Math 3 Unit 8: Trigonometry

Unit	Title	Standards
8.1	Review & Introduction to the Unit Circle	G.SRT.6
8.2	Angles in Standard Position & Intro to Solving for an Angle	F.TF.2
8.3	Coterminal Angles and Evaluating Trig Functions for Angles	F.TF.2, F.TF.3
8.4	Solving Trig Equations for angles $0° \leq \theta < 360°$	F.TF.2, F.TF.7
8.5	Introduction to Radians	F.TF.2, F.TF.1
8.6	Radians and Trigonometric Functions	F.TF.2, F.TF.1
8.7	The Sine Graph	F.TF.2, F.IF.7.e, F.BF.3
8.8	The Cosine Graph	F.IF.7.e, F.TF.2, F.BF.3
8.9	Solutions of Functions with Sine and Cosine Graphs	F.IF.7.e, F.IF.9
Unit 8 Review		

Additional Clovis Unified Resources

http://mathhelp.cusd.com/courses/math-3

Clovis Unified is dedicated to helping you be successful in Math 3. On the website above you will find videos from Clovis Unified teachers on lessons, homework, and reviews. Digital copies of the worksheets, as well as hyperlinks to the videos listed on the back are also available at this site.

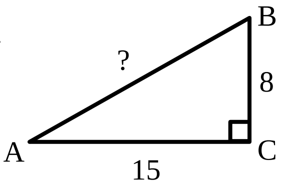
Math 3 Unit 8: Online Resources

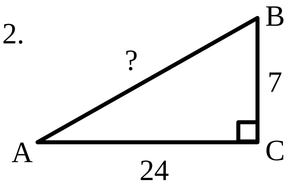
8.1	Review & Introduction to the Unit Circle	• Khan Academy: Intro to the Pythagorean Theorem 1 http://bit.ly/81ituca • Khan Academy: Trigonometric Ratios in Right Triangles http://bit.ly/81itucb • Khan Academy: Intro to the Trigonometric Ratios http://bit.ly/81itucc • Patrick JMT: The Trigonometric Functions: The Basics! Example 1 http://bit.ly/81itucd • Patrick JMT: Special Right Triangles in Trigonometry: 45-45-90 and 30-60-90 http://bit.ly/81ituce • Gettin' Triggy Wit It http://bit.ly/81itucf
8.2	Angles in Standard Position & Intro to Solving for an Angle	• Patrick JMT: Finding the Quadrant in Which an Angle Lies – Example 1 http://bit.ly/82aispa • Patrick JMT: The Trigonometric Functions: The Basics! Example 2 http://bit.ly/82aispb • Patrick JMT: Evaluating Trigonometric Functions Using the Reference Angle, Example 1 http://bit.ly/82aispc
8.3	Coterminal Angles and Evaluating Trig Functions for Angles	• Patrick JMT: Reference Angle for an Angle, Ex 1 (Using Degrees) http://bit.ly/83ctaa • Patrick JMT: Coterminal Angles – Example 1 http://bit.ly/83ctab • Patrick JMT: Deriving Values on the Unit Circle http://bit.ly/83ctaf • Patrick JMT: A Way to remember the Entire Unit Circle for Trigonometry http://bit.ly/83ctag
8.4	Solving Trig Equations for angles $0° \le \theta < 360°$	• Math TV: Solving Trig Equations http://bit.ly/84steb • Solving Trig Equations for angles $0° \le \theta < 360°$ http://bit.ly/84stee
8.5	Introduction to Radians	• Patrick JMT: Reference Angle for an Angle, Ex 2 (Using Radians) http://bit.ly/85itra • Khan Academy: Radian Angles & Quadrants http://bit.ly/85itrb
8.6	Radians and Trigonometric Functions	• Patrick JMT: Solving a Basic Trigonometric Equation, Example 1 http://bit.ly/86ratfa • Patrick JMT: Solving a Basic Trigonometric Equation, Example 2 http://bit.ly/86ratfb • Khan Academy: Radians & Degrees http://bit.ly/86ratfc or http://bit.ly/86ratfd
8.7	The Sine Graph	• Patrick JMT: Graphing Sine and Cosine with Phase (Horizontal) Shifts, Example 2 http://bit.ly/87tsgb • Purple Math: Graphing Trigonometric Functions (Pages 1 through 3) http://bit.ly/87tsgc • Khan Academy: Graph of y=sin(x) http://bit.ly/87tsgd
8.8	The Cosine Graph	• Patrick JMT: The Graph of Cosine, y = cos (x) http://bit.ly/88tcga • Patrick JMT: Trigonometric Functions and Graphing: Amplitude, Period, Vertical and Horizontal Shifts, Ex 2 http://bit.ly/88tcgb
8.9	Solutions of Functions with Sine and Cosine Graphs	• Patrick JMT: Simplifying Products of Binomials Involving Trigonometric Functions, Ex 2 http://bit.ly/89sofa • Khan Academy: Intersection points of y=sin(x) and y=cos(x) http://bit.ly/89sofb • Solving a Trigonometric Equation by Factoring 2sin^2(x)+3sinx+1=0,[0,2π) http://bit.ly/89sofc • Patrick JMT: Solving Trigonometric Equations http://bit.ly/89sofd

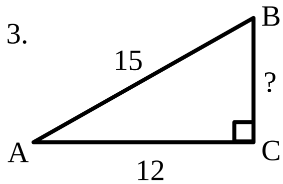
Math 3 Unit 8 Worksheet 1
Review & Introduction to the Unit Circle
**** Scientific calculator needed for 5-12 ****

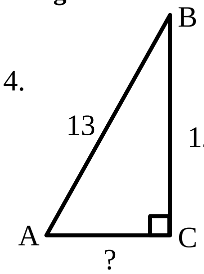
Name:______________________________
Date:_____________________Per:_________

[1-4]: Find the sine, cosine, and tangent ratios for angle A and for angle B in each of the following triangles.
{Hint: Use the Pythagorean theorem to find the missing side in the triangle first.}

1. 

2. 

3. 

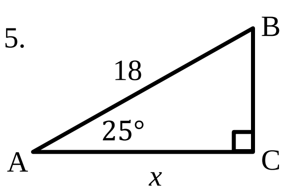
4. 

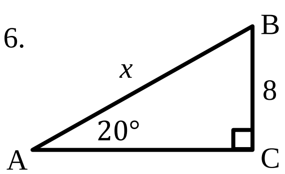
$\sin A =$ ___ $\sin B =$ ___ $\sin A =$ ___ $\sin B =$ ___ $\sin A =$ ___ $\sin B =$ ___ $\sin A =$ ___ $\sin B =$ ___

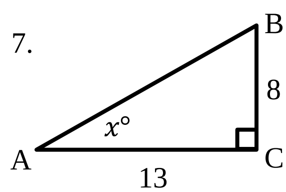
$\cos A =$ ___ $\cos B =$ ___ $\cos A =$ ___ $\cos B =$ ___ $\cos A =$ ___ $\cos B =$ ___ $\cos A =$ ___ $\cos B =$ ___

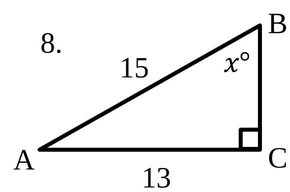
$\tan A =$ ___ $\tan B =$ ___ $\tan A =$ ___ $\tan B =$ ___ $\tan A =$ ___ $\tan B =$ ___ $\tan A =$ ___ $\tan B =$ ___

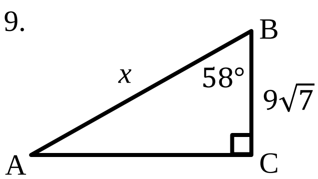
[5-12]: Use right-triangle trigonometry to find the value for *x*, without calculator. Once you have solved for *x* without calculator, use a scientific calculator to find the value of *x* to the nearest thousandth (*i.e.* 3 decimal place accuracy.)

