LEARNING GOALS

- SWBAT describe an angle and convert between degree and radian measures given an angle measured in either degrees or radians.

- SWBAT identify the unit circle and its relationships to real numbers.

CLASS AGENDA

- Clock activity
- Degrees vs. Radians
- Break
- Unit Circle
- Closure

CLOCK ACTIVITY

CLOCK ACTIVITY

- Draw a clock
  1. Center is the Origin
  2. Add the following times
     1. 1A – Halfway between 1 and 2
     2. 4A – Halfway between 4 and 5
     3. 7A – Halfway between 7 and 8
     4. 10A – Halfway between 10 and 11

- If these times were angles created by the x-axis and the minute hand (moving counter clockwise), what would each angle be?

TERMINAL AND INITIAL SIDE OF AN ANGLE

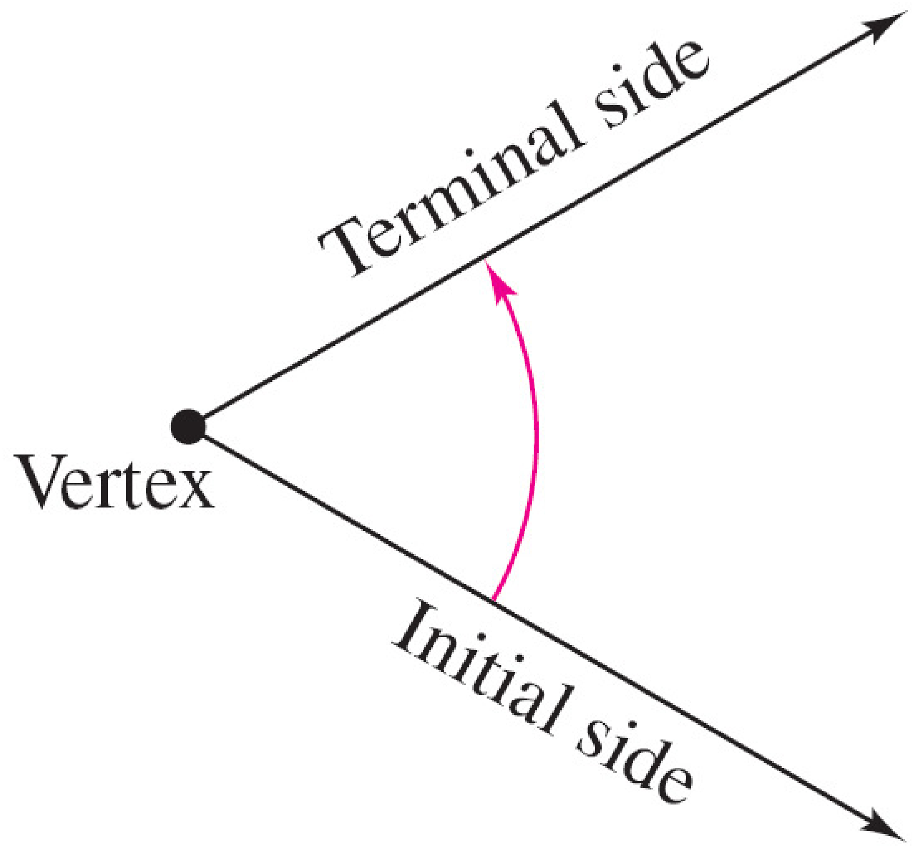


Figure 4.1

STANDARD POSITION OF AN ANGLE

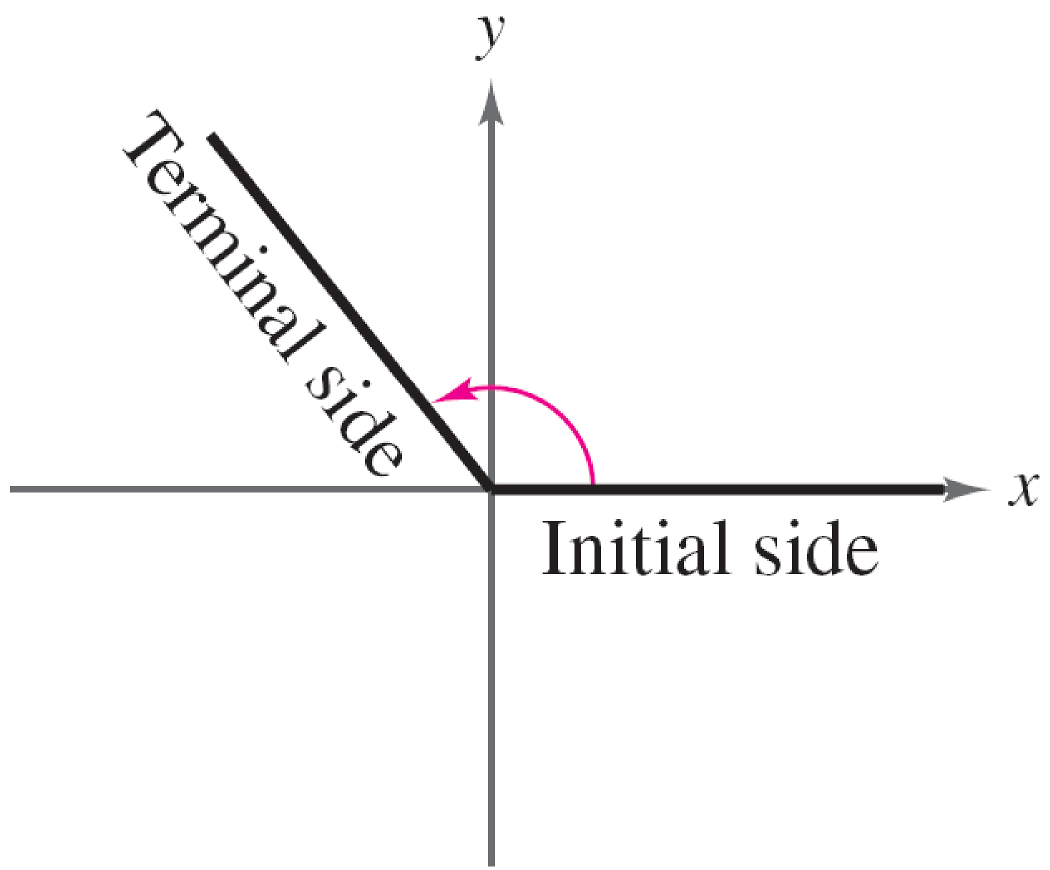


Figure 4.2

POSITIVE AND NEGATIVE ANGLES

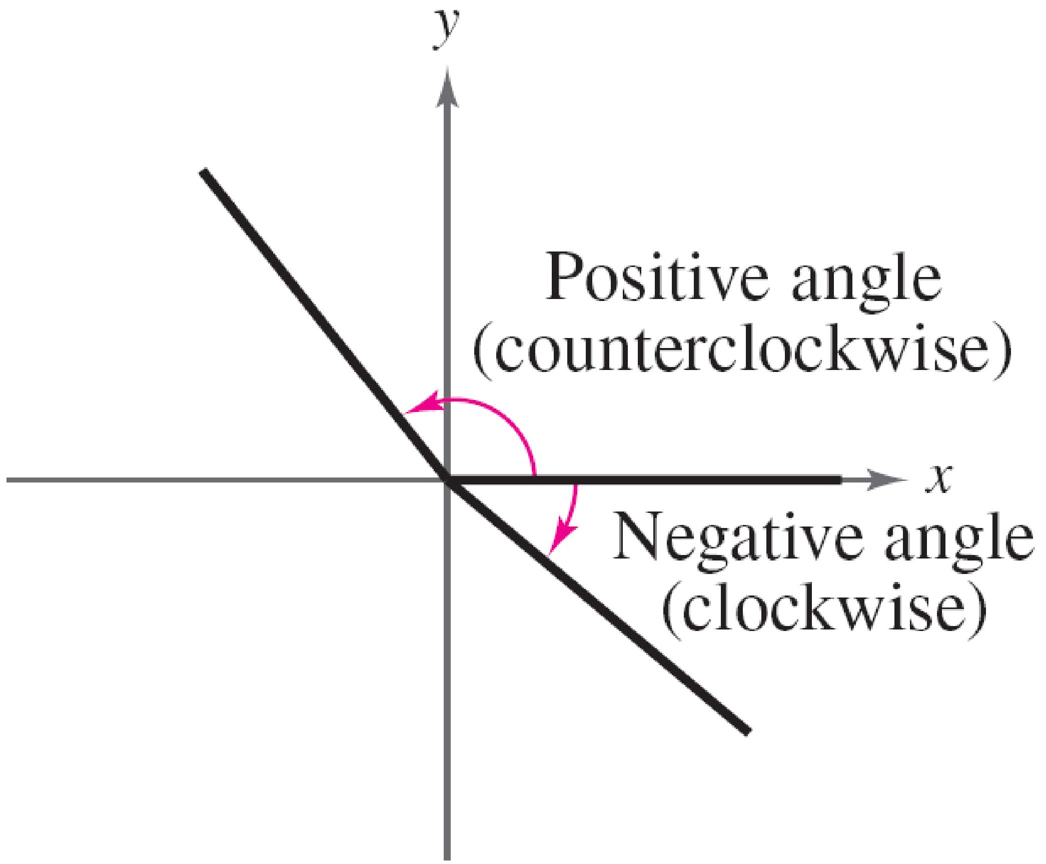


Figure 4.3

COTERMINAL ANGLE

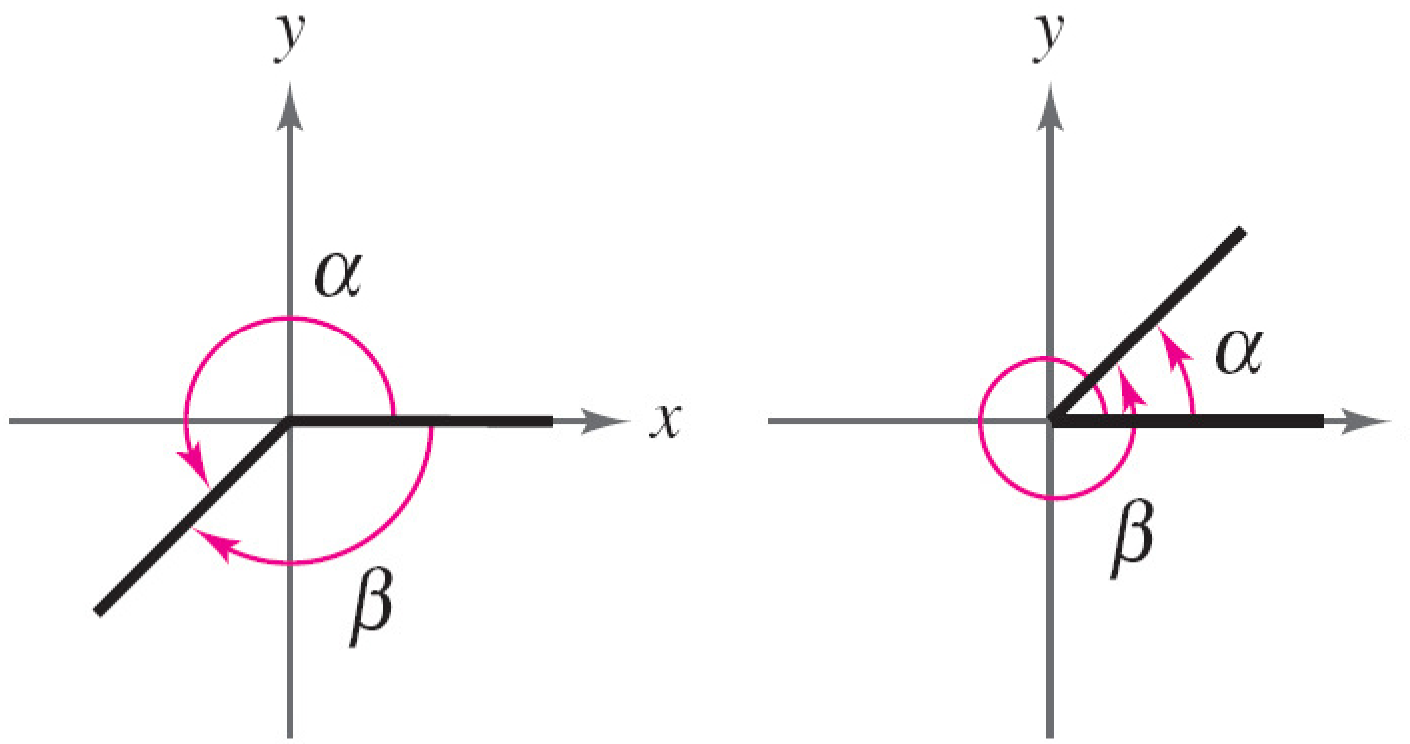


Figure 4.4

BREAK

WHAT IS A RADIAN?

