Learning Objective

I will be able to determine tangent ratios and solve problems involving it

Success Criteria

At the end of the lesson, I will be able to:
- Determine tangent ratios
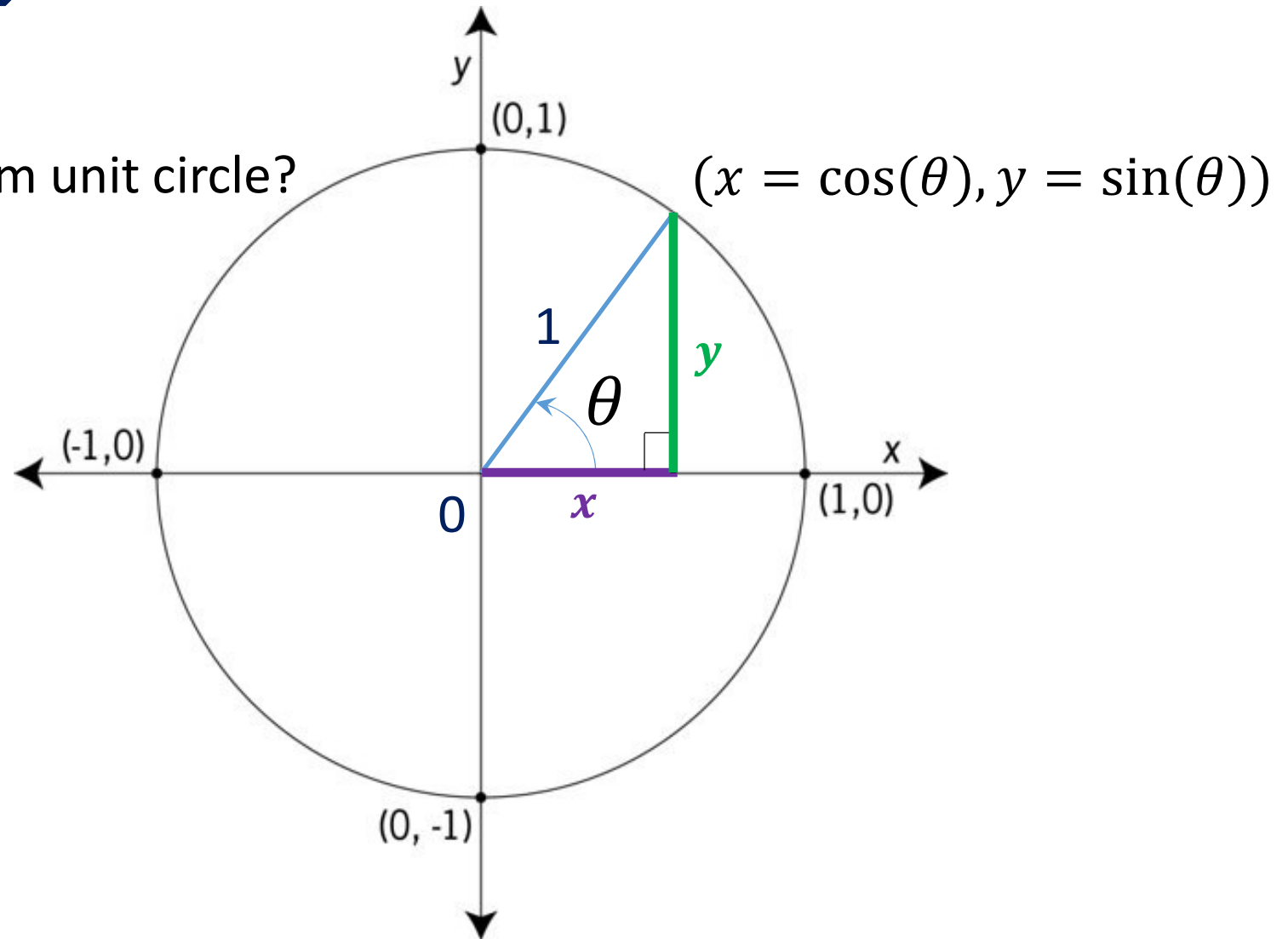- Solve problems involving tangent ratios

Unit Circle

Can we find $\tan(\theta)$ from unit circle?