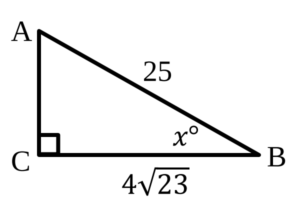
5. 

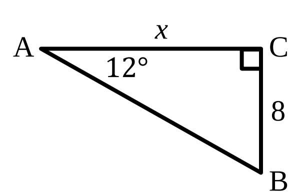
6. 

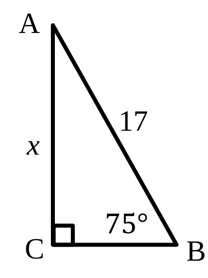
7. 

8. 

9. 

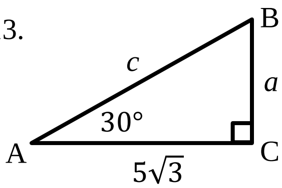
10. 

11. 

12. 

[13-14]: Use only right-triangle trig and the sum of the angles of a triangle to solve the triangle.
{To solve a triangle means to find all angle measures and the length for each side of the triangle.}

13.

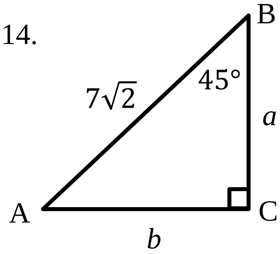


$\angle B =$ _____

$a =$ _____

$c =$ _____

14.

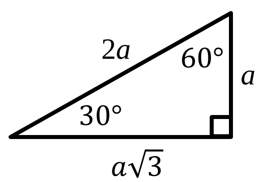


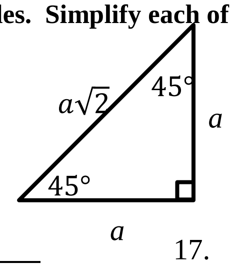
$\angle A =$ _____

$a =$ _____

$b =$ _____

[15-17]: Hopefully you noticed that the previous two problems were special right triangles. The generalized form for the $30°:60°:90°$ *right triangle* and the $45°:45°:90°$ *right triangle* are shown below. Find the sine, cosine, and tangent ratios for $30°$, $60°$, and $45°$ using these generalized special right triangles. Simplify each of the ratios too.





15. $\sin 30° =$ _____ $=$ _____

$\cos 30° =$ _____ $=$ _____

$\tan 30° =$ _____ $=$ _____

16. $\sin 60° =$ _____ $=$ _____

$\cos 60° =$ _____ $=$ _____

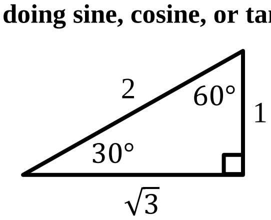
$\tan 60° =$ _____ $=$ _____

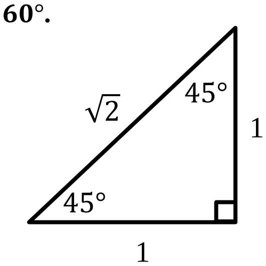
17. $\sin 45° =$ _____ $=$ _____

$\cos 45° =$ _____ $=$ _____

$\tan 45° =$ _____ $=$ _____

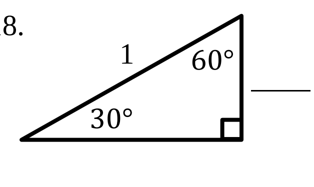
Notice the a's reduce from each of the fractions above; therefore, we can use a simplified form of the generalized special right triangles where $a = 1$ when doing sine, cosine, or tangent of $30°, 45°, or\ 60°$.



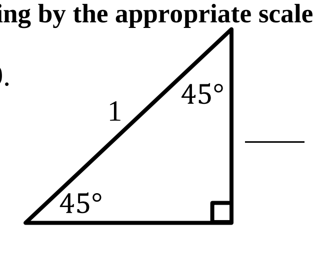


[18-19]: It is also advantageous to have the hypotenuse of these special right triangles with a length of 1. Convert each of the special right triangles so that its hypotenuse has length 1 by multiplying by the appropriate scale factor. Label the length for each side of the triangle.

18.

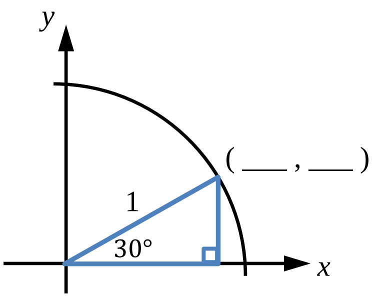


19.

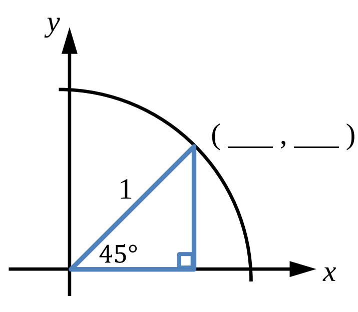


[20-22]: Fill-in the missing information in the following drawings; each triangle is a special right triangle.

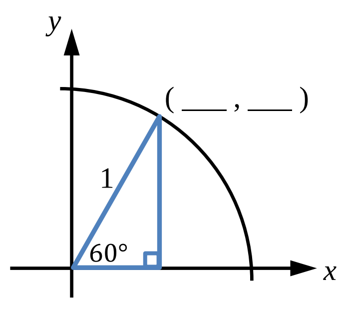
20.



21.



22.

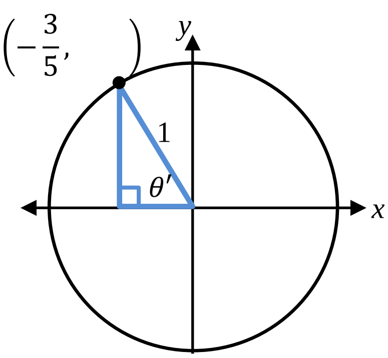


Math 3 Unit 8 Worksheet 2 **Name:________________________________**
Angles in Standard Position & Intro to Solving for an Angle **Date:______________________Per:__________**
**** Scientific calculator <u>not</u> allowed. ****

[1-16]: a) sketch each of the following angles in standard position, b) identify the quadrant in which the terminating ray resides, and c) find the reference angle, θ', for each of the original angles.

