

Pre-Calculus Chapter 5 Basic Trigonometry

Section 5.1 Reference Angles

Day 1

Vertex: corner of an angle

Note: The 2 sides of the angle are the initial side and the terminal side

STANDARD POSITION: An angle in which the vertex is at the origin and its initial side along the positive x-axis.

Picture:

Degrees, Minutes, and Seconds

- **1 full rotation** = 360 degrees
- **Note:**–Positive degrees are counterclockwise.
- **1 degree** = $1 / 360^{\text{th}}$ of a full rotation
- **1 minute** = $1 / 60^{\text{th}}$ of a degree (notation: 30')
- **1 second** = $1 / 60^{\text{th}}$ of a minute (notation: 10'')

Examples from 5-1A: 28, 30

Your Turn from 5-1A: 27, 32

Coterminal Angles

Since angles repeat every 360° , every angle has infinite angles that look identical. These are called Coterminal Angles.

The angles coterminal to angle k are equal to $k + 360n$ where n is an integer.

Reference Angles

If an angle is in the standard position, the 3 angles formed by reflecting across the x-axis and y-axis. *Make the bow tie to illustrate.*

Picture:

Examples from 5-1A: 37, 45, 52

Your Turn from 5-1A: 38, 46, 53

Assignment: Finish 5-1A

Section 5.2 Sine, Cosine, Tangent

Day 1

Note: Put your calculator in Degree Mode.

Right Triangle Trigonometry

- H In a right triangle, the Hypotenuse H is the longest side.
- O Given that one of the acute angles is theta, the side across from it is the Opposite, O
- A The third side is the Adjacent side, A

Examples: label O, H, and A

Sine, Cosine, and Tangent

$$\sin \theta = O/H$$

$$\cos \theta = A/H$$

$$\tan \theta = O/A$$

Memory Trick: SohCahToa

Picture:

Examples from 5-2A: 5

Your Turn from 5-2A: 10

Solving Strategy:
make a proportion and always
cross multiply and divide to solve.

Reciprocal Trigonometry

Cosecant	Reciprocal of Sine	$\sin \theta = 1 / \csc \theta$ $\csc \theta = 1 / \sin \theta$	$\sin \theta = O/H$ $\csc \theta = H/O$
Secant	Reciprocal of Cosine	$\cos \theta = 1 / \sec \theta$ $\sec \theta = 1 / \cos \theta$	$\cos \theta = A/H$ $\sec \theta = H/A$
Cotangent	Reciprocal of Tangent	$\tan \theta = 1 / \cot \theta$ $\cot \theta = 1 / \tan \theta$	$\tan \theta = O/A$ $\cot \theta = A/O$

Examples from 5-2A: 6, 7, 20

Your Turn from 5-2A: 14, 15, 21

Assignment: Finish 5-2A

Section 5.2 Special Right Triangles

Day 2

Special Right Triangle 1 = The 45-45-90 Triangle

- The short sides are the same (isosceles).
- The hypotenuse is sq rt 2 times larger than the smaller sides.

Picture:

Examples from 5-2B: 1, 3

Your Turn from 5-2B: 4

Special Right Triangle 2 = The 30-60-90 Triangle

- The short side is across from the 30° angle.
- The hypotenuse is 2 times larger than the shortest side.
- The middle side (across from 60°) is sq rt 3 times larger than the shortest side.

Picture:

Examples from 5-2B: 2, 5

Your Turn from 5-2B: 6

Extra Practice:

45-45-90, shortest side is 3

30-60-90, hypotenuse is 8

45-45-90, hypotenuse is 4

Assignment: Finish 5-2B (Special Right Triangles)