$\tan(\theta) = \dfrac{Opp}{Adj}$

$\tan(\theta) = \dfrac{y}{x}$

$\tan(\theta) = \dfrac{\sin(\theta)}{\cos(\theta)}$

$(x = \cos(\theta), y = \sin(\theta))$

y

$(0,1)$

$(-1,0)$

1

θ

y

0
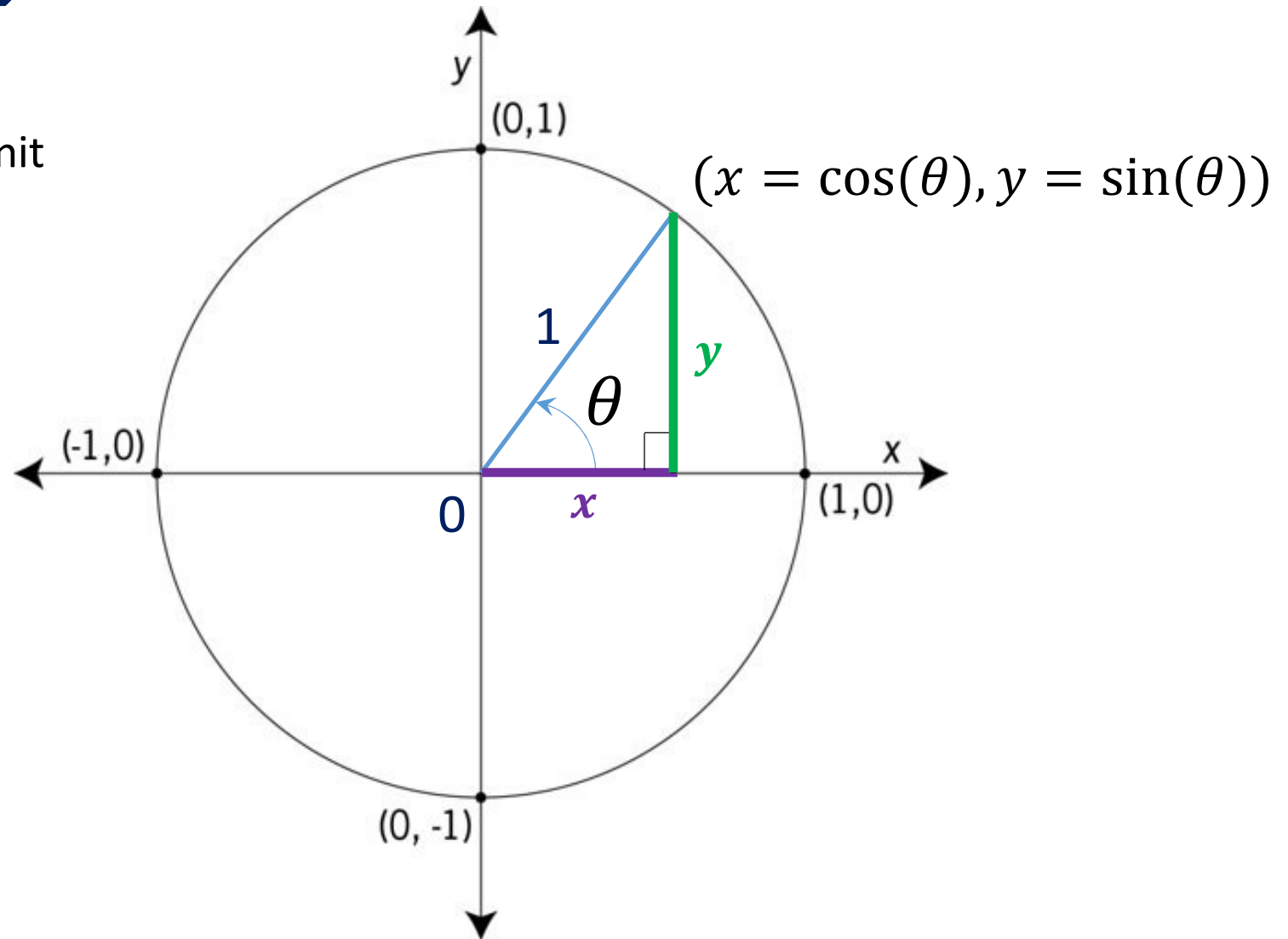
x

x

$(1,0)$

$(0, -1)$

Unit Circle

(x, y) on a point on the unit circle can be found by

$$x = cos(\theta)$$

$$y = sin(\theta)$$

$$\tan(\theta) = \frac{\sin(\theta)}{\cos(\theta)}$$