1. $\theta = 160°$ b) Quadrant _____ c) $Ref\angle\theta' =$ _____
2. $\theta = 200°$ b) Quadrant _____ c) $Ref\angle\theta' =$ _____
3. $\theta = 310°$ b) Quadrant _____ c) $Ref\angle\theta' =$ _____
4. $\theta = 230°$ b) Quadrant _____ c) $Ref\angle\theta' =$ _____
5. $\theta = 100°$ b) Quadrant _____ c) $Ref\angle\theta' =$ _____
6. $\theta = 440°$ b) Quadrant _____ c) $Ref\angle\theta' =$ _____
7. $\theta = 500°$ b) Quadrant _____ c) $Ref\angle\theta' =$ _____
8. $\theta = 705°$ b) Quadrant _____ c) $Ref\angle\theta' =$ _____
9. $\theta = 385°$ b) Quadrant _____ c) $Ref\angle\theta' =$ _____
10. $\theta = 610°$ b) Quadrant _____ c) $Ref\angle\theta' =$ _____
11. $\theta = -70°$ b) Quadrant _____ c) $Ref\angle\theta' =$ _____
12. $\theta = -140°$ b) Quadrant _____ c) $Ref\angle\theta' =$ _____
13. $\theta = -310°$ b) Quadrant _____ c) $Ref\angle\theta' =$ _____
14. $\theta = -195°$ b) Quadrant _____ c) $Ref\angle\theta' =$ _____
15. $\theta = 195°$ b) Quadrant _____ c) $Ref\angle\theta' =$ _____
16. $\theta = 280°$ b) Quadrant _____ c) $Ref\angle\theta' =$ _____

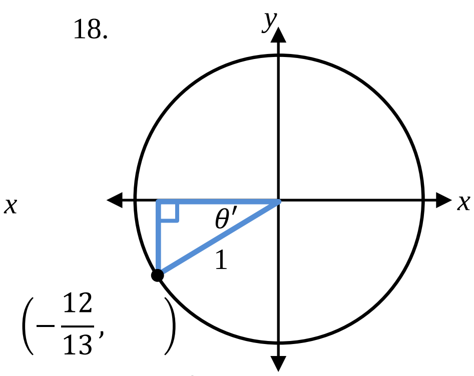
[17-19]: a) Find the missing coordinate for the point on the unit circle. b) Next find the simplified sine, cosine, and tangent ratios for the angle, θ, by using its reference angle, θ'.

17.


b) $\sin\theta =$ _____

$\cos\theta =$ _____

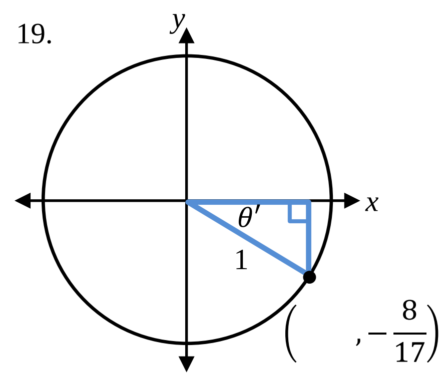
$\tan\theta =$ _____

18.


b) $\sin\theta =$ _____

$\cos\theta =$ _____

$\tan\theta =$ _____

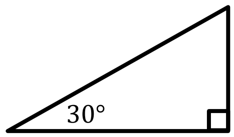
19.


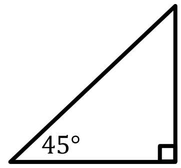
b) $\sin\theta =$ _____

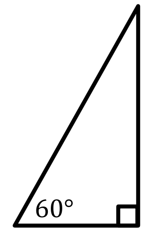
$\cos\theta =$ _____

$\tan\theta =$ _____

[20-27]: Fill-in the missing sides for the special right triangles found below, then find the acute angle, θ, that satisfies the following equations.







20. $\sin\theta = \frac{\sqrt{3}}{2}$

21. $\cos\theta = \frac{\sqrt{3}}{2}$

22. $\tan\theta = \sqrt{3}$

23. $\sin\theta = \frac{\sqrt{2}}{2}$

24. $\tan\theta = 1$

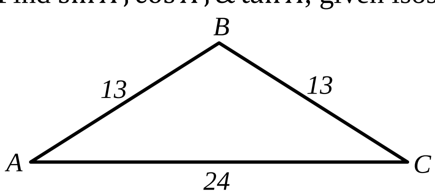
25. $\cos\theta = \frac{1}{2}$

26. $\cos\theta = \frac{\sqrt{2}}{2}$

27. $\tan\theta = \frac{\sqrt{3}}{3}$

[28-29]: Review

28. Find $\sin A$, $\cos A$, & $\tan A$, given isosceles ΔABC.

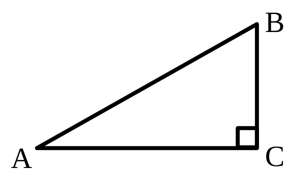


b) $\sin A =$ ______

$\cos A =$ ______

$\tan A =$ ______

29. If $\tan B = \frac{24}{7}$, then find $\sin A$, $\cos A$, & $\tan A$.



b) $\sin A =$ ______

$\cos A =$ ______

$\tan A =$ ______

Math 3 Unit 8 Worksheet 3 **Name:________________________________**

Coterminal Angles and Evaluating Trig Functions for Angles **Date:____________________Per:________**

**** Scientific calculator not allowed. ****

[1-5]: Identify one positive coterminal angle and one negative coterminal angle for each of the following.

1. $\theta = 100°$ $Pos\angle =$ _____ $Neg\angle =$ _____
2. $\theta = 200°$ $Pos\angle =$ _____ $Neg\angle =$ _____
3. $\theta = 50°$ $Pos\angle =$ _____ $Neg\angle =$ _____
4. $\theta = -110°$ $Pos\angle =$ _____ $Neg\angle =$ _____
5. $\theta = -400°$ $Pos\angle =$ _____ $Neg\angle =$ _____

[6-20]: A) Sketch each angle in standard position. B) Identify the quadrant in which the terminating ray lies. C) Identify the reference angle. D) And identify the sine, cosine, and tangent ratio for each.

6. $\theta = 60°$
b) Quadrant _____
c) $Ref\angle\theta' =$ _____
d) sin ____ = _____
cos ____ = _____
tan ____ = _____

7. $\theta = 240°$
b) Quadrant _____
c) $Ref\angle\theta' =$ _____
d) sin ____ = _____
cos ____ = _____
tan ____ = _____

8. $\theta = 30°$
b) Quadrant _____
c) $Ref\angle\theta' =$ _____
d) sin ____ = _____
cos ____ = _____
tan ____ = _____

9. $\theta = 150°$
b) Quadrant _____
c) $Ref\angle\theta' =$ _____
d) sin ____ = _____
cos ____ = _____
tan ____ = _____

10. $\theta = 45°$
b) Quadrant _____
c) $Ref\angle\theta' =$ _____
d) sin ____ = _____
cos ____ = _____
tan ____ = _____

11. $\theta = 315°$
b) Quadrant _____
c) $Ref\angle\theta' =$ _____
d) sin ____ = _____
cos ____ = _____
tan ____ = _____

12. $\theta = 120°$
b) Quadrant _____
c) $Ref\angle\theta' =$ _____
d) sin ____ = _____
cos ____ = _____
tan ____ = _____

13. $\theta = 225°$
b) Quadrant _____
c) $Ref\angle\theta' =$ _____
d) sin ____ = _____
cos ____ = _____
tan ____ = _____

14. $\theta = -150°$
b) Quadrant _____
c) $Ref\angle\theta' =$ _____
d) sin ____ = _____
cos ____ = _____
tan ____ = _____

15. $\theta = -300°$
b) Quadrant _____
c) $Ref\angle\theta' =$ _____
d) sin ____ = _____
cos ____ = _____
tan ____ = _____

16. $\theta = -135°$
b) Quadrant _____
c) $Ref\angle\theta' =$ _____
d) sin ____ = _____
cos ____ = _____
tan ____ = _____

17. $\theta = -210°$
b) Quadrant _____
c) $Ref\angle\theta' =$ _____
d) sin ____ = _____
cos ____ = _____
tan ____ = _____

18. $\theta = 495°$
b) Quadrant _____
c) $Ref\angle\theta' =$ _____
d) sin ____ = _____
cos ____ = _____
tan ____ = _____

19. $\theta = 690°$
b) Quadrant _____
c) $Ref\angle\theta' =$ _____
d) sin ____ = _____
cos ____ = _____
tan ____ = _____

20. $\theta = 600°$
b) Quadrant _____
c) $Ref\angle\theta' =$ _____
d) sin ____ = _____
cos ____ = _____
tan ____ = _____

[21-30]: A) Sketch each angle in standard position. B) And identify the sine, cosine, and tangent ratio for each.

