

IM2 Problem Set 2.3 - Applications of the Tangent Ratio

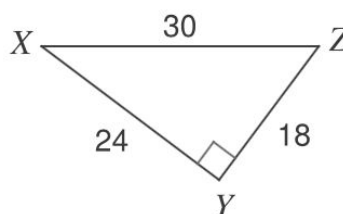
BIG PICTURE of this UNIT:

- How do I determine the measure of angles in geometric shapes, without direct measurement?
- How do I solve for sides or angles in right triangles?
- How can I solve problems that require geometric models using right triangles??

Part 1 - Skills Review

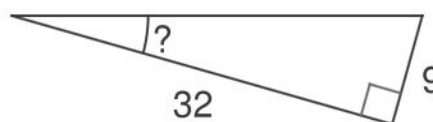
1. For the given triangle, determine:

- a. The tangent **ratio** of angle Z;
- b. The tangent **ratio** of angle X.

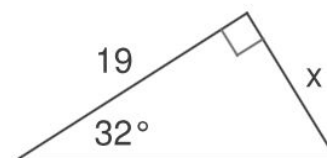


2. For the given triangle, determine:

- a. The measure of the indicated angle;
- b. The length of the third side.



3. For the given triangle, determine the measures of the other two sides of the triangle.



4. Tony's Restaurant is open six days a week. His lunch business income for the first five days of this week are: \$120, \$110, \$200, \$300 and \$140.

- a. Determine the average income for the first five days of this week.
- b. Tony would like to average \$200 for six days this week. How much business income must Tony's Restaurant earn on the sixth day to achieve this average of \$200.

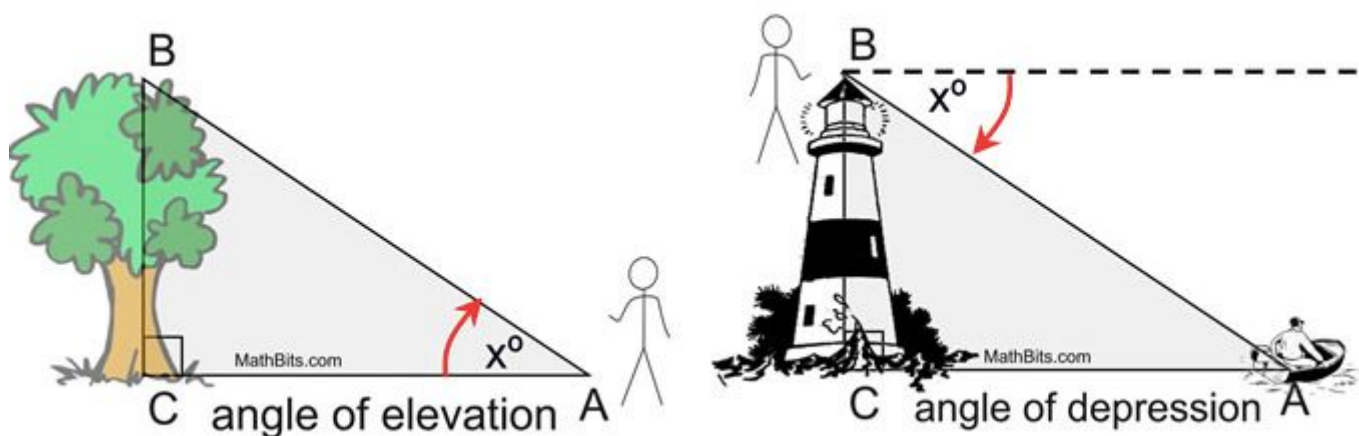
5. The following data set shows the number of accidents per year for drivers who live in Maadi;

- a. Find the mean, median and mode.
- b. Are there any outliers in the data set?
- c. Which measure (median or mean) best reflects the number of accidents per year for a typical driver in Maadi?