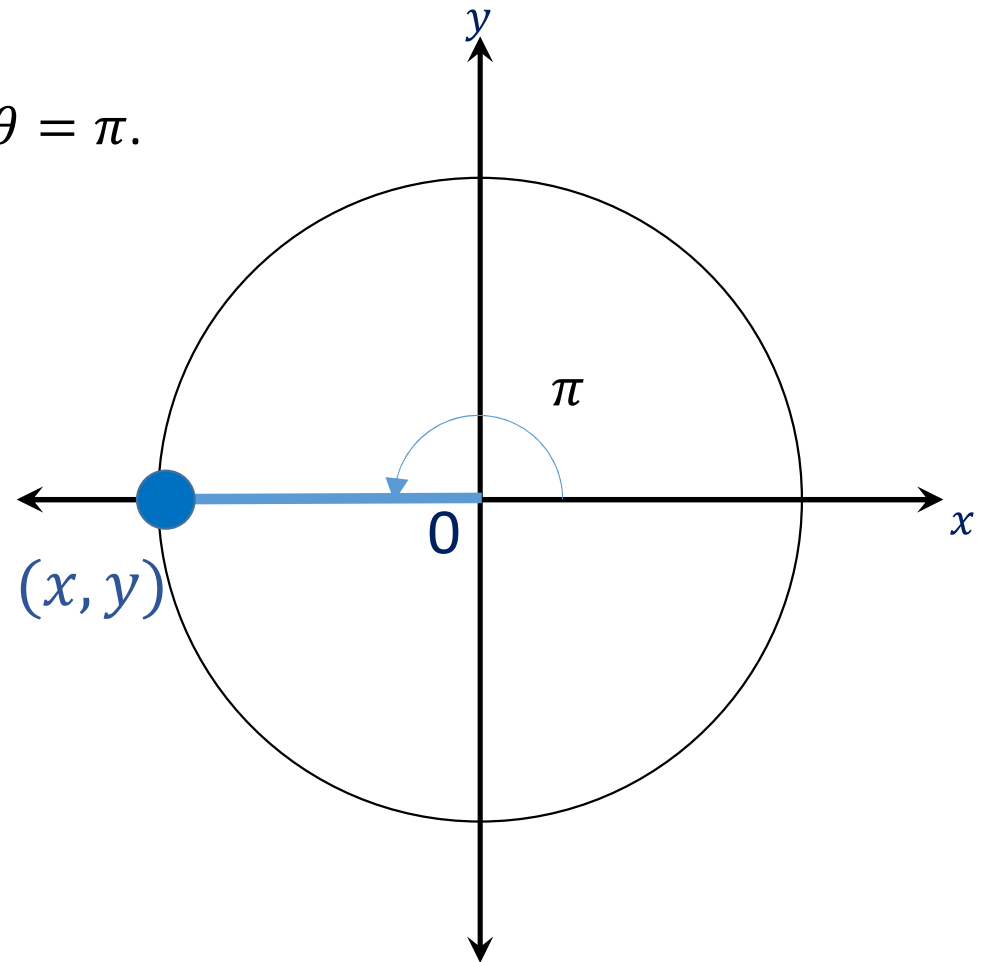$(x = \cos(\theta), y = \sin(\theta))$

Unit Circle

Determine $\cos(\theta)$, $\sin(\theta)$ and $\tan(\theta)$ when $\theta = \pi$.

Coordinates of $(x, y) = (-1, 0)$

$$(x, y) = (\cos(\theta), \sin(\theta))$$

$$\cos(\pi) = -1 \qquad sin(\pi) = 0$$
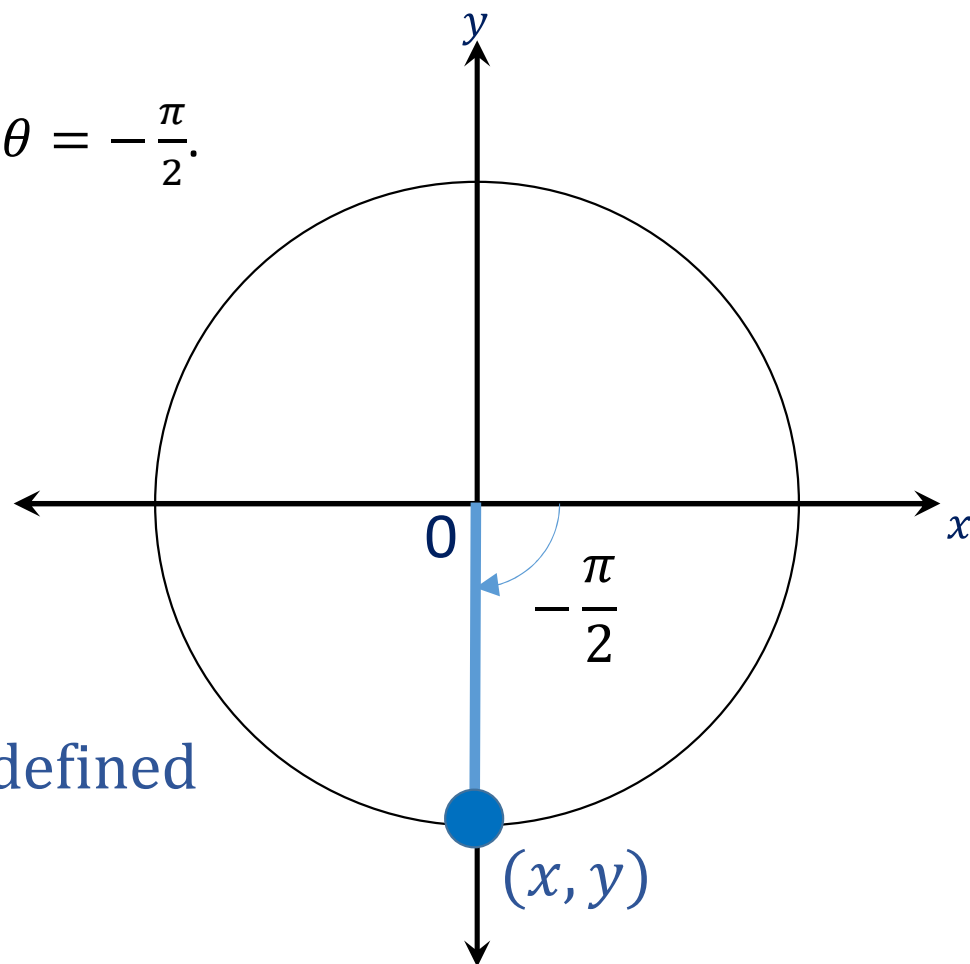
$$\tan(\pi) = \frac{\sin(\pi)}{\cos(\pi)} = 0$$