21. $\theta = 90°$ b) $\sin\theta =$ _____ $\cos\theta =$ _____ $\tan\theta =$ _____

22. $\theta = 270°$ b) $\sin\theta =$ _____ $\cos\theta =$ _____ $\tan\theta =$ _____

23. $\theta = 180°$ b) $\sin\theta =$ _____ $\cos\theta =$ _____ $\tan\theta =$ _____

24. $\theta = 0°$ b) $\sin\theta =$ _____ $\cos\theta =$ _____ $\tan\theta =$ _____

25. $\theta = 630°$ b) $\sin\theta =$ _____ $\cos\theta =$ _____ $\tan\theta =$ _____

26. $\theta = -540°$ b) $\sin\theta =$ _____ $\cos\theta =$ _____ $\tan\theta =$ _____

27. $\theta = -450°$ b) $\sin\theta =$ _____ $\cos\theta =$ _____ $\tan\theta =$ _____

28. $\theta = 810°$ b) $\sin\theta =$ _____ $\cos\theta =$ _____ $\tan\theta =$ _____

29. $\theta = 1080°$ b) $\sin\theta =$ _____ $\cos\theta =$ _____ $\tan\theta =$ _____

30. $\theta = -630°$ b) $\sin\theta =$ _____ $\cos\theta =$ _____ $\tan\theta =$ _____

[31-40]: Identify all of the quadrants where the terminating ray for $\boldsymbol{\theta}$ can lie so that the equation is true. {Hint #1: There should be at least two quadrants identified for each of these. Hint #2: Do <u>not</u> attempt to actually solve for $\boldsymbol{\theta}$, just identify the quadrants where the reference angle will make the equation true. Hint #3: $\boldsymbol{sin^2\theta}$ is mathematical notation for $(\boldsymbol{sin\ \theta})^2$.}

31. $\sin\theta = -\frac{1}{5}$

32. $\cos\theta = \frac{1}{4}$

33. $\tan\theta = -3$

34. $\sin\theta = \pm\frac{2}{5}$

35. $\cos\theta = -\frac{1}{10}$

36. $\tan\theta = \frac{4}{3}$

37. $\sin\theta = \frac{1}{3}$

38. $\cos\theta = \pm\frac{3}{5}$

39. $\tan\theta = \pm\frac{10}{7}$

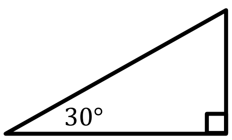
40. $\sin^2\theta = \frac{5}{16}$

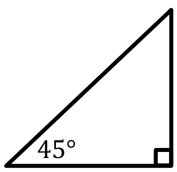
Math 3 Unit 8 Worksheet 4 **Name:________________________________**
Solving Trig Equations for angles $0° \leq \theta < 360°$ **Date:_____________________Per:_________**
**** Scientific calculator <u>not</u> allowed. ****

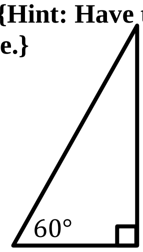
[1-10]: Identify all of the possible quadrants in which the terminating ray for θ could lie.

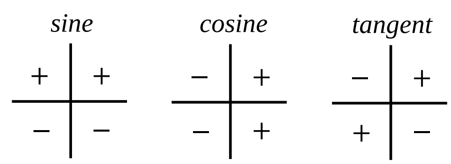
1. $\cos\theta > 0$
2. $\sin\theta > 0$
3. $\tan\theta > 0$
4. $\cos\theta < 0$
5. $\sin\theta < 0$
6. $\tan\theta < 0$
7. $cos^2\theta > 0$
8. $sin^2\theta > 0$
9. $tan^2\theta < 0$
10. $tan^2\theta > 0$

[11-21]: Solve for all values of θ such that $0° \leq \theta < 360°$. {Hint: Have the special right triangles handy, and keep in mind the quadrants where sine/cosine/tangent are positive vs negative.}









11. $2\sin\theta - 1 = 0$
12. $2\cos\theta + 1 = 0$
13. $5\tan\theta + 5 = 0$
14. $\sqrt{3}\tan\theta - 1 = 0$
15. $2cos^2\theta - 1 = 0$
16. $tan^2\theta - 3 = 0$

17. $4sin^2\theta - 1 = 0$

18. $4cos^2\theta - 3 = 0$

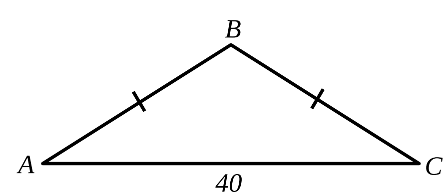
19. $3tan^2\theta + 1 = 0$

20. $\left(2\sin\theta + \sqrt{3}\right)\left(\sqrt{2}\sin\theta - 1\right) = 0$

21. $\left(\tan\theta + \sqrt{3}\right)(\tan\theta - 1) = 0$

[22]: Review

22. If $\tan A = \frac{3}{4}$, then find the perimeter and the area for isosceles ΔABC.



Math 3 Unit 8 Worksheet 5 **Name:**________________________________
Introduction to Radians **Date:**_____________________**Per:**_________
**** Scientific calculator <u>not</u> allowed ****

[1-18]: A) Sketch each angle in standard position. B) Identify the quadrant for the terminating ray; however, if it's a quadrantal, identify the two quadrants it's between. C) Identify the reference angle; however, if it's a quadrantal, identify it as such.

1. $\theta = \frac{3\pi}{5}$

b) Quadrant _____

c) $Ref\angle =$ ______

2. $\theta = \frac{11\pi}{9}$

b) Quadrant _____

c) $Ref\angle =$ ______

3. $\theta = \frac{5\pi}{18}$

b) Quadrant _____

c) $Ref\angle =$ ______

4. $\theta = \frac{8\pi}{5}$

b) Quadrant _____

c) $Ref\angle =$ ______

5. $\theta = \frac{3\pi}{2}$

b) Quadrant _____

c) $Ref\angle =$ ______

6. $\theta = \frac{7\pi}{3}$

b) Quadrant _____

c) $Ref\angle =$ ______

7. $\theta = \frac{3\pi}{4}$

b) Quadrant _____

c) $Ref\angle =$ ______

8. $\theta = \frac{15\pi}{8}$

b) Quadrant _____

c) $Ref\angle =$ ______

9. $\theta = \frac{17\pi}{5}$

b) Quadrant _____

c) $Ref\angle =$ ______

10. $\theta = \frac{5\pi}{9}$

b) Quadrant _____

c) $Ref\angle =$ ______

11. $\theta = \frac{9\pi}{2}$

b) Quadrant _____

c) $Ref\angle =$ ______

12. $\theta = \frac{16\pi}{7}$

b) Quadrant _____

c) $Ref\angle =$ ______

13. $\theta = 3\pi$

b) Quadrant _____

c) $Ref\angle =$ ______

14. $\theta = \frac{19\pi}{6}$

b) Quadrant _____

c) $Ref\angle =$ ______

15. $\theta = \frac{5\pi}{8}$

b) Quadrant _____

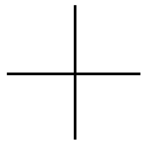
c) $Ref\angle =$ ______

16. $\theta = \frac{11\pi}{7}$

b) Quadrant _____

c) $Ref\angle =$ ______

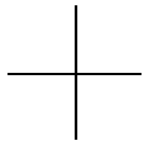
17. $\theta = -\frac{\pi}{4}$



b) Quadrant _____

c) $Ref\angle =$ ______

18. $\theta = -\frac{\pi}{3}$



b) Quadrant _____

c) $Ref\angle =$ ______

[19-24]: A) Find the complement for each angle. B) Find the supplement for each angle.

