

# Geometry Unit 10: Trigonometry

Bronx Early College Academy

Christopher J. Huson PhD

17 April 2023 - 5 May 2023

10.1 Slope and the tangent function	17 April
10.2 Inverse tangent function	18 April
10.3 Algebra practice	24 April
10.4 Applications	25 April
10.6 Applications	28 April

## Learning Target: I can convert angle measures to slopes using the tangent function.

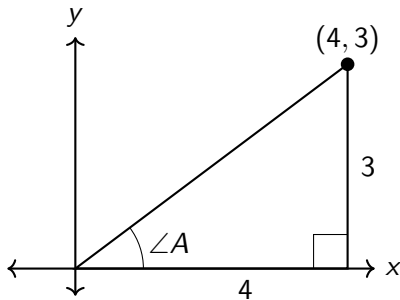
HSG.SRT.C.8 Use trigonometric ratios and the Pythagorean Theorem to solve problems 10.1 Monday 17 April

Do Now: Given right  $\triangle$ , as shown

1. What is the length of the hypotenuse?
2. What is the slope of the hypotenuse?
3. Estimate  $m\angle A$  in degrees.

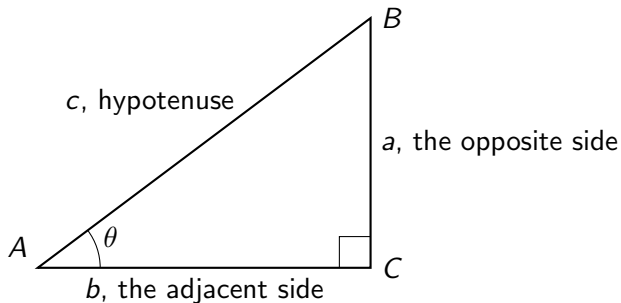
Lesson: The tangent function, calculator use

Homework: Complete the classwork practice, Deltamath problem set



## Standard notation for trigonometric functions

Right triangle  $\triangle ABC$  with side lengths  $a$ ,  $b$ ,  $c$ .  $m\angle A = \theta$



**Opposite** The side across from the angle

**Adjacent** The side next to the angle

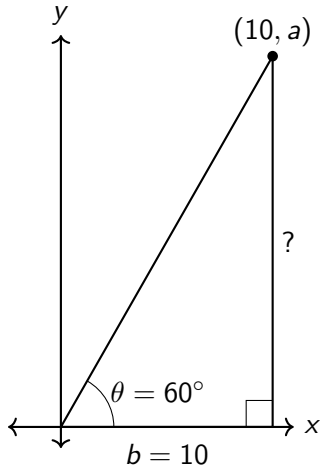
**Theta** A Greek letter used to represent the angle measure

**tangent** The ratio of the opposite side to the adjacent side

Find the height of a triangle with base  $b = 10$  and angle  $60$  degrees

$$\tan(\theta) = \frac{\text{opposite}}{\text{adjacent}}$$

Substitute the given values and use your calculator for  $\tan(60^\circ)$



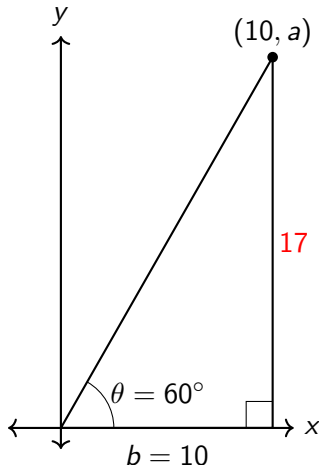
Find the height of a triangle with base  $b = 10$  and angle  $60$  degrees

$$\tan(\theta) = \frac{\text{opposite}}{\text{adjacent}}$$

Substitute the given values and use your calculator for  $\tan(60^\circ)$

$$\tan(60^\circ) = \frac{a}{10} \approx 1.732$$

$$a = 10 \times 1.732 \approx 17.32$$



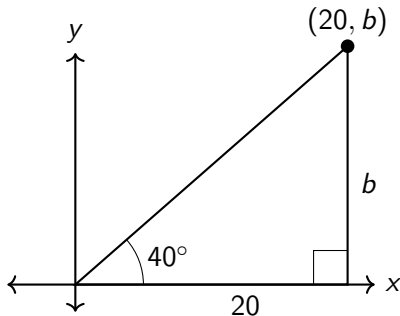
## Learning Target: I can find an angle measure using inverse tangent.

CCSS.HSG.SRT.C.8 Use trig ratios and the Pythagorean Theorem to solve problems 10.2 Tuesday 18 April

Do Now: Given right  $\triangle$  shown, find its height  $b$  to the *nearest tenth*.

