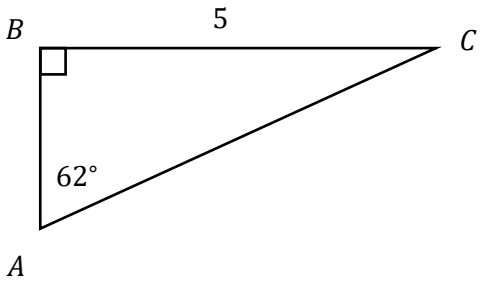
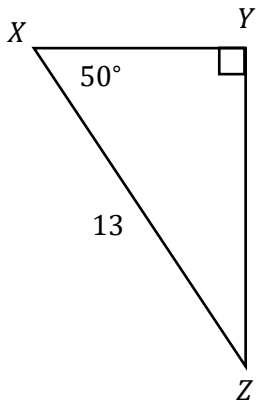
Lesson 2 – Solving Angles of Triangles

Goal: • Given a right-angle triangle with 2 sides, you can determine the measure of the two acute angles. (Can be applied to contextualized problems) • Understands that trig operators have a reverse operator (just like add/subtract) that will transform a ratio of sides to an angle between $0°$ and $90°$.
New Terminology: • Inverse

Review: Determine the two missing side lengths of each triangle. Use cosine, sine, and tangent all at least once.

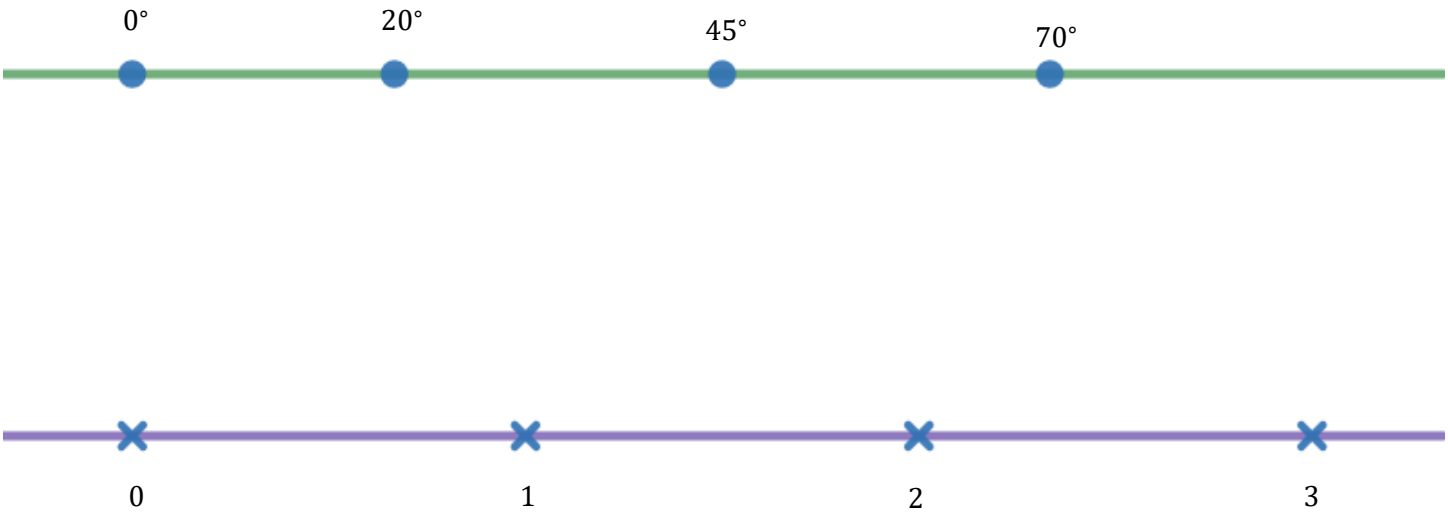




Review: In your own words what does $\tan\psi = 3.2$ mean?

Remember that yesterday we looked at how we can relate the angle and the ratios (proportions) of sides to each other using our trig operators.

Practice: Use the "tangent" operator on the following numbers 0 , 20 , 45 , 70 and illustrate the connection



We can easily find the ratio of a given angle, but what if we want to go backward and determine the angle of a given ratio?

