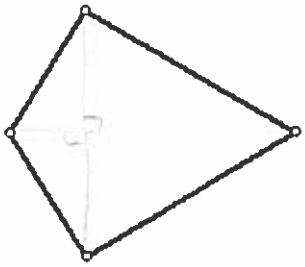
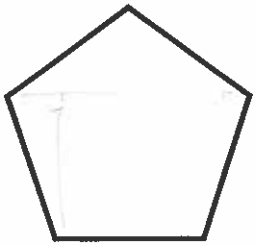
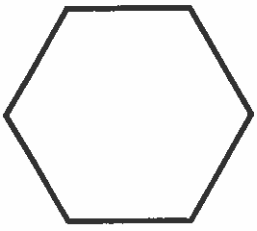
4. Check student work throughout

Assignment: Students will Read 113-119
Students will complete 116-117:1-7 all; 119: 1-7 all

IB Math Studies Year 2

IB Applications of Trigonometry: Geometric Shapes

Name of Shape	Where are the right-angled triangles?
Isosceles Triangle	 more
Equilateral Triangle	 more
Rectangle	
Square	
Circle	 none

Name of Shape	Where are the right-angled triangles?
Rhombus	 None
Trapezoid	 None
Parallelogram	 None
Kite	
Regular Polygon	 

IB Math Studies Year 2

IB Applications of Trigonometry: Angles of Elevation and Depression

Angle of elevation equals Angle of depression

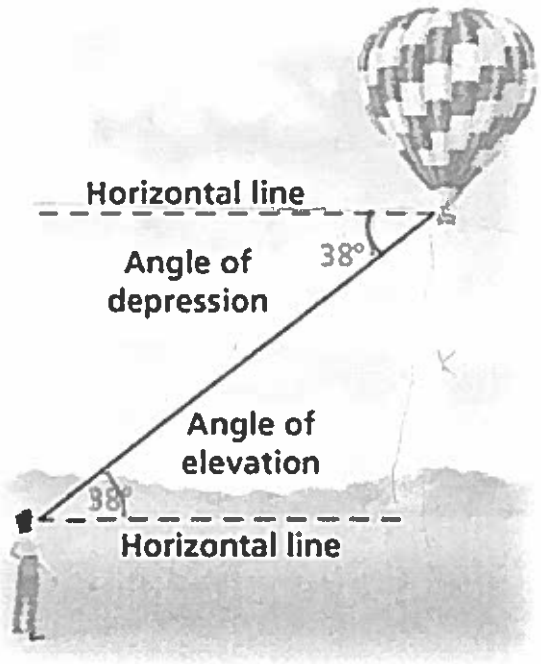
Suppose that you are looking at an object in the distance.

If the object is above you, then the angle of elevation is the angle your eyes look up.

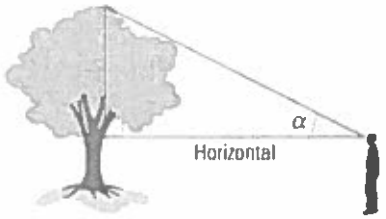
If the object is below you, the angle of depression is the angle your eyes look down.

Angles of elevation and depression are measured from the horizontal.

It is common mistake not to measure the angle of depression from the horizontal.

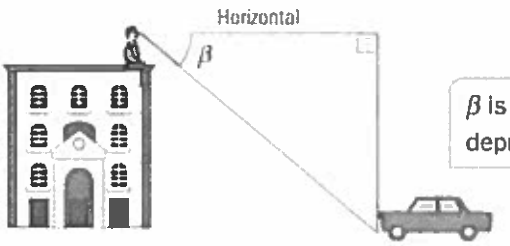


→ The **angle of elevation** is the angle you lift your eyes through to look at something above.



α is the angle of elevation.

→ The **angle of depression** is the angle you lower your eyes through to look at something below.



β is the angle of depression.

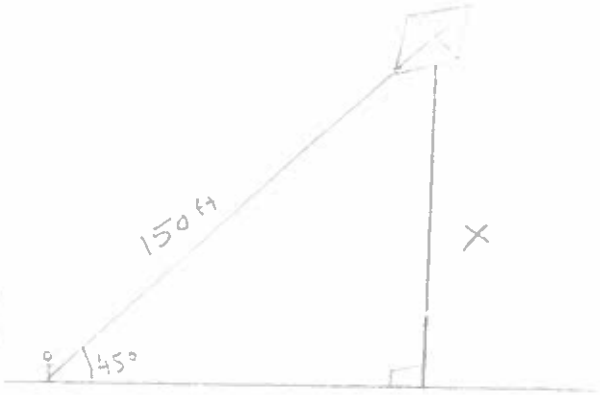
SohCahToa

1. A kite with a string 150 feet long makes an angle of 45° with the ground, Assuming the string is straight, how high is the kite?