Lesson: The inverse tangent function,  $\tan^{-1}$

Homework: Complete the classwork practice,  
Deltamath problem set



## Learning Target: I can model and solve with trigonometry algebra.

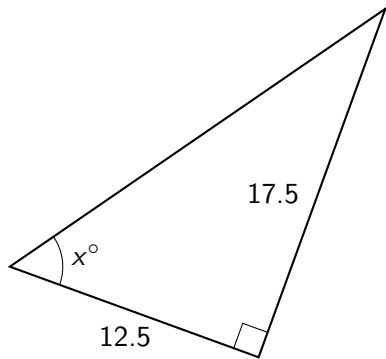
CCSS.HSG.SRT.C.8 Use trig ratios and the Pythagorean Theorem to solve problems 10.3 Monday 24 April

Do Now: Given right  $\triangle$  with leg lengths 12.5 and 17.5. Find the angle measure  $x$  to the *nearest degree*.

Lesson: Practice modeling with tangent function and solving the algebra

**Calculator check** (it should be on your desk)

Homework: Complete the classwork practice, Deltamath problem set

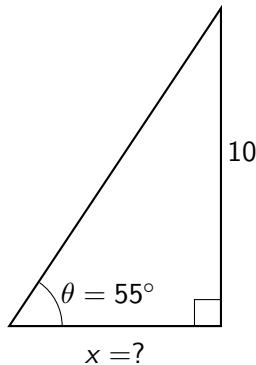




Find the base of a triangle with height  $h = 10$  and angle  $55^\circ$

$$\tan(\theta) = \frac{\textit{opposite}}{\textit{adjacent}}$$

Substitute the given values and use your calculator for  $\tan(55^\circ)$



Find the base of a triangle with height  $h = 10$  and angle  $55^\circ$

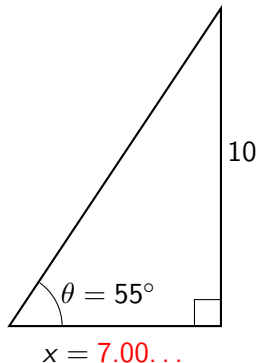
$$\tan(\theta) = \frac{\text{opposite}}{\text{adjacent}}$$

Substitute the given values and use your calculator for  $\tan(55^\circ)$

$$\tan(55^\circ) = \frac{10}{x}$$

$$x(1.428\dots) = 10$$

$$x = \frac{10}{1.428\dots} \approx 7.00\dots$$



## Learning Target: I can solve real world problems with trigonometry.

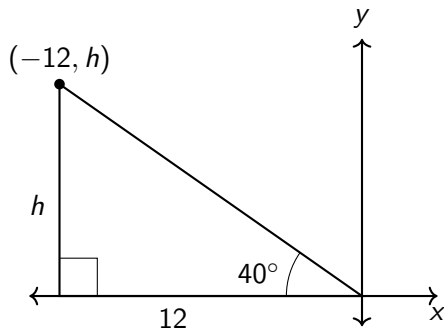
CCSS.HSG.SRT.C.8 Use trig ratios and the Pythagorean Theorem to solve problems 10.4 Tuesday 25 April

Do Now: Given right  $\triangle$  shown, find its height  $h$  to the *nearest tenth*.

Lesson: Applying trigonometry to real world situations

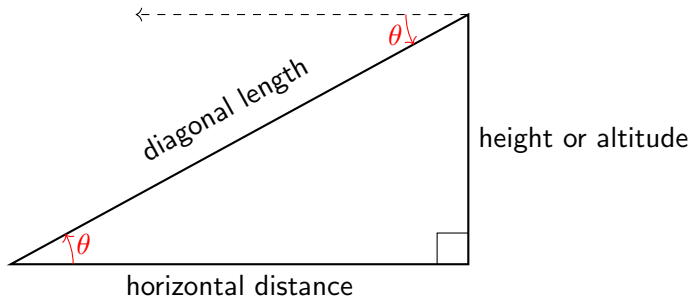
Homework: Complete the classwork,  
Deltamath problem set

Test Tuesday



## Applications to real world situations

For example: heights of trees, wires to a pole, lighthouses, buildings, airplanes...



**Angle of elevation** The upward angle from the horizontal to line of sight

**Angle of declination** The downward angle from the horizon to the object on the ground

**Equal angles** The two alternate interior angles are congruent.

## Learning Target: I can solve real world problems with trigonometry.

CCSS.HSG.SRT.C.8 Use trig ratios and the Pythagorean Theorem to solve problems

10.6 Friday 28 April

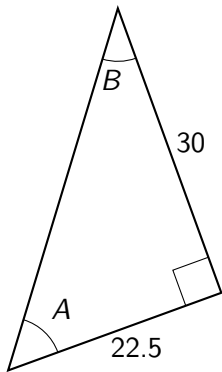
Do Now: "Solve" the  $\triangle$  shown. i.e. calculate the two angle measures and the length of the hypotenuse .

Lesson: Applying trigonometry in a variety of contexts

Deltamath exit quiz (10 minutes)

Homework: Complete the classwork practice

Test Tuesday



## Percentage grade of a road

Example: A road rising 30 feet for every 1000 feet of horizontal distance has a 3% grade.



**Grade** The ratio of the vertical change to the horizontal change (percent)

**Elevation** How high something is above sea level

**Altitude** The height of an object above the ground

**not to scale** proportions are not accurate