19. $\theta = \frac{2\pi}{5}$

a) C: _______

b) S: _______

20. $\theta = \frac{3\pi}{8}$

a) C: _______

b) S: _______

21. $\theta = \frac{3\pi}{7}$

a) C: _______

b) S: _______

22. $\theta = \frac{\pi}{3}$

a) C: _______

b) S: _______

23. $\theta = \frac{\pi}{4}$

a) C: _______

b) S: _______

24. $\theta = \frac{\pi}{6}$

a) C: _______

b) S: _______

[25-30]: A) Find a positive coterminal angle and a negative coterminal angle for each.

25. $\theta = \frac{7\pi}{4}$

a) P: _______

N: _______

26. $\theta = \frac{5\pi}{6}$

a) P: _______

N: _______

27. $\theta = \frac{4\pi}{3}$

a) P: _______

N: _______

28. $\theta = \frac{5\pi}{4}$

a) P: _______

N: _______

29. $\theta = \frac{11\pi}{6}$

a) P: _______

N: _______

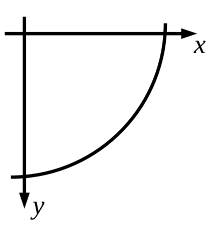
30. $\theta = \frac{2\pi}{3}$

a) P: _______

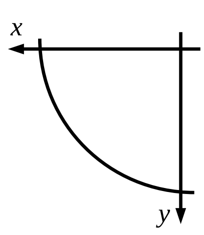
N: _______

[31-33]: Review: Find the ordered pair on the unit circle for each angle.

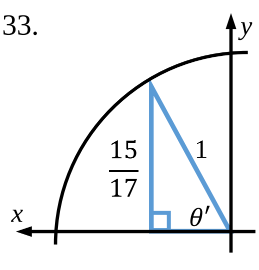
31. $\theta = 315°$



32. $\theta = 210°$

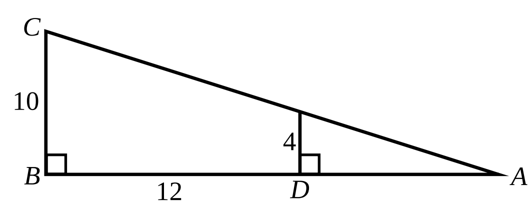


33.



[34]: Review.

34. Find $\sin A$, $\cos A$, & $\tan A$.



$\sin A =$ _____

$\cos A =$ _____

$\tan A =$ _____

Math 3 Unit 8 Worksheet 6 **Name:______________________________**
Radians and Trigonometric Functions **Date:____________________Per:_________**
**** Scientific calculator <u>not</u> allowed ****

[1-12]: Convert each angle from degrees to radian measure or radians to degrees, whichever is appropriate.

1. $\theta = 135°$
2. $\theta = 240°$
3. $\theta = \frac{7\pi}{5}$
4. $\theta = \frac{11\pi}{12}$
5. $\theta = 330°$
6. $\theta = 270°$
7. $\theta = \frac{15\pi}{8}$
8. $\theta = \frac{5\pi}{4}$
9. $\theta = -150°$
10. $\theta = -315°$
11. $\theta = -3\pi$
12. $\theta = -\frac{5\pi}{3}$

[13-24]: A) Sketch the reference angle for each in the correct quadrant. B) Find $\sin\theta$, $\cos\theta$, & $\tan\theta$.

13. $\theta = \frac{5\pi}{4}$

b) $\sin\theta =$ _____
$\cos\theta =$ _____
$\tan\theta =$ _____

14. $\theta = \frac{\pi}{3}$

b) $\sin\theta =$ _____
$\cos\theta =$ _____
$\tan\theta =$ _____

15. $\theta = \frac{5\pi}{6}$

b) $\sin\theta =$ _____
$\cos\theta =$ _____
$\tan\theta =$ _____

16. $\theta = \frac{\pi}{4}$

b) $\sin\theta =$ _____
$\cos\theta =$ _____
$\tan\theta =$ _____

17. $\theta = \frac{5\pi}{3}$

b) $\sin\theta =$ _____
$\cos\theta =$ _____
$\tan\theta =$ _____

18. $\theta = \frac{13\pi}{6}$

b) $\sin\theta =$ _____
$\cos\theta =$ _____
$\tan\theta =$ _____

19. $\theta = -\frac{\pi}{6}$

b) $\sin\theta =$ _____
$\cos\theta =$ _____
$\tan\theta =$ _____

20. $\theta = -\frac{2\pi}{3}$

b) $\sin\theta =$ _____
$\cos\theta =$ _____
$\tan\theta =$ _____

21. $\theta = -\frac{5\pi}{4}$

b) $\sin\theta =$ _____
$\cos\theta =$ _____
$\tan\theta =$ _____

22. $\theta = \frac{2\pi}{3}$

b) $\sin\theta =$ _____
$\cos\theta =$ _____
$\tan\theta =$ _____

23. $\theta = \frac{7\pi}{4}$

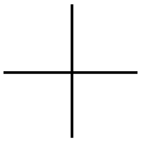
b) $\sin\theta =$ _____
$\cos\theta =$ _____
$\tan\theta =$ _____

24. $\theta = \frac{11\pi}{6}$

b) $\sin\theta =$ _____
$\cos\theta =$ _____
$\tan\theta =$ _____

[25-30]: A) Sketch each angle. B) Find $\sin\theta$, $\cos\theta$, & $\tan\theta$.

25. $\theta = \frac{3\pi}{2}$

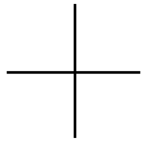


b) $\sin\theta =$ _____

$\cos\theta =$ _____

$\tan\theta =$ _____

26. $\theta = 3\pi$

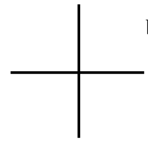


b) $\sin\theta =$ _____

$\cos\theta =$ _____

$\tan\theta =$ _____

27. $\theta = \frac{5\pi}{2}$

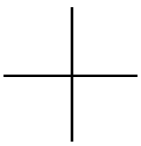


b) $\sin\theta =$ _____

$\cos\theta =$ _____

$\tan\theta =$ _____

28. $\theta = 4\pi$

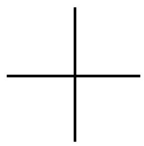


b) $\sin\theta =$ _____

$\cos\theta =$ _____

$\tan\theta =$ _____

29. $\theta = -\frac{5\pi}{2}$

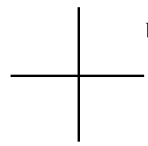


b) $\sin\theta =$ _____

$\cos\theta =$ _____

$\tan\theta =$ _____

30. $\theta = -7\pi$



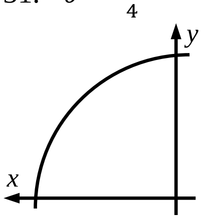
b) $\sin\theta =$ _____

$\cos\theta =$ _____

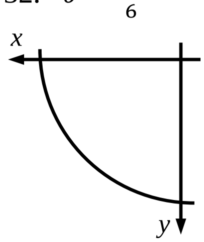
$\tan\theta =$ _____

[31-34]: Find the ordered pair on the unit circle for each angle.

