

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
10.7 Quiz: tangent function	2 May

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

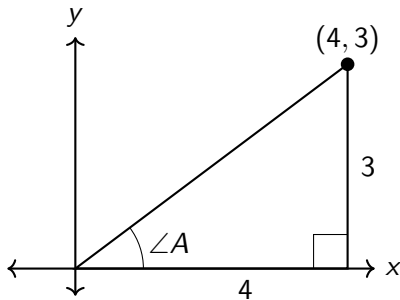
HSG.SRT.C.8 Use trigonometric ratios and the Pythagorean Theorem to solve problems 10.1 Monday 17 April

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.

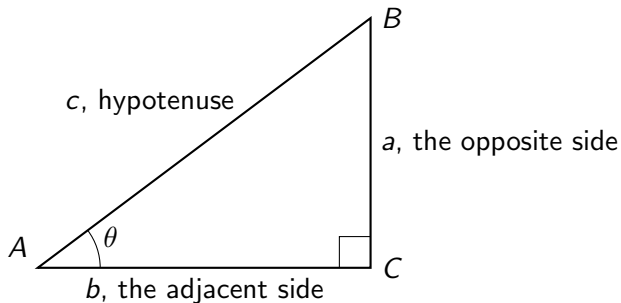
Lesson: The tangent function, calculator use

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

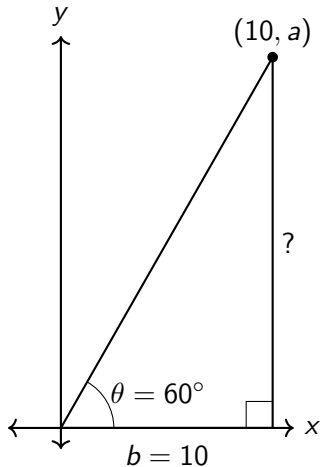
Theta A Greek letter used to represent the angle measure

tangent The ratio of the opposite side to the adjacent side

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

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

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



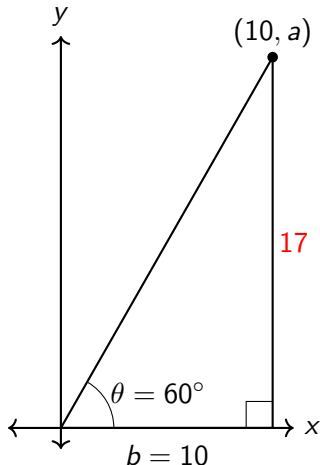
Find the height of a triangle with base $b = 10$ and angle 60°

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

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

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

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



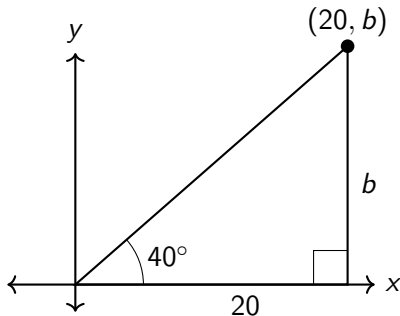
Learning Target: I can find an angle measure using inverse tangent.

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.

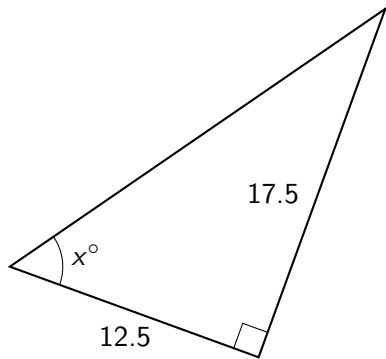
CCSS.HSG.SRT.C.8 Use trig ratios and the Pythagorean Theorem to solve problems 10.3 Monday 24 April

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)

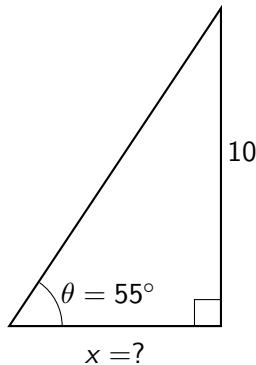
Homework: Complete the classwork practice, Deltamath problem set



Find the base of a triangle with height $h = 10$ and angle 55°

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

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°

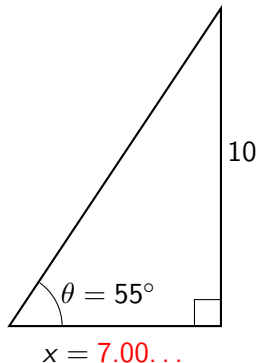
$$\tan(\theta) = \frac{\text{opposite}}{\text{adjacent}}$$

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.

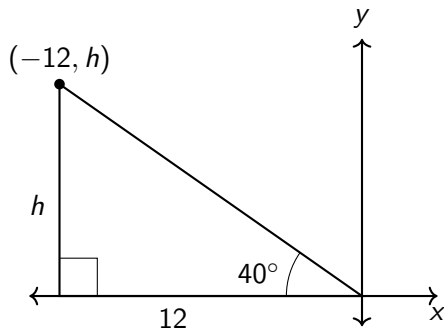
CCSS.HSG.SRT.C.8 Use trig ratios and the Pythagorean Theorem to solve problems 10.4 Tuesday 25 April

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

Lesson: Applying trigonometry to real world situations

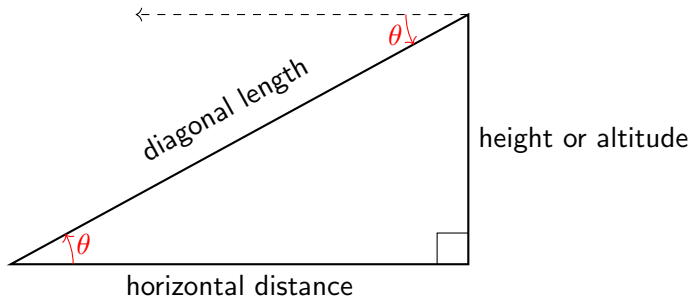
Homework: Complete the classwork,
Deltamath problem set

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

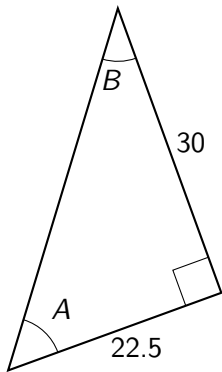
Do Now: "Solve" the \triangle shown. i.e. calculate the two angle measures and the length of the hypotenuse.

Lesson: Applying trigonometry in a variety of contexts

Deltamath exit quiz (10 minutes)

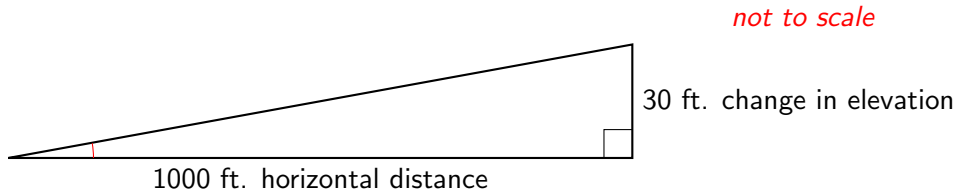
Homework: Complete the classwork practice

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

Learning Target: I can use the tangent function and solve problems with trigonometry.

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

10.7 Tuesday 2 May

Do Now: Turn in Unit 10 problem sets, stapled in reverse order

Test: Use your notebook and calculator (no computers)

Do not share calculators

Early finishers: Deltamath Regents review