Unit Circle

Determine $\cos(\theta),\ \sin(\theta)\ and\ \tan(\theta)$ when $\theta = -\dfrac{\pi}{2}$.

$$\cos\left(-\frac{\pi}{2}\right) = 0 \qquad sin\left(-\frac{\pi}{2}\right) = -1$$

$$\tan\left(-\frac{\pi}{2}\right) = \frac{\sin\left(-\frac{\pi}{2}\right)}{\cos\left(-\frac{\pi}{2}\right)} = -\frac{1}{0} = \text{undefined}$$

Unit Circle

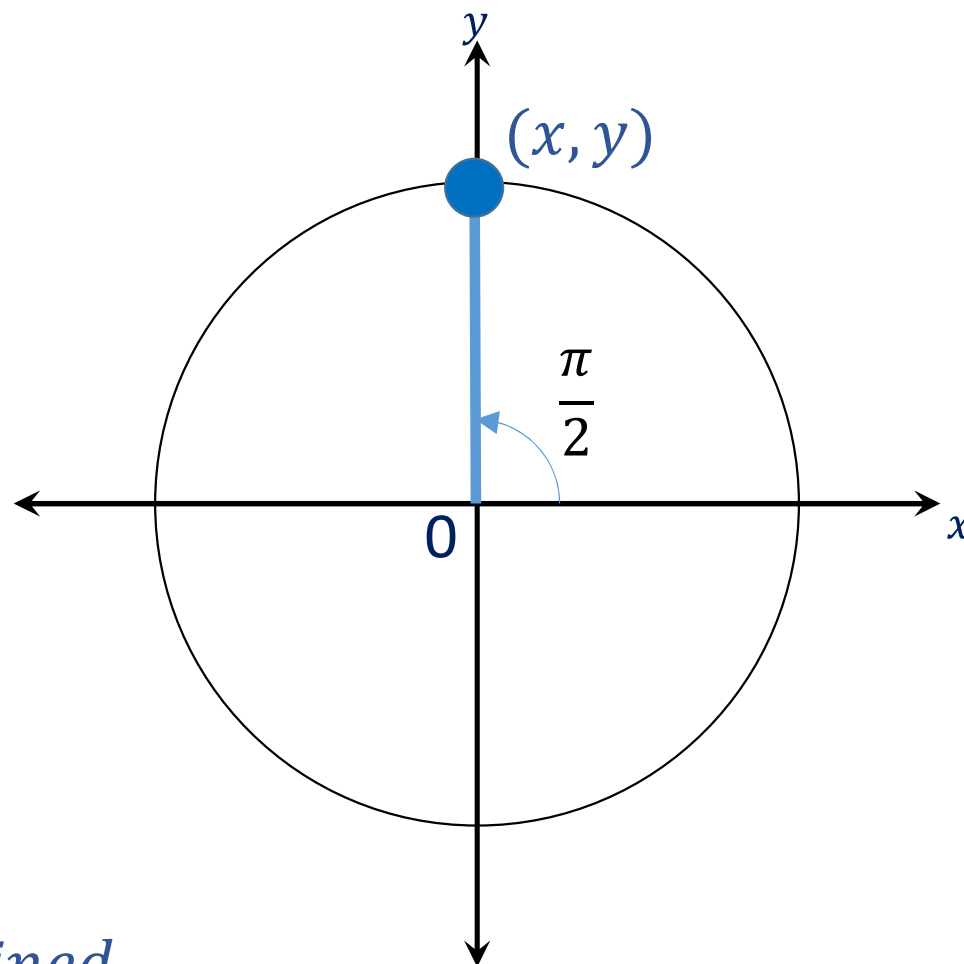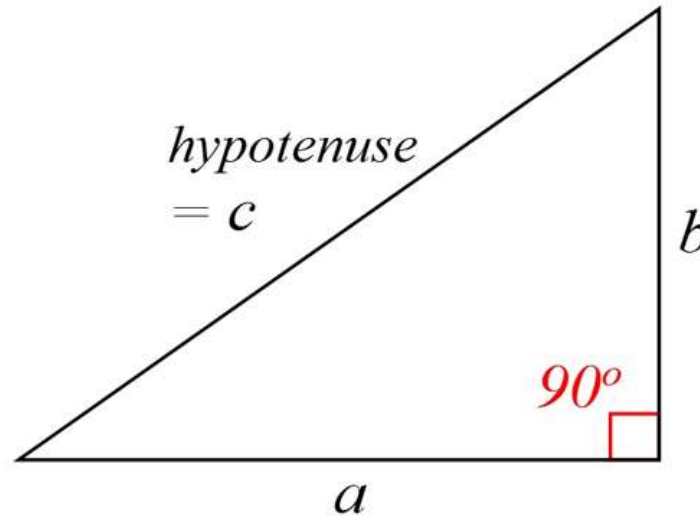Determine $\cos(\theta),\ \sin(\theta)$ when $\theta = \frac{5\pi}{2}$.

