|  | -How do I determine the measure of angles in geometric shapes, without direct <br> BIG PICTURE of <br> this UNIT: | measurement? |
| :--- | :--- | :--- |
|  | -How do I solve for sides or angles in right triangles? |  |

## Part 1 - Skills Review

1. Solve the following proportions:
a. $\quad \frac{7-x}{5}=\frac{x}{2}$
b. $0.3275=\frac{12}{x-2}$
c. $\frac{2}{8}=\frac{x+4}{x-4}$
2. Determine the equation of a circle whose center is at $(2,-3)$ and that goes through the point $(5,1)$.
3. Go online and find the definition of "tangent to a curve". Then draw a diagram of a circle and a tangent line to this circle.
4. Draw the circle $x^{2}+y^{2}=1$ and draw the line that is tangent to the circle at $(1,0)$.

## Part 2 - Skills \& Concept Practice - The TANGENT RATIO

Our angle - slope ratio relationship has a special name and a special function associated with it - it is called the TANGENT ratio (which we will call tan) and our calculators have the tan function programmed into it.


1. Working with our calculators. Make sure your calculator is in DEGREE mode. Enter the following into your calculator, record what values show up and explain what the values MEAN!!!
a. i) $\tan \left(45^{\circ}\right)$
ii) $\tan \left(30^{\circ}\right)$
iii) $\tan \left(10^{\circ}\right)$
iv) $\tan \left(60^{\circ}\right)$
v) $\tan \left(78^{\circ}\right)$
vi) $\tan \left(90^{\circ}\right)$
b. i) $\tan ^{-1}(1)$
ii) $\tan ^{-1}(0.5)$
iii) $\tan ^{-1}(0.2)$
iv) $\tan ^{-1}(2)$
v) $\tan ^{-1}(4.5)$
vi) $\tan ^{-1}(10)$
2. Given the following diagrams, state the tangent ratio for the specified angle, then determine the measure of the angle as well.

| Angle Z | Angle A | Angle X | Angle Z |
| :---: | :---: | :---: | :---: |
|  |  |  |  |

3. Given the following diagrams, determine the length of the unknown side in the triangle.

|  |  |  |  |
| :---: | :---: | :---: | :---: |
|  |  |  |  |

## Part 3 - Skills \& Concept Applications

1. Determine the horizontal clearance, $x$, required by a wheelchair ramp which is inclined at an angle of $6^{\circ}$, given
 that the ramp needs to rise 3 ft .
2. A flagpole casts a shadow 25 meters long when the angle of elevation of the Sun is $40^{\circ}$. How tall is the flagpole to the nearest meter?

3. A surveyor is finding the width of a river for a proposed bridge. A theodolite is used by the surveyor to measure angles. The distance from the surveyor to the proposed bridge site is 40 feet. She measures a $50^{\circ}$ angle to the bridge site across the river. Find the length of the bridge to the nearest foot.

4. A steel cable is fastened to a TV tower 50 feet above the ground and then anchored to the ground. The cable forms an angle of $65^{\circ}$ with the tower. How far is it from the base of the tower to the point where the guyline is anchored into the ground? How long is the cable? Round to the nearest foot.
5. You are standing 50 meters from a hot air balloon that is preparing to take off. The angle of elevation to the top of the balloon is $28^{\circ}$. Find the height of the balloon.
6. Matt is standing on top of a cliff 305 feet above a lake. The measurement of the angle of depression to a boat on the lake is $42^{\circ}$. How far is the boat from the base of the cliff?
7. You are in a hot air balloon that is 600 feet above the ground where you can see your friend. If the angle from your line of sight to your friend is $20^{\circ}$, how far is he from the point on the ground below the hot air balloon?

8. Use the diagram below to find the distance across the suspension bridge.


## Problem of the Week <br> Problem D <br> From the Four Corners

In the diagram, $A B C D$ is a rectangle. Point $P$ is located inside the rectangle so that the distance from $P$ to $A$ is 5 cm , the distance from $P$ to $B$ is 11 cm , and the distance from $P$ to $D$ is 10 cm .
How far is $P$ from $C$ ?


HINT: Consider drawing a line segment through $P$, perpendicular to two of the sides of the rectangle. Then use the Pythagorean Theorem.