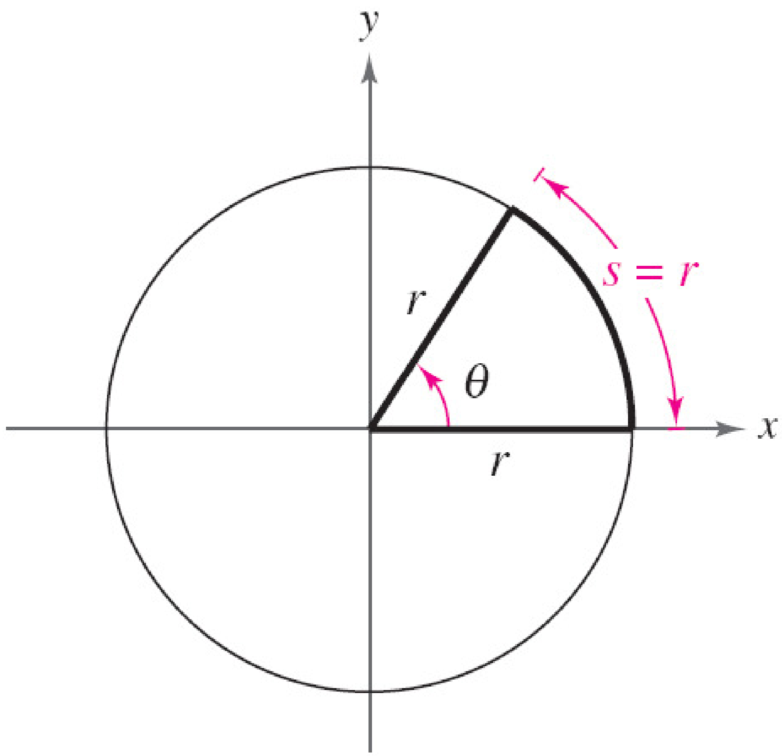
Definition of Radian

One **radian** (rad) is the measure of a central angle θ that intercepts an arc s equal in length to the radius r of the circle. See Figure 4.5. Algebraically this means that

$$\theta = \frac{s}{r}$$

where θ is measured in radians.

WHAT IS A RADIAN?



Arc length = radius when θ = 1 radian.

Figure 4.5

WHAT IS A RADIAN?

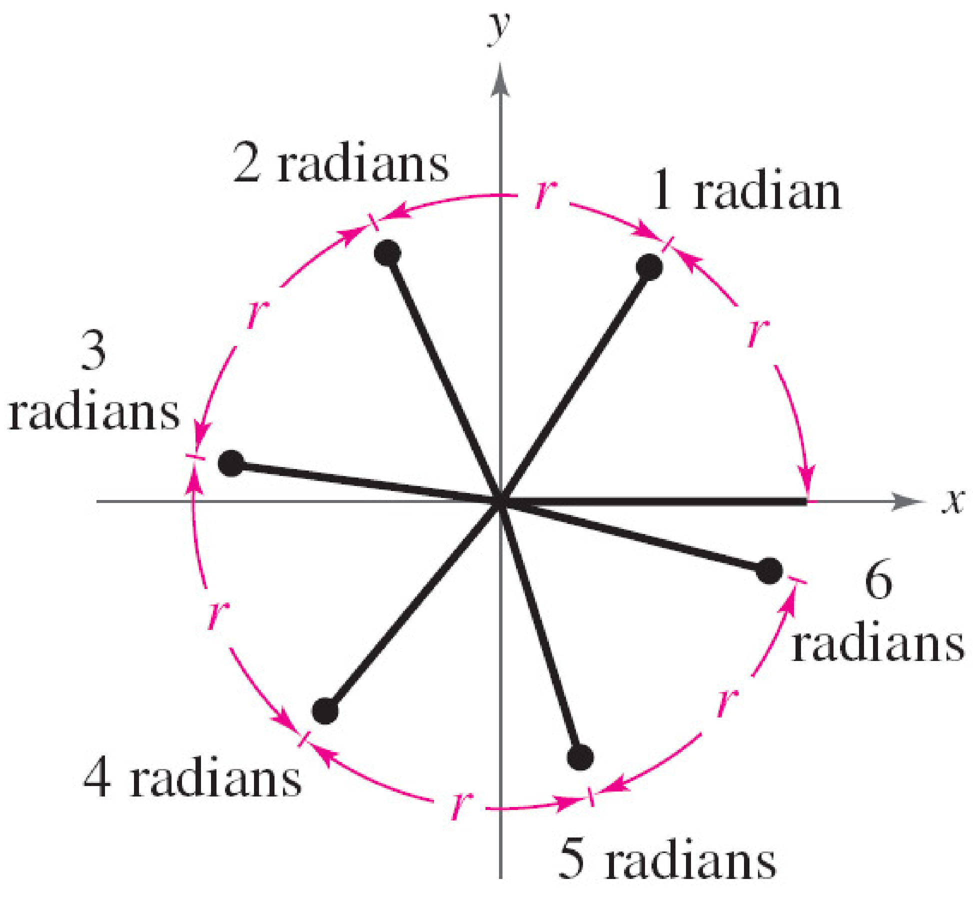


Figure 4.6

WHAT IS A RADIAN?