$$\cos\left(\frac{5\pi}{2}\right) = \cos\left(\frac{\pi}{2} + 2\pi\right)$$

$$= \cos\left(\frac{\pi}{2}\right) = 0$$

$$\sin\left(\frac{5\pi}{2}\right) = \sin\left(\frac{\pi}{2} + 2\pi\right)$$

$$= \sin\left(\frac{\pi}{2}\right) = 1$$

$$\tan\left(\frac{5\pi}{2}\right) = \frac{\sin\left(\frac{5\pi}{2}\right)}{\cos(\frac{5\pi}{2})} = \frac{1}{0} = undefined$$

y

(x, y)

$\frac{\pi}{2}$

0

x

Pythagoras' Theorem: **the square of the length of the hypotenuse, is equal to the sum of the squares of the two smaller sides**
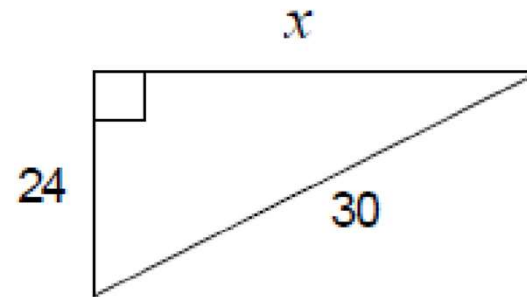

$$c^2 = a^2 + b^2$$

Solve for the unknowns

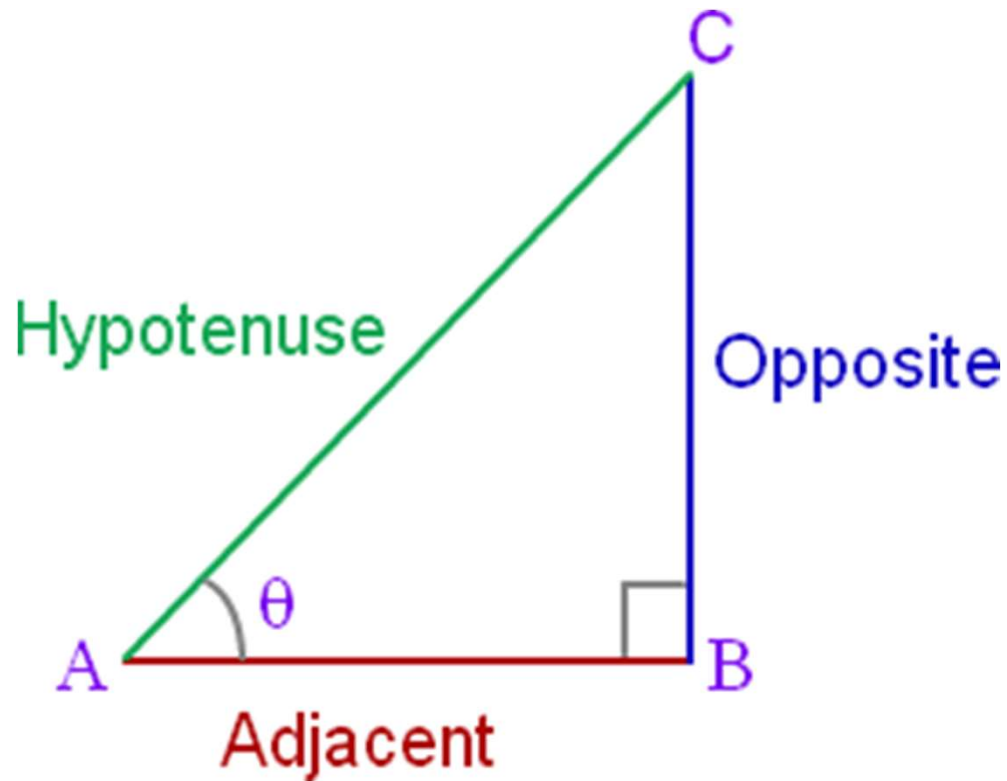$$a^2 + b^2 = c^2$$

$$12^2 + 9^2 = x^2$$

$$x = 15$$

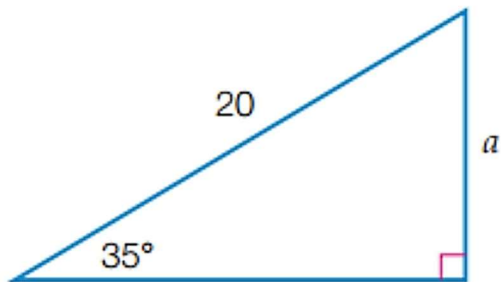$$a^2 + b^2 = c^2$$

$$x^2 + 24^2 = 30^2$$

$$x = 18$$

- Sin θ = $\dfrac{Opposite}{Hypotenuse}$

- Cos θ = $\dfrac{Adjacent}{Hypotenuse}$
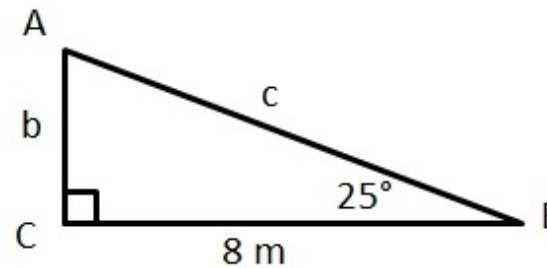
- Tan θ = $\dfrac{Opposite}{Adjacent}$

