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

## Part 1 - Concept Investigation

Investigation 1 - Angle, Slope Ratio Relationship $\Rightarrow$ go to https://www.geogebra.org/classic/ua6nvdyf and let's work together to complete the data table. So in this investigation, I provided you with the angle that the line makes with the $x$-axis and we used GEOGEBRA to graph the line and then to determine the slope ratio of a line.

Investigation 2 - Slope Ratio, Angle Relationship $\Rightarrow$ go to https://www.geogebra.org/classic/bnrgqhnw and let's work together to complete the data table. So in this investigation, I provided you with the slope ratio and we used GEOGEBRA to measure the angle that the line makes with the $x$-axis.

| Investigation 1 - Angle, Slope Ratio Relationship $\Rightarrow$ go to https://www.geogebra.org/classic/ua6nvdyf and let's work together to complete the data table: |  | Investigation 2 - Slope Ratio, Angle Relationship $\Rightarrow$ go to https://www.geogebra.org/classic/bnrgqhnw and let's work together to complete the data table. |  |
| :---: | :---: | :---: | :---: |
| Angle | Slope Ratio | Slope Ratio | Angle |
| $45^{\circ}$ | 1 | 1 | $45^{\circ}$ |
| $10^{\circ}$ |  | 2 |  |
| $20^{\circ}$ |  | 3 |  |
| $30^{\circ}$ |  | 4 |  |
| $40^{\circ}$ |  | 0 |  |
| $50^{\circ}$ |  | 0.1 |  |
| $60^{\circ}$ |  | 0.2 |  |
| $70^{\circ}$ |  | 0.4 |  |
| $80^{\circ}$ |  | 0.6 |  |
| $90^{\circ}$ |  | 0.8 |  |

## Part 2 - Skills \& Concept Practice - Together

1. Determine the slope ratio of a line that makes a $35^{\circ}$ angle with the $x$-axis.
2. Determine the slope ratio of a triangle that has a $35^{\circ}$ angle at one vertex.
3. Determine the slope ratio of a line that makes a $55^{\circ}$ angle with the $x$-axis.
4. Determine the slope ratio of a triangle that has a $55^{\circ}$ angle at one vertex.
5. Determine the slope ratio of a line that makes a $21^{\circ}$ angle with the $x$-axis.
6. Determine the slope ratio of a triangle that has a $21^{\circ}$ angle at one vertex.
7. Determine the slope ratio of a line that makes a $78^{\circ}$ angle with the $x$-axis.
8. Determine the slope ratio of a triangle that has a $78^{\circ}$ angle at one vertex.
9. A line has a slope of $\frac{10}{3}$. Determine the angle that this line makes with the $x$-axis.
10. A triangle has a slope ratio of $\frac{10}{3}$. Determine the measure of the angle at the vertex at $(0,0)$
11. A line has a slope of 1.25 . Determine the angle that this line makes with the $x$-axis.
12. A triangle has a slope ratio of 1.25 . Determine the measure of the angle at the vertex at $(0,0)$
13. A line has a slope of 0.75 . Determine the angle that this line makes with the $x$-axis.
14. A triangle has a slope ratio of 0.75 . Determine the measure of the angle at the vertex at $(0,0)$
15. A line has a slope of 0.125 . Determine the angle that this line makes with the $x$-axis.
16. A triangle has a slope ratio of 0.125 . Determine the measure of the angle at the vertex at $(0,0)$

Working with Data Tables - I have prepared some data tables that you will use to answer the remaining questions in this problem set:

| Angle | Slope Ratio | Slope Ratio | Angle |
| :---: | :---: | :---: | :---: |
| $17^{\circ}$ | 0.3057 | $\frac{1}{10}$ | $5.7^{\circ}$ |
| $22^{\circ}$ | 0.4040 | $\frac{1}{3}$ | $18.4^{\circ}$ |
| $24^{\circ}$ | 0.4452 | 0.3429 | $18.9^{\circ}$ |
| $27^{\circ}$ | 0.5095 | 0.5833 | $30.3^{\circ}$ |
| $29^{\circ}$ | 0.5543 | $\frac{2}{3}$ | $33.7^{\circ}$ |
| $41^{\circ}$ | 0.8693 | $\frac{3}{4}$ | $36.9^{\circ}$ |
| $53^{\circ}$ | 1.3270 | $\frac{4}{3}$ | $53.1^{\circ}$ |
| $62^{\circ}$ | 1.8807 | 1.875 | $61.9^{\circ}$ |
| $71^{\circ}$ | 2.9042 | 4 | $76.0^{\circ}$ |
| $82^{\circ}$ | 7.1154 | 6.5 | $81.3^{\circ}$ |

1. State the slope ratio of the given angle in the following diagrams and then use the chart above to determine the measure of the specified angle, given the slope ratio.

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

2. Given the angle in the following triangles, use the chart above to determine the slope ratio. Then use the slope ratio to determine the measure of the unknown side..


## Part 3 - Skills \& Concept Applications

1. Mr. S sees the top of tree and his line of sight makes an angle of $27^{\circ}$ with the ground. If he is 40 meters away from the foot of the tree, how tall is the tree?
2. The foot of a ladder is placed 5 meters away from a wall. The ladder reaches up 20 meters up the wall. What angle does the ladder make with the ground?
3. A small sailboat is 94 meters away from the base of a lighthouse. The lighthouse has a height of 32.25 meters above the level of the sea. Determine the angle of the line of sight from the sailboat to the top of the lighthouse.
4. To view the top of a building from where he is standing on the ground, the line of sight of $\mathrm{Mr} . \mathrm{S}$ is $17^{\circ}$. If he is 100 m away from the base of the building, how tall is the building?

PS 2.1 Challenge Q

Problem D
Taken Token

Some tokens are placed in a bag. Each of the tokens has a positive integer stamped on one of its sides. It is possible that more than one token in the bag has the same number stamped on it. The average of all the tokens in the bag is 56 . If a token with the number 68 on it is removed from the bag, the average number on the remaining tokens is 55 .

Determine the largest possible integer that could appear on one of the tokens in the bag.