Answer:

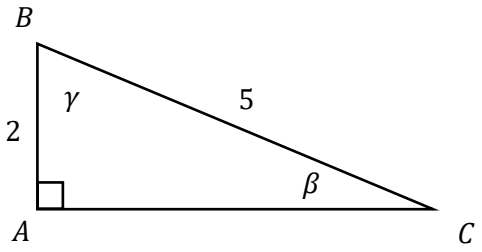
Example: What does the following represent?

$$\arcsin\left(\frac{7}{10}\right) \qquad \cos^{-1}\left(\frac{3}{8}\right)$$

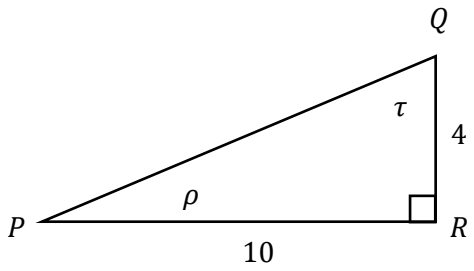
Practice: What does the following represent?

$\sin^{-1}(0.46)$ $\arctan(2.3)$

Example: Solve for the acute angles in the following triangle



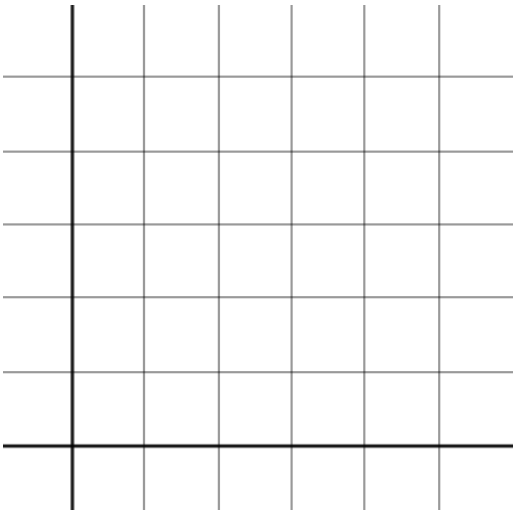
Practice: Solve for the acute angles in the following triangle



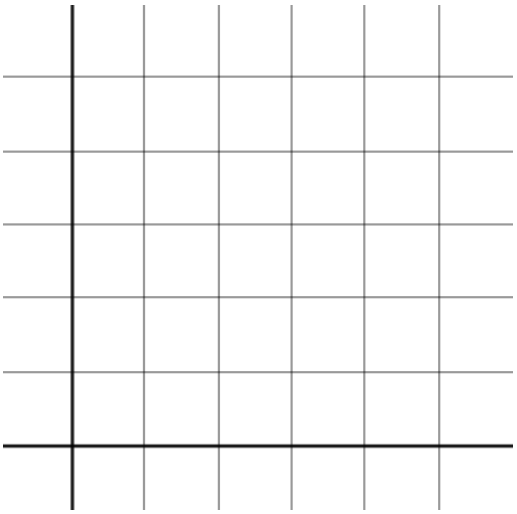
Example: A tree stands 63 m tall and you are standing 20 m from the base of the tree. If your eyes are 1.5 m above the ground what is the angle of inclination when you look up to the top?

Practice: Two buildings are separated by 85 m. The shorter building is 185 m tall and the taller building is 250 m tall. What is the angle of declination from the tall building to the short building?

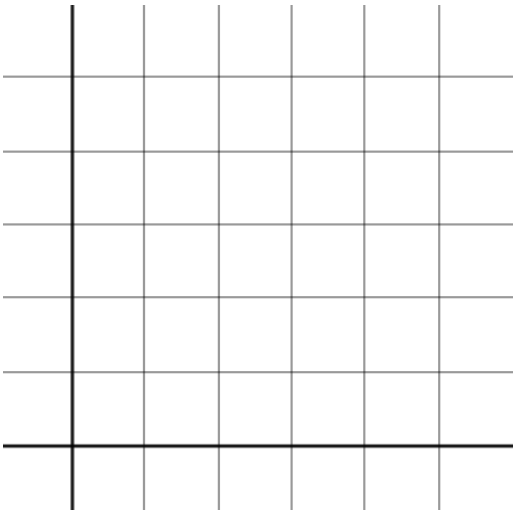
Discuss: Determine the angle between the line through $(0,0)$ and $(5,3)$ and the x-axis?



Discuss: Determine the angle between the line through $(1,0)$ and $(4,5)$ and the x-axis?



Discuss: Determine the angle between the line through $(2,3)$ and $(5,1)$ and the x-axis?



SUMMARY: We know that a right-angle triangle will have 3 distinct sides and 2 acute angles. The minimal amount of information we need is TWO THINGS!

- 2 sides $\Longrightarrow$

- 1 side and 1 angle $\Longrightarrow$

- 2 angles $\Longrightarrow$

Assigned Problems: 3.1 page 107 – 112: # 4, 5, 6b, 7a, 8, 11, 13a, 19

 20

3.2 page 120 – 123: # 3, 5, 6ac, 12, 13

 15:

Key Ideas on page 107 and 119