Solve for the unknowns (give your answers to 2 decimals)

$$\sin(35) = \frac{a}{20}$$

$$a = 11.47$$

$$\tan(25) = \frac{b}{8}$$
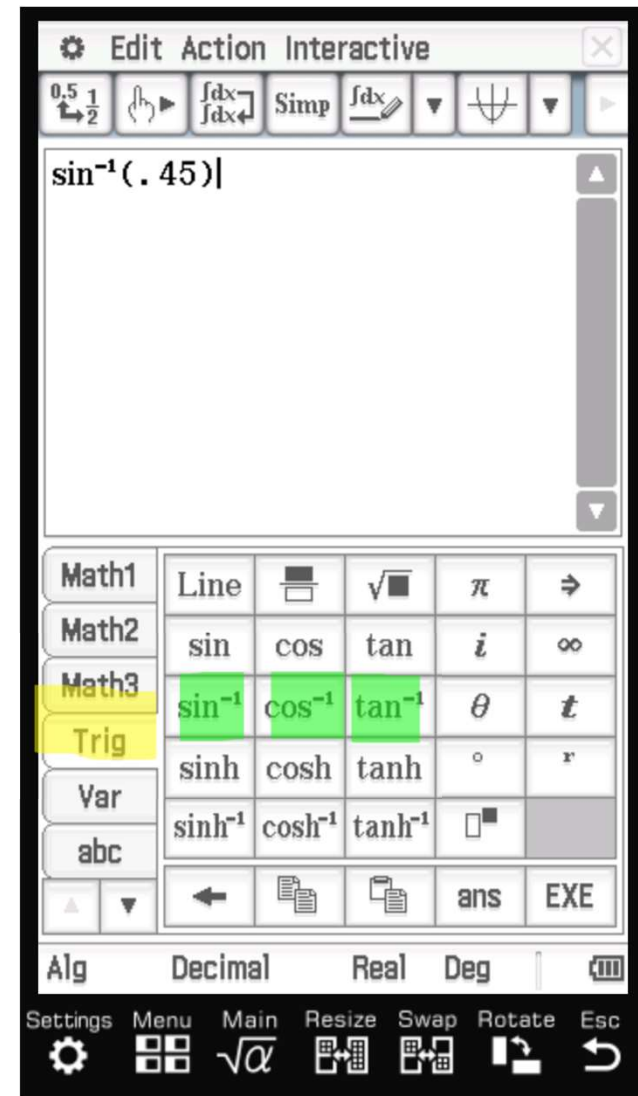
$$b = 3.73$$

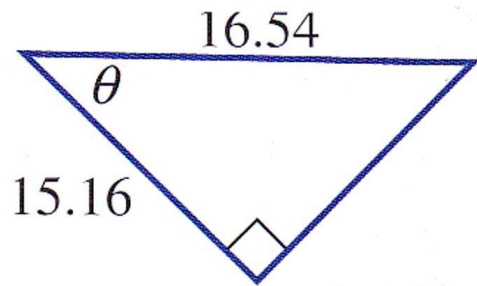$$\cos(25) = \frac{8}{c}$$

$$c = 8.83$$

ClassPad Introduction

Using MAIN Menu

- Solve
  - $\sin^{-1}(0.45)$

- Select on Keyboard - > Trig
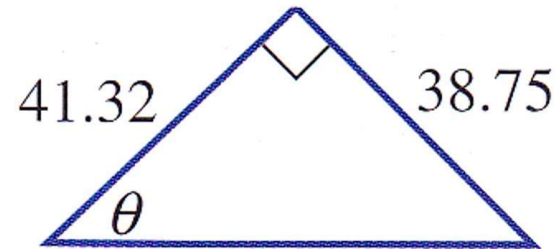
- Solve the following (in decimals)
$$\tan^{-1}(0.1)$$

Solve for the unknowns (give your answers to 2 decimals)

16.54

θ

15.16

$$\cos(\theta) = \frac{15.16}{16.54}$$
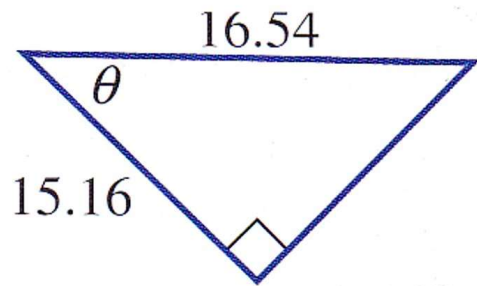
$$\theta = 23.57$$