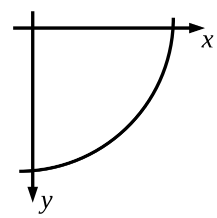
31. $\theta = \frac{3\pi}{4}$



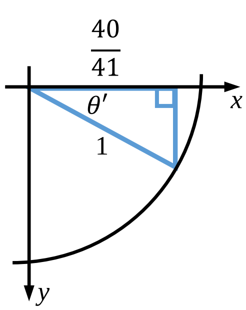
32. $\theta = \frac{7\pi}{6}$



33. $\theta = \frac{5\pi}{3}$

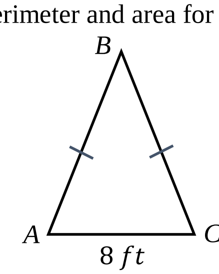


34.



35.

If $\tan A = \frac{5}{2}$, then find the perimeter and area for ΔABC.

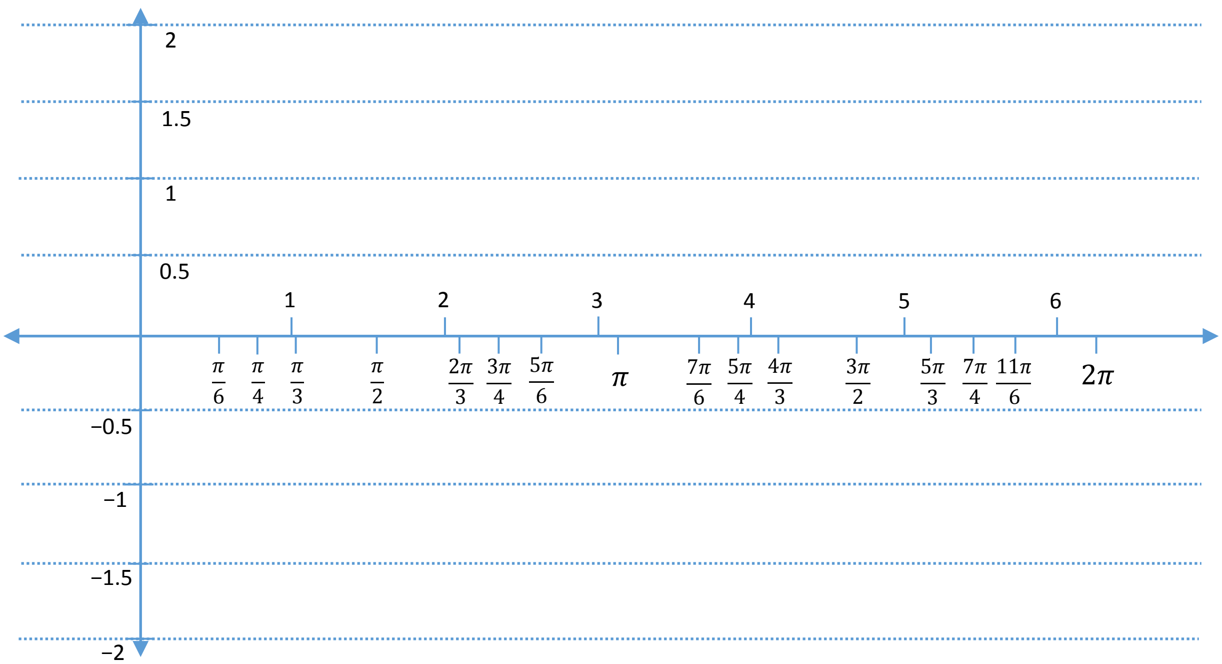


Math 3 Unit 8 Worksheet 7 **Name:________________________________**
The Sine Graph **Date:______________________Per:_________**

1. $y = \sin x$ a) Fill-in the table with the fractional values for the equation, $y = \sin x$, then use a calculator to help approximate the decimal value for each of the fractions. After you have filled in the table of values, plot each of the points on the graph paper below and connect the dots with a smooth flowing curve.

x	0	$\pi/6$	$\pi/4$	$\pi/3$	$\pi/2$	$2\pi/3$	$3\pi/4$	$5\pi/6$	π
$y = \sin x$ *(fractional)*									
$y = \sin x$ *(decimal)*									

x	π	$7\pi/6$	$5\pi/4$	$4\pi/3$	$3\pi/2$	$5\pi/3$	$7\pi/4$	$11\pi/6$	2π
$y = \sin x$ *(fractional)*									
$y = \sin x$ *(decimal)*									



What you have just graphed is one period of the function $y = \sin x$. If you continued plugging in values you would see this same-sized shape continuously emerging as you go to the left of $x = 0$ and to the right of $x = 2\pi$.

b) What is the highest value (*y*-coordinate) for this function? _____ At what location (*x*-coordinate) does this occur? _____

c) What is the lowest value (*y*-coordinate) for this function? _____ At what location (*x*-coordinate) does this occur? _____

d) Since this function is periodic (does the same exact pattern forever to the left and to the right):

What is the domain for this function? __________________ What is the range for this function? _________________

e) At what locations (*x*-coordinate) is the value of the function (*y*-coordinate) equal to zero? _______________

The ***amplitude*** for the curve $y = \sin x$ is 1, since it goes up one and down one from its equilibrium value of elevation zero. (By the way, amplitude is always a non-negative value.)

2. $y = 2\sin x$ a) Think about what the 2 would do to each of the y-values from the filled-in table for $y = \sin x$. Using a different color from the previous problem, plot the points appropriate to $y = 2\sin x$ on the same graph, then connect the dots with a smooth flowing curve and answer the following questions.

b) What is the highest value (y-coordinate) for this function? _____ At what location (x-coordinate) does this occur? _____

c) What is the lowest value (y-coordinate) for this function? _____ At what location (x-coordinate) does this occur? _____

d) Since this function is periodic (does the same exact pattern forever to the left and to the right):

What is the domain for this function? __________________ What is the range for this function? _________________

e) At what locations (x-coordinate) is the value of the function (y-coordinate) equal to zero? _______________

f) What is the amplitude for $y = 2\sin x$? _____

3. $y = \frac{1}{2}\sin x$ a) Think about what the ½ would do to each of the y-values from the filled-in table for $y = \sin x$. Using a different color from the previous problems, plot the points appropriate to $y = \frac{1}{2}\sin x$ on the same graph, then connect the dots with a smooth flowing curve and answer the following questions.

b) What is the highest value (y-coordinate) for this function? _____ At what location (x-coordinate) does this occur? _____

c) What is the lowest value (y-coordinate) for this function? _____ At what location (x-coordinate) does this occur? _____

d) Since this function is periodic (does the same exact pattern forever to the left and to the right):

What is the domain for this function? __________________ What is the range for this function? _________________

e) At what locations (x-coordinate) is the value of the function (y-coordinate) equal to zero? _______________

f) What is the amplitude for $y = \frac{1}{2}\sin x$? _____

4. $y = -\sin x$ a) Think about what the -1 would do to each of the y-values from the filled-in table for $y = \sin x$. Using a different color from the previous problems, plot the points appropriate to $y = -\sin x$ on the same graph, then connect the dots with a smooth flowing curve and answer the following questions.

b) What is the highest value (y-coordinate) for this function? _____ At what location (x-coordinate) does this occur? _____

c) What is the lowest value (y-coordinate) for this function? _____ At what location (x-coordinate) does this occur? _____