Section 5.3 The Unit Circle

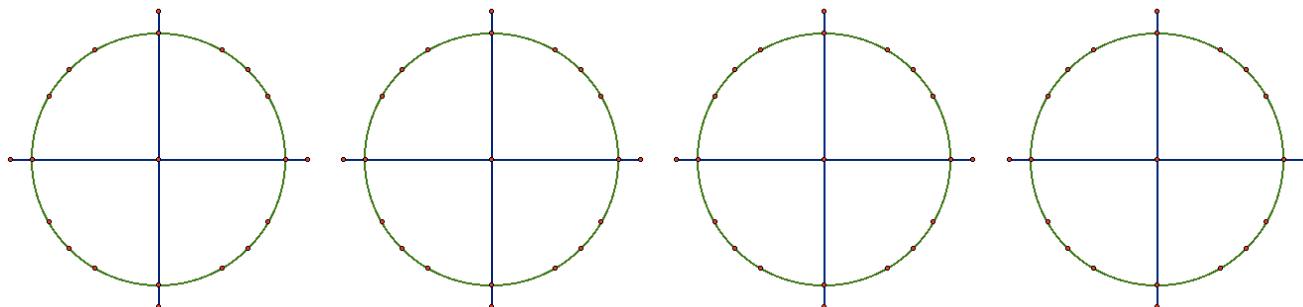
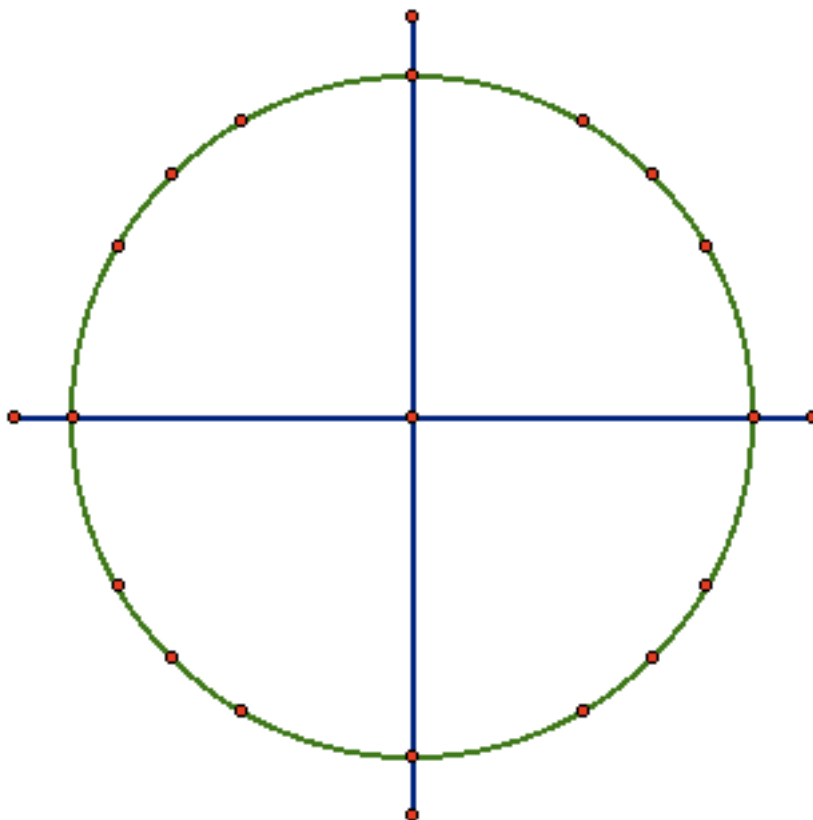
Day 1

Basics of the Unit Circle

- Draw a circle centered at the origin with radius 1.
- State the ordered pairs where the x and y axes meet the circle
- State the ordered pairs every 30 degrees (this uses the 30-60-90 triangle)
- State the ordered pairs every 45 degrees (this uses the 45-45-90 triangle)

Note: There are only 3 fractions used in the unit circle. Memorize these: $\frac{1}{2}$ $\frac{\sqrt{3}}{2}$ $\frac{\sqrt{2}}{2}$

Picture:



Section 5.3 The Unit Circle Day 2

Using the Unit Circle

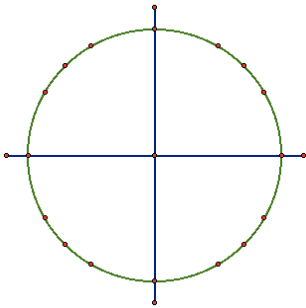
Every point along the unit circle has an angle θ and coordinates (x, y)

$\sin \theta =$ the y value

$\cos \theta =$ the x value

$\tan \theta = y / x$

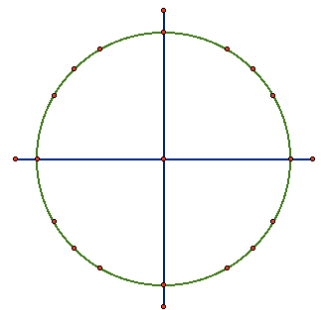
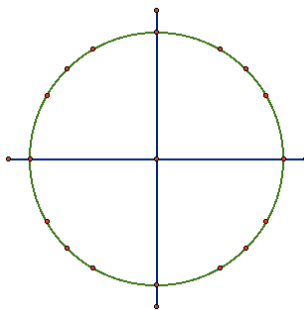
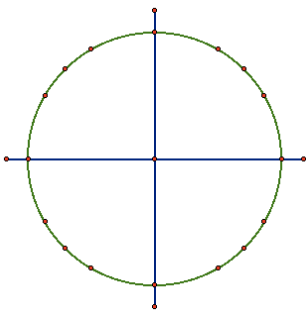
Example: find the reference angle for 135 degrees and state the $\sin 135$ and $\cos 135$



Now we will work through the front of 5-3A together.

Assignment: Finish 5-3A (Special Right Triangles)

Section 5.3 The Unit Circle Day 3



Examples from 5-3B: 38, 44

Your Turn from 5-3B: 39

Assignment: finish worksheet 5-3B

Study for the Quiz!