41.32   38.75

θ

$$\tan(\theta) = \frac{38.75}{41.32}$$

$$\theta = 43.16$$

Daily Review
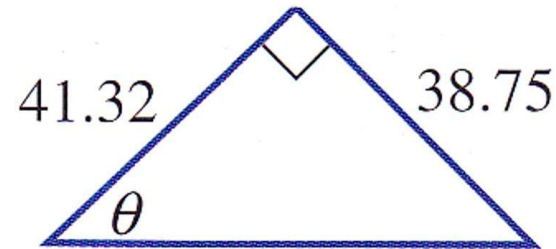
Solve for the unknowns (give your answers to 2 decimals)

$$\cos(\theta) = \frac{15.16}{16.54}$$

In ClassPad:

Solve $\left(\cos(x) = \frac{15.16}{16.54} \mid 0 \leq x \leq 180°\right)$

$$\theta = 23.57°$$

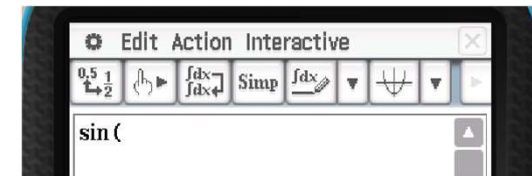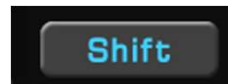$$\tan(\theta) = \frac{38.75}{41.32}$$

$$\theta = 43.16$$

In ClassPad:

Solve $\left(\tan(x) = \frac{38.75}{41.32} \mid 0 \leq x \leq 180°\right)$

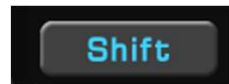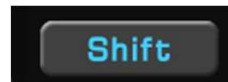# ClassPad Introduction

Introducing SHIFT keys

Enter Shift, followed by 1, brings up sin(
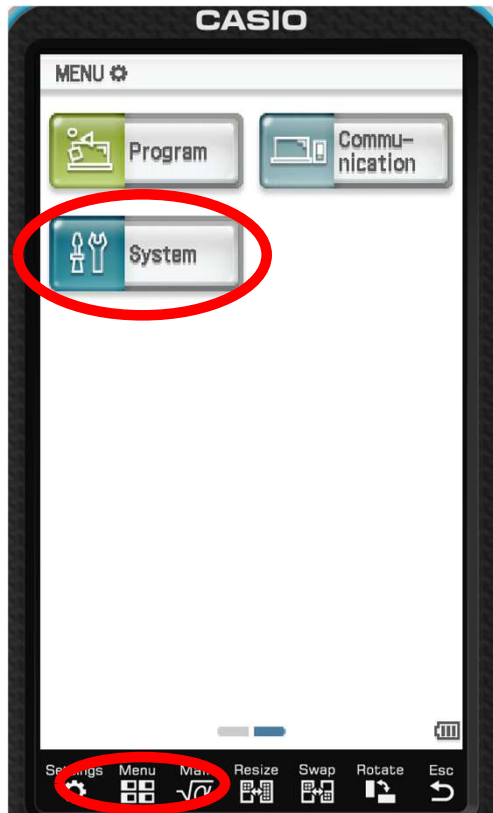
Enter Shift, followed by 2, brings up cos(

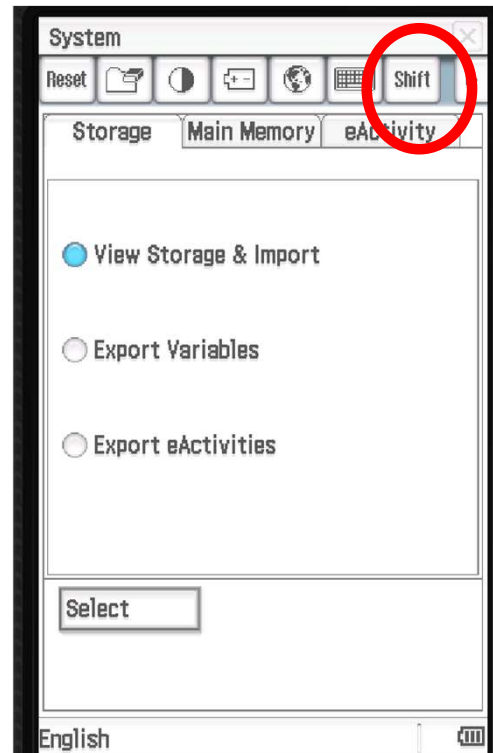Enter Shift, followed by 3, brings up tan(