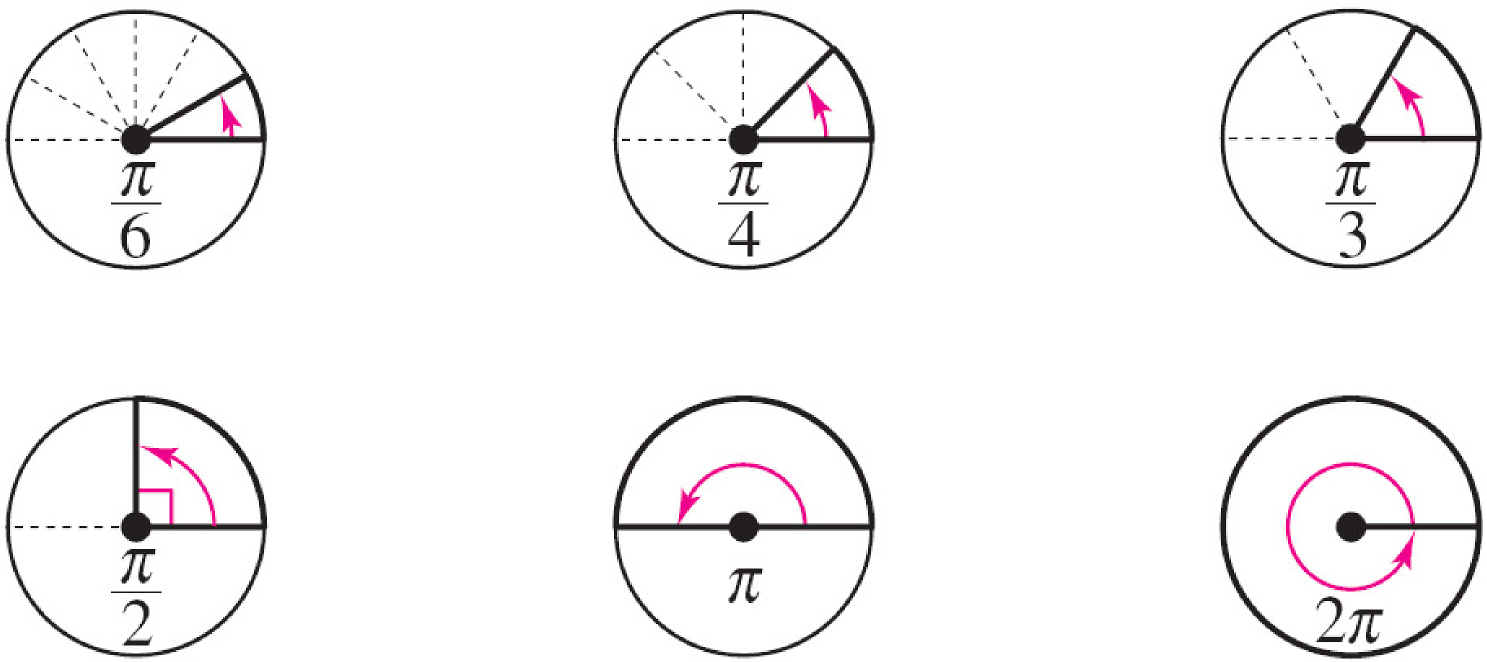


Figure 4.7

What are these angles in degrees?