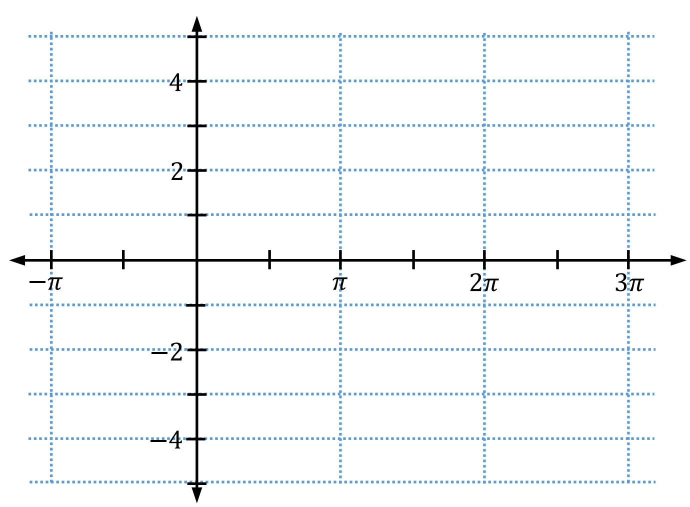
d) Since this function is periodic (does the same exact pattern forever to the left and to the right):

What is the domain for this function? __________________ What is the range for this function? _________________

e) At what locations (x-coordinate) is the value of the function (y-coordinate) equal to zero? _______________

f) What is the amplitude for $y = -\sin x$? _____

5. $y = 3\sin x + 1$ a) Using what you have learned about the sine function and your previous experience with functions in general, answer the following questions about the function $y = 3\sin x + 1$ after sketching it.



b) What is the highest value (y-coordinate) for this function? _____

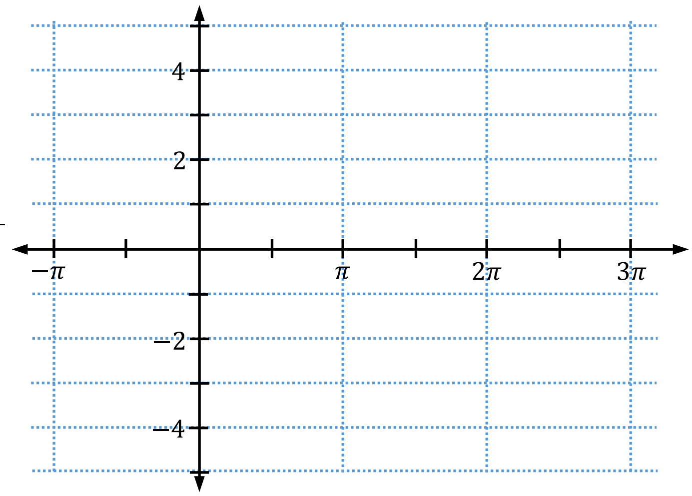
At what location (x-coordinate) does this occur? _____

c) What is the lowest value (y-coordinate) for this function? _____

At what location (x-coordinate) does this occur? _____

d) Using a different color, extend the pattern for the function in both directions so that it contains the x-values, $-\pi \le x \le 3\pi$.

6. $y = -2\sin\left(x - \frac{\pi}{2}\right)$ a) Using what you have learned about the sine function and your previous experience with functions in general, answer the following questions about the function $y = -2\sin\left(x - \frac{\pi}{2}\right)$ after sketching it.



b) What is the highest value (y-coordinate) for this function? ______

At what location (x-coordinate) does this occur? ______

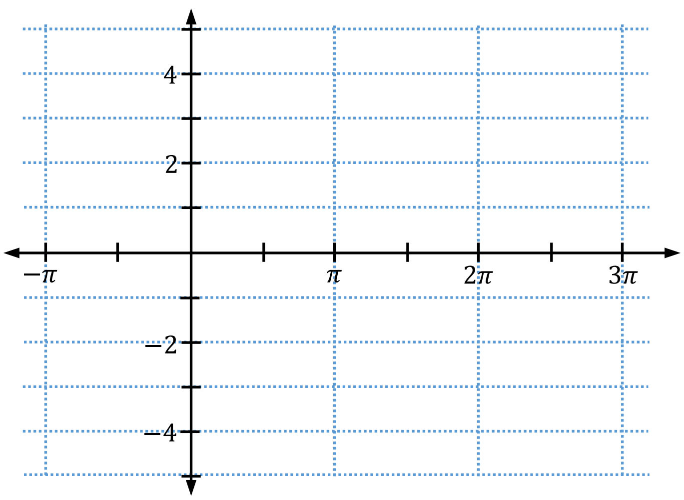
c) What is the lowest value (y-coordinate) for this function? ______

At what location (x-coordinate) does this occur? ______

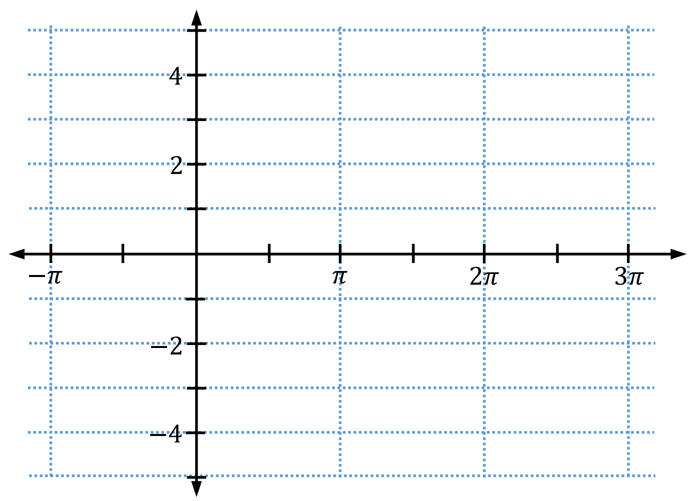
d) Using a different color, extend the pattern for the function in both directions so that it contains the x-values, $-\pi \le x \le 3\pi$.

[7-10]: Focus on the five key points for a trig function {beginning, middle, end, 1/4th, & 3/4th} to sketch the first period for each of the following functions in one color. Using a different color, extend the pattern for that function in both directions so that it contains the x-values $-\pi \le x \le 3\pi$.

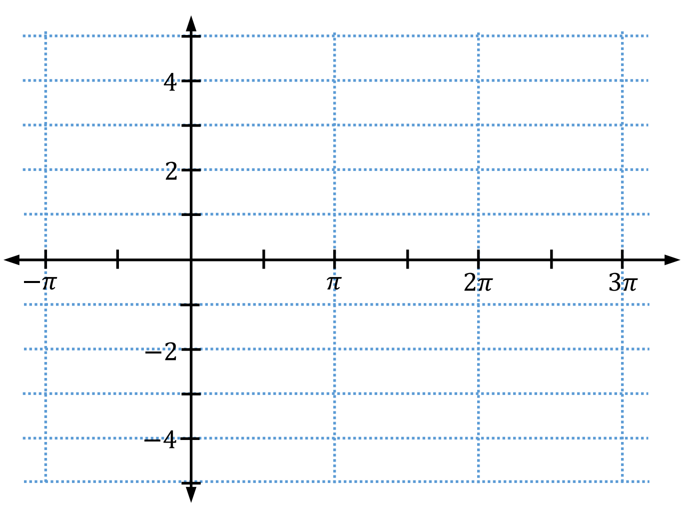
7. $f(x) = 3\sin\left(x - \frac{\pi}{2}\right) + 1$