ClassPad Introduction

Setting Up SHIFT keys
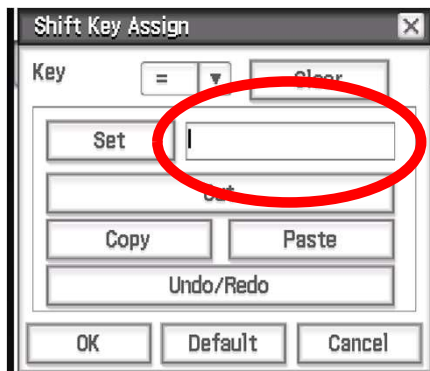
1. Enter System App from Menu
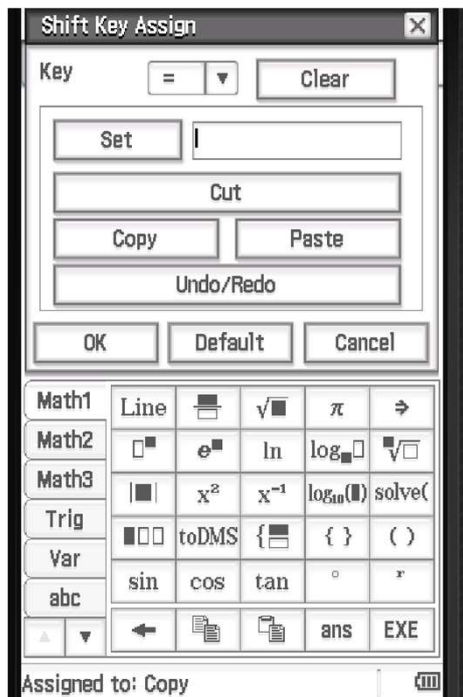
2. In System app, Tap "Shift"

3. Let's Set Up Key "="

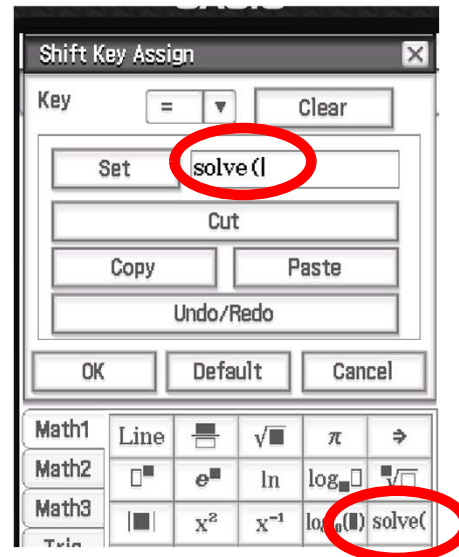# ClassPad Introduction

Setting Up SHIFT keys

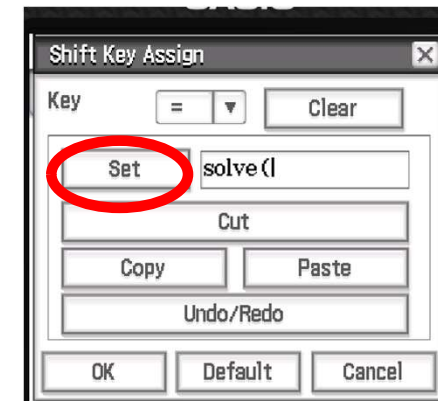4. Tap into box on the right of "Set"

5. Bring up Keyboard
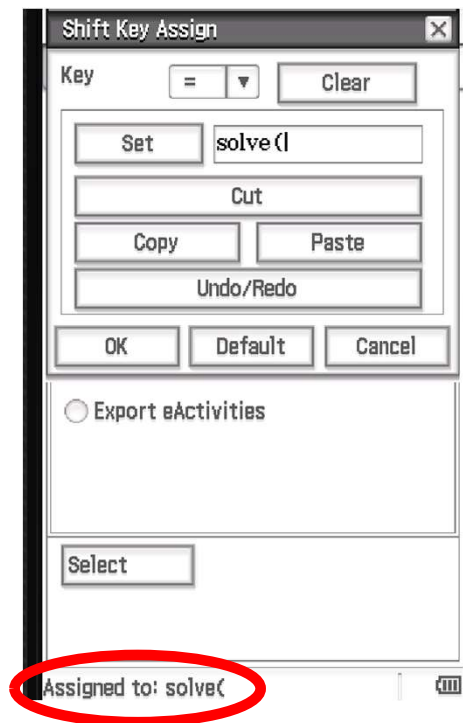

6. Tap on "Solve"

7. Tap on "Set"

ClassPad Introduction

Setting Up SHIFT keys

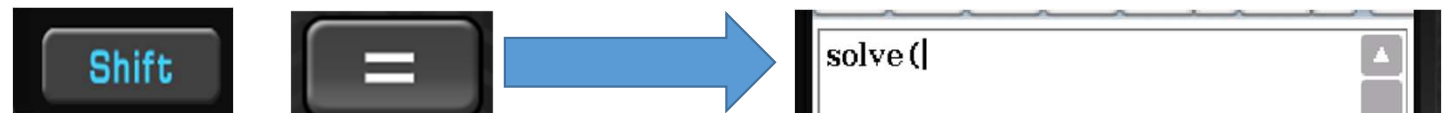8. Check to see if it has been Assigned

9. Tap on "ok"

10. Back in MAIN
Enter Shift, followed by =, brings up solve(

ClassPad Introduction

Setting Up SHIFT keys

Shift	
0	π
1	sin(
2	cos(
3	tan(
=	solve(
(	$\leq$
)	$\geq$
,	|
$\div$	
$\times$	expand(
$-$	factor(

Complete Ex 12C and 12D