COMMON ANGLES ON THE UNIT CIRCLE

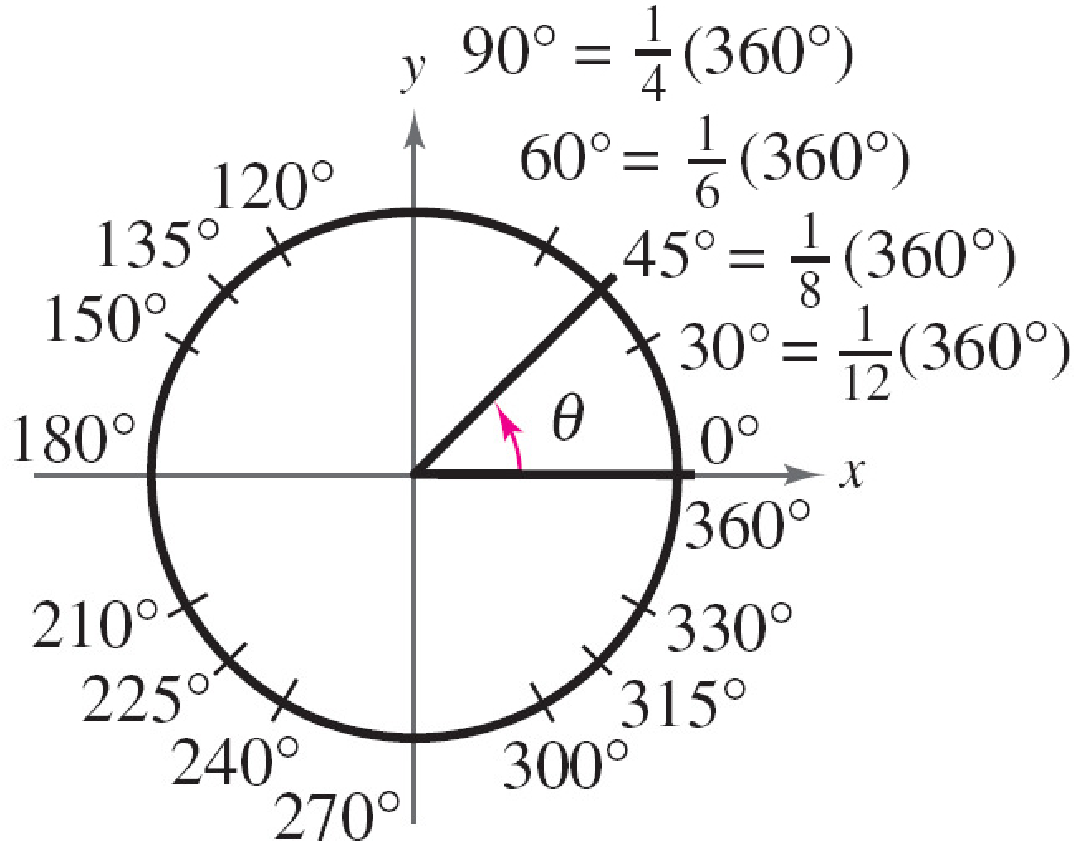


Figure 4.13

HOW DO WE CONVERT?

- Degrees to Radians?
  - (degrees) * (π/180)
- Radians to Degrees?
  - (radians) * (180/π)