$\sin(45) = \frac{x}{150}$

$x = 106.066$

the kite is 106.1 ft high in the sky

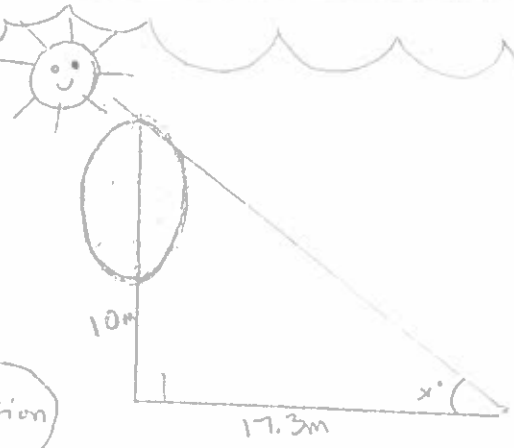


2. A tree 10 meters high casts a 17.3 meter shadow. Find the angle of elevation of the sun.

$\tan(x) = 10/17.3$

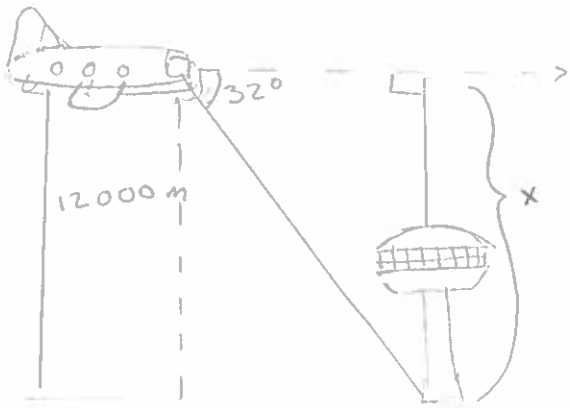
$30.029 = x$

30.1° = angle of elevation of sun



3. A plane is flying at an altitude of 12,000 m. From the pilot, the angle of depression to the airport tower is 32°. How far is the tower from a point directly beneath the plane?

12000m?



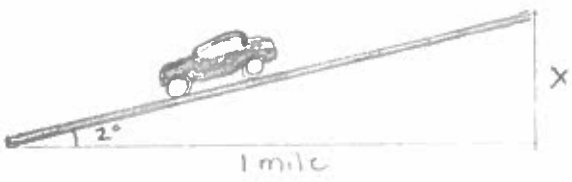
4.. A car is traveling up a slight grade with an angle of elevation of 2°. After traveling 1 mile, what is the vertical change in feet?
(1 mile = 5,280 ft)

$\tan(2) = \frac{x}{1}$

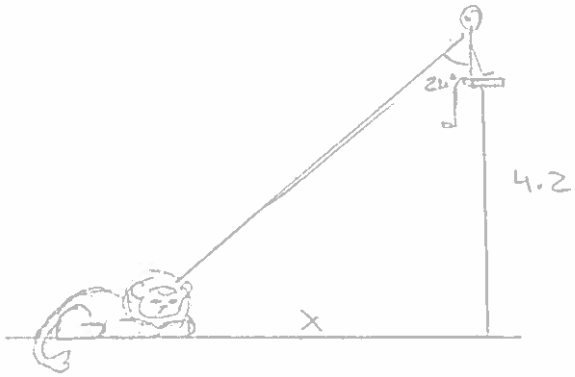
$x = .0349 \text{ miles}$

$\frac{x \text{ ft}}{1 \text{ mile}} = \frac{1 \text{ mile}}{5280 \text{ ft}}$

$x = 1842.72 \text{ ft}$



5. From the top of a fence, a person sights a lion on the ground at an angle of depression of 24°. If the man and the fence is 4.2 meters high, how far is the man from the lion?

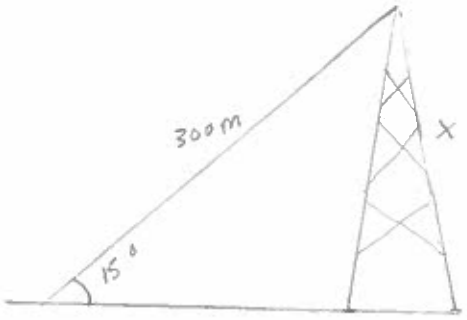


$\tan(24) = \frac{x}{4.2}$

$x = 1.86996$

$x = 1.9$

6. A 300 m cable is attached to the top of an antenna. The angle of elevation to the top of the antenna is 15°. How high is the antenna?

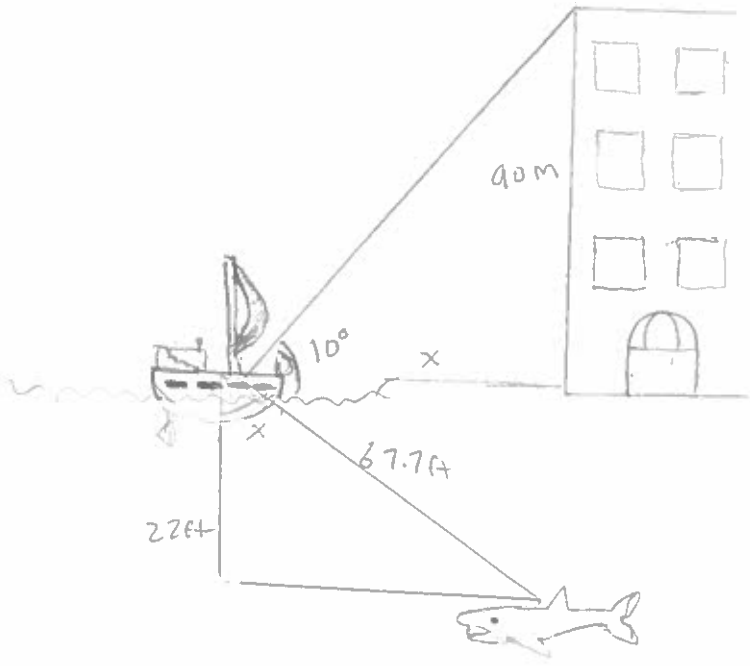


$\sin(15) = \frac{x}{300}$

$x = 77.647$

$x = 77.6m$

7. The angle of elevation from a boat to the top of a 90 meter hotel is 10 °. How far is the boat from the base of the hotel?



$\sin(10) = \frac{90}{x}$

$90 = \sin(10)x$

518.289

518m

8. A great white shark swims 22 feet below sea level. If the shark is 67.7 feet from the sailboat, what is the angle of depression of the boat to the shark?

$\cos(x) = \frac{22}{67.7}$

$x = 71.036$

71.03°