Number of Accidents	Number of People
0	6
1	8
2	4
3	1
11	1

Part 2 - Application Problems with the Tangent Ratio

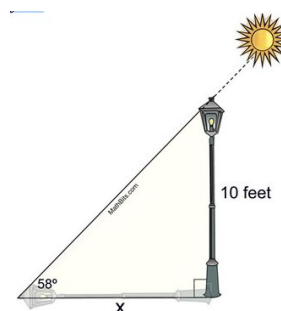
New Terms:



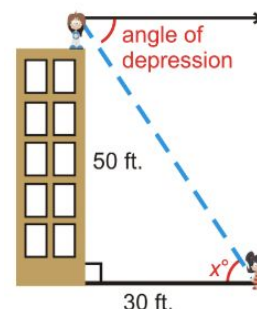
Angle of Elevation \Rightarrow In this diagram, x° marks the **angle of elevation** of the top of the tree as seen from a point on the ground. It is an upward angle from a horizontal line. It is always **inside** the triangle.

Angle of Depression \Rightarrow In this diagram, x° marks the **angle of depression** of the boat at sea from the top of the lighthouse. You can think of the **angle of depression** in relation to the movement of your eyes. You are standing at the top of the lighthouse and you are looking straight ahead. You must lower (*depress*) your eyes to see the boat in the water.

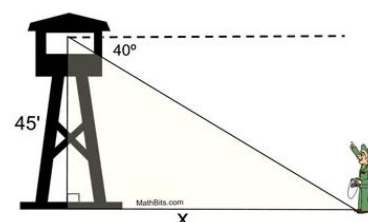
1. Find the length of the shadow cast by a 10 foot lamp post when the angle of elevation of the sun is 58° . Find the length to the *nearest tenth of a foot*



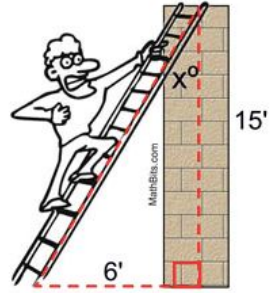
2. Elise is standing on top of a 50 foot building and sees her friend, Molly. If Molly is 30 feet away from the base of the building, what is the angle of depression from Elise to Molly? Elise's eye height is 4.5 feet.



3. From the top of a fire tower, a forest ranger sees his partner on the ground at an angle of depression of 40° . If the tower is 45 feet in height, how far is the partner from the base of the tower, to the *nearest tenth of a foot*?

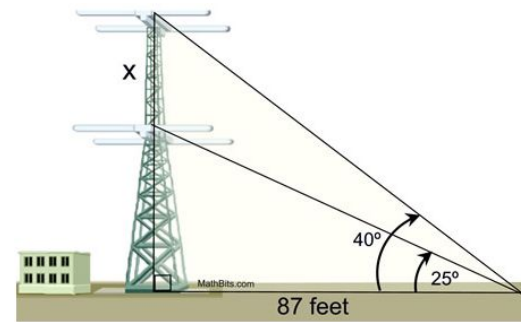


4. A ladder leans against a brick wall. The foot of the ladder is 6 feet from the wall. The ladder reaches a height of 15 feet on the wall.
- Find to the *nearest degree*, the angle the ladder makes with the wall.
 - How long is the ladder?



5. From a point on the ground 96 m from a tree, the angle to the top of the tree is 38 degrees. What is the height of the tree?
6. The angle from the ground to the top of the Statue of Liberty is 7 degrees at a distance of 1220 ft from the building. Find the height of the statue.

7. A radio station tower was built in two sections. From a point 87 feet from the base of the tower, the angle of elevation of the top of the first section is 25° , and the angle of elevation of the top of the second section is 40° . To the *nearest foot*, what is the height of the top section of the tower?



8. Two buildings are 30 meters apart. Mr. R stands on top of one of the buildings - which has a height of 16 meters - and Mr. S stands on top of the other building. Mr. R looks to the other building and sees Mr. S at an angle of elevation of 48° . How tall is the building upon which Mr. S is standing?

9. **(HL Extension - Optional)** You are watching a fireworks display where you are standing 290 feet behind the launch pad. The launch tubes are aimed directly away from you at an angle of 65° with the ground. The angle for you to see the fireworks is 40° . To the nearest foot, what is the height of the fireworks when they explode?