PRACTICE

- Pages 260
- # 1 & 2 ALL

BREAK

THE UNIT CIRCLE

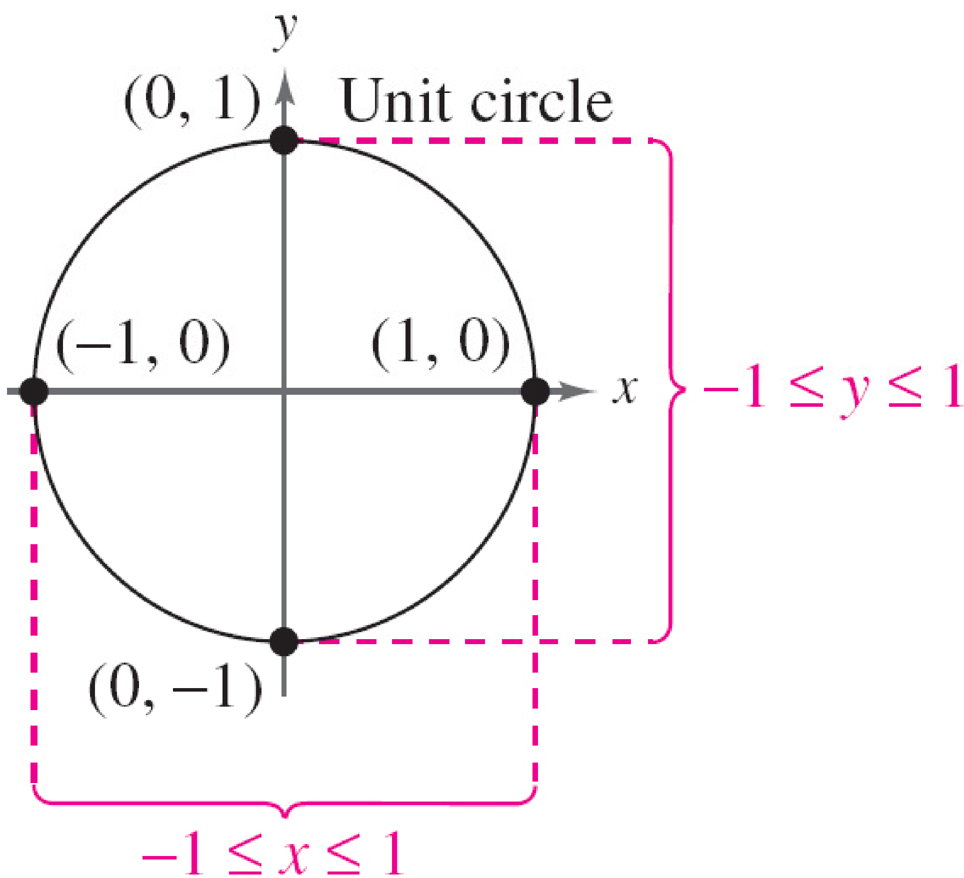


Figure 4.22

THE UNIT CIRCLE

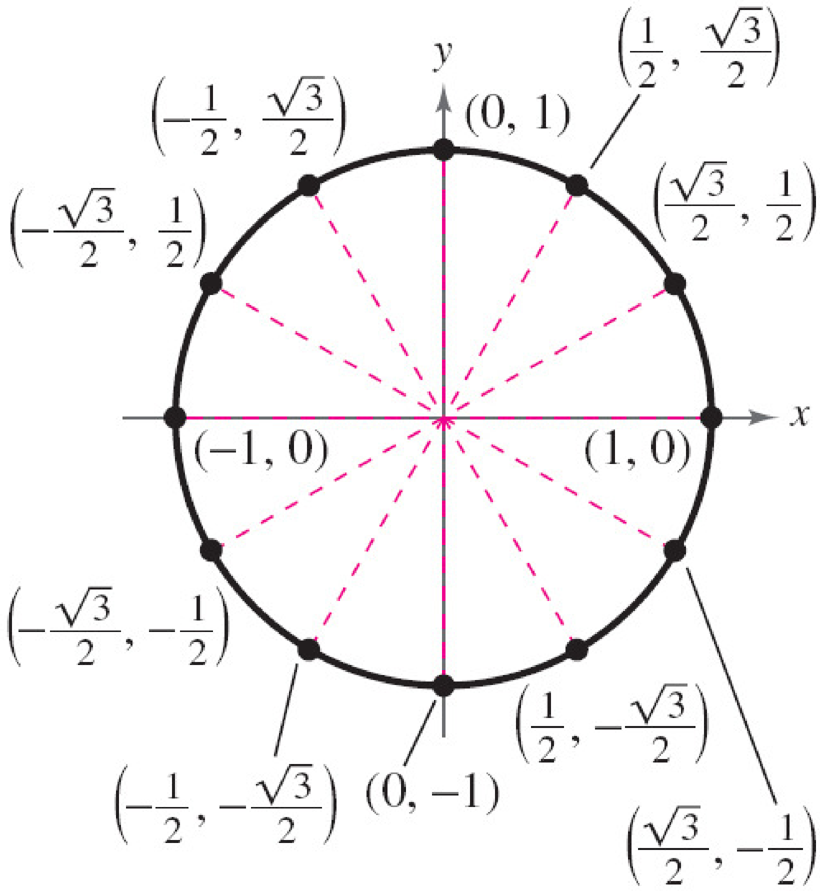


Figure 4.21

THE UNIT CIRCLE

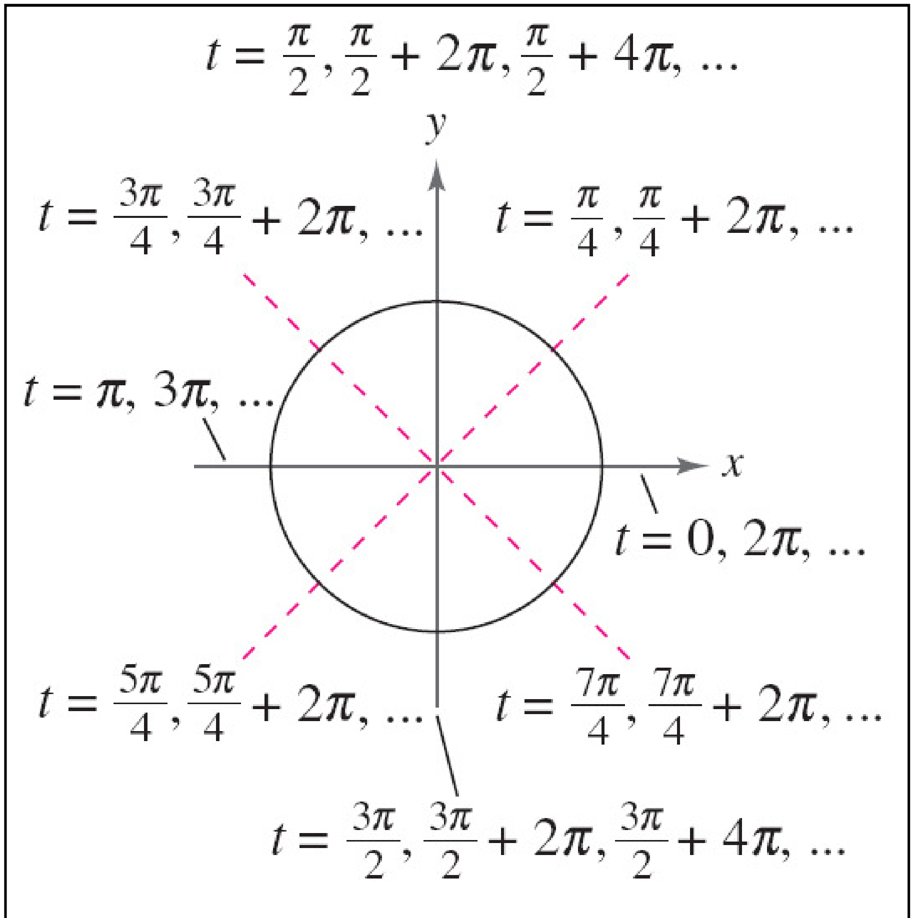


Figure 4.23

TRIGONOMETRIC FUNCTIONS

- Sine (Sin)

$$Sin\ (t) = y$$

- Cosine (Cos)

$$Cos\ (t) = x$$

- Tangent (Tan)

$$Tan\ (t) = \frac{y}{x}$$

- Cosecant (Csc)

$$Csc\ (t) = \frac{1}{y}$$

- Secant (Sec)

$$Sec\ (t) = \frac{1}{x}$$

- Cotangent (Cot)

$$Cot\ (t) = \frac{x}{y}$$

TRIG FUNCTIONS AND THE UNIT CIRCLE

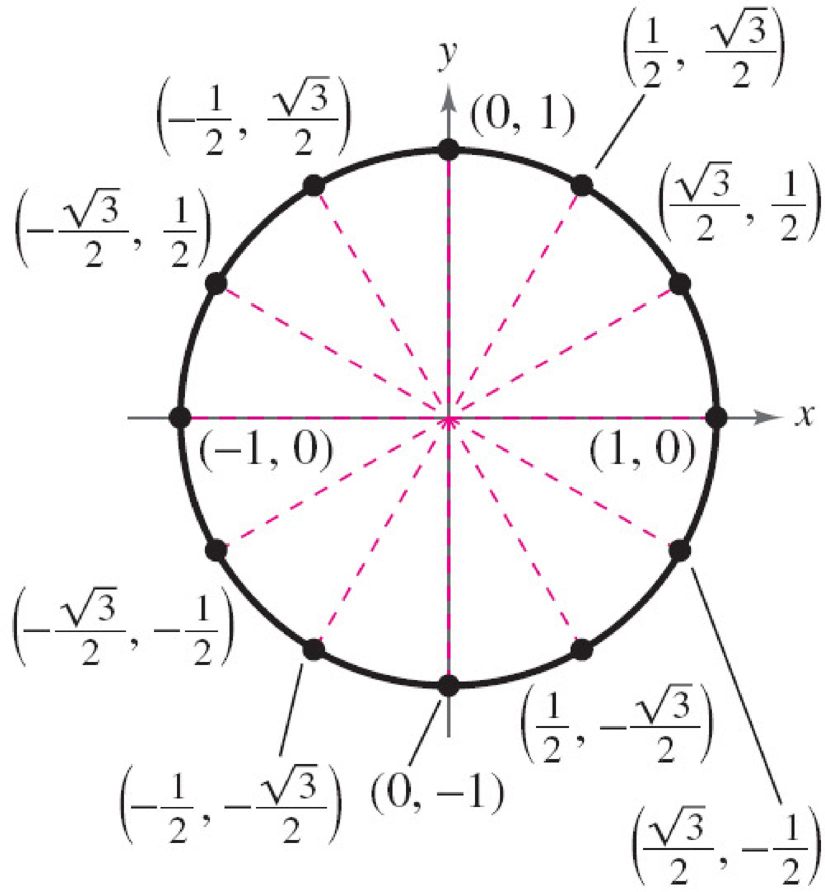


Figure 4.21

ODD AND EVEN TRIGONOMETRIC FUNCTIONS

- EVEN
- cos (-t) = cos (t)
- sec (-t) = sec (t)

- ODD
- sin (-t) = sin (t)
- csc (-t) = csc (t)
- tan (-t) = tan (t)
- cot (-t) = cot (t)

CLOSURE

CLOSURE

- How do you convert an angle from degrees to radians?
  - from radians to degrees?
- How does knowing the properties of a unit circle, allow me to understand the relationship of real numbers and trigonometric functions?

EXIT TICKET

- Create a table with the header being angles 0, 30, 45, 60, and 90 degrees.
  - Write a second header with the radian equivalents.
  - Calculate the six trigonometric functions for each angle
    - Sine
    - Cosecant
    - Cosine
    - Secant
    - Tangent
    - Cotangent