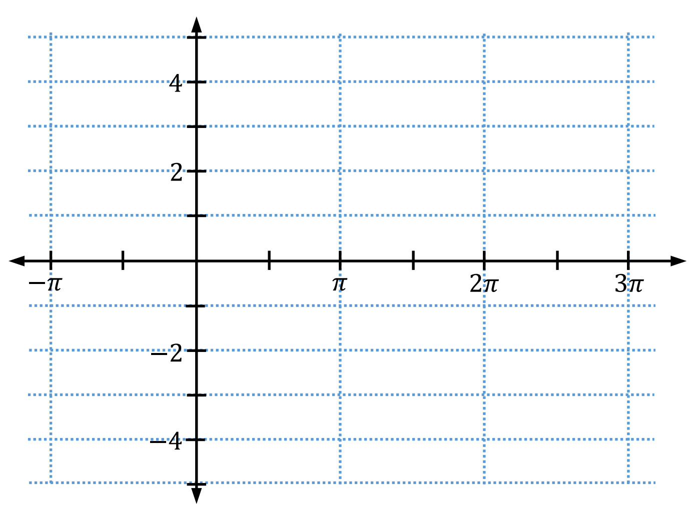
8. $f(x) = -\sin(x - \pi) + 2$



9. $f(x) = \frac{1}{2}\sin(x + \pi) + 3$



10. $f(x) = -2\sin\left(x + \frac{\pi}{2}\right) - 1$

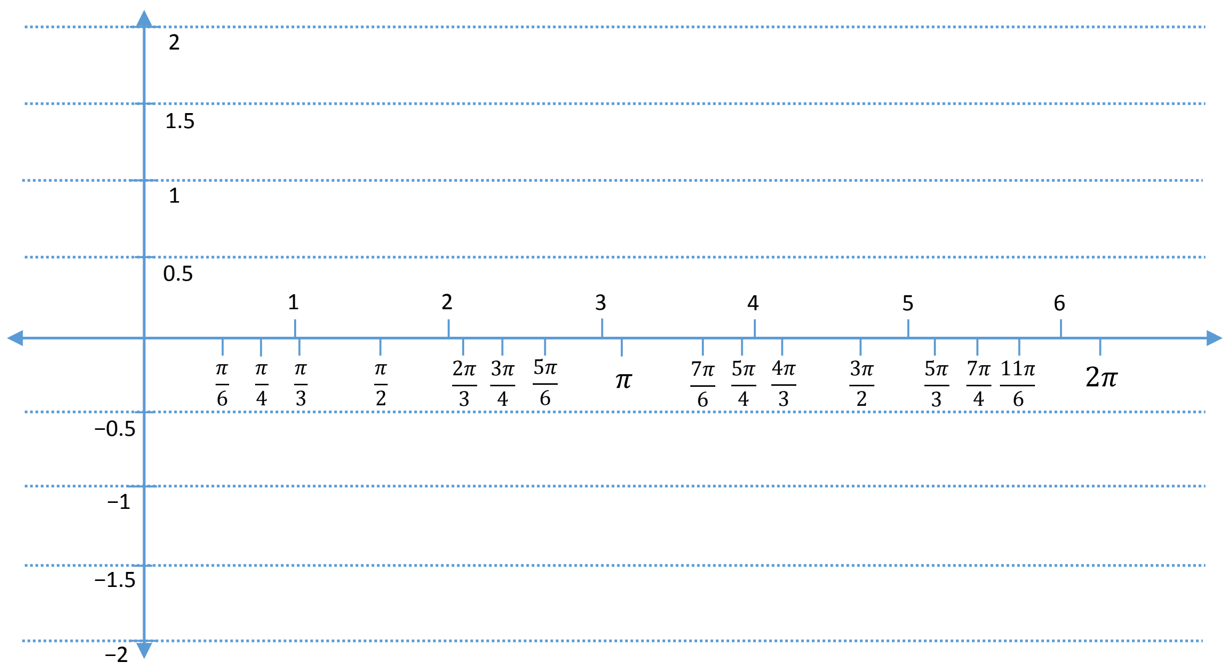


Math 3 Unit 8 Worksheet 8 | **Name:**______________________________
The Cosine Graph | **Date:**____________________**Per:**__________

1. $y = \cos x$ a) Fill-in the table with the fractional values for the equation, $y = \cos x$, then use a calculator to help approximate the decimal value for each of the fractions. After you have filled in the table of values, plot each of the points on the graph paper below and connect the dots with a smooth flowing curve.

x	0	$\pi/6$	$\pi/4$	$\pi/3$	$\pi/2$	$2\pi/3$	$3\pi/4$	$5\pi/6$	π
$y = \cos x$ (fractional)									
$y = \cos x$ (decimal)									

x	π	$7\pi/6$	$5\pi/4$	$4\pi/3$	$3\pi/2$	$5\pi/3$	$7\pi/4$	$11\pi/6$	2π
$y = \cos x$ (fractional)									
$y = \cos x$ (decimal)									



What you have just graphed is one period of the function $y = \cos x$. If you continued plugging in values you would see this same-sized shape continuously emerging as you go to the left of $x = 0$ and to the right of $x = 2\pi$.

b) What is the highest value (y-coordinate) for this function? _____ At what location (x-coordinate) does this occur? _____

c) What is the lowest value (y-coordinate) for this function? _____ At what location (x-coordinate) does this occur? _____

d) Since this function is periodic (does the same exact pattern forever to the left and to the right):

What is the domain for this function? __________________ What is the range for this function? _________________

e) At what locations (x-coordinate) is the value of the function (y-coordinate) equal to zero? _______________

The ***amplitude*** for the curve $y = \cos x$ is 1, since it goes up one and down one from its equilibrium value of elevation zero. (Amplitude in the cosine function works just the same as it does for the sine function, and it's still non-negative.)

2. $y = 2\cos x$ a) Think about what the 2 would do to each of the y-values from the filled-in table for $y = \cos x$. Using a different color from the previous problem, plot the points appropriate to $y = 2\cos x$ on the same graph, then connect the dots with a smooth flowing curve and answer the following questions.

b) What is the highest value (y-coordinate) for this function? _____ At what location (x-coordinate) does this occur? _____

c) What is the lowest value (y-coordinate) for this function? _____ At what location (x-coordinate) does this occur? _____

d) Since this function is periodic (does the same exact pattern forever to the left and to the right):

What is the domain for this function? __________________ What is the range for this function? _________________

e) At what locations (x-coordinate) is the value of the function (y-coordinate) equal to zero? _______________

f) What is the amplitude for $y = 2\cos x$? _____

3. $y = \frac{1}{2}\cos x$ a) Think about what the ½ would do to each of the y-values from the filled-in table for $y = \cos x$. Using a different color from the previous problems, plot the points appropriate to $y = \frac{1}{2}\cos x$ on the same graph, then connect the dots with a smooth flowing curve and answer the following questions.

b) What is the highest value (y-coordinate) for this function? _____ At what location (x-coordinate) does this occur? _____

c) What is the lowest value (y-coordinate) for this function? _____ At what location (x-coordinate) does this occur? _____

d) Since this function is periodic (does the same exact pattern forever to the left and to the right):

What is the domain for this function? __________________ What is the range for this function? _________________

e) At what locations (x-coordinate) is the value of the function (y-coordinate) equal to zero? _______________

f) What is the amplitude for $y = \frac{1}{2}\cos x$? _____

4. $y = -\cos x$ a) Think about what the -1 would do to each of the y-values from the filled-in table for $y = \cos x$. Using a different color from the previous problems, plot the points appropriate to $y = -\cos x$ on the same graph, then connect the dots with a smooth flowing curve and answer the following questions.

b) What is the highest value (y-coordinate) for this function? _____ At what location (x-coordinate) does this occur? _____

c) What is the lowest value (y-coordinate) for this function? _____ At what location (x-coordinate) does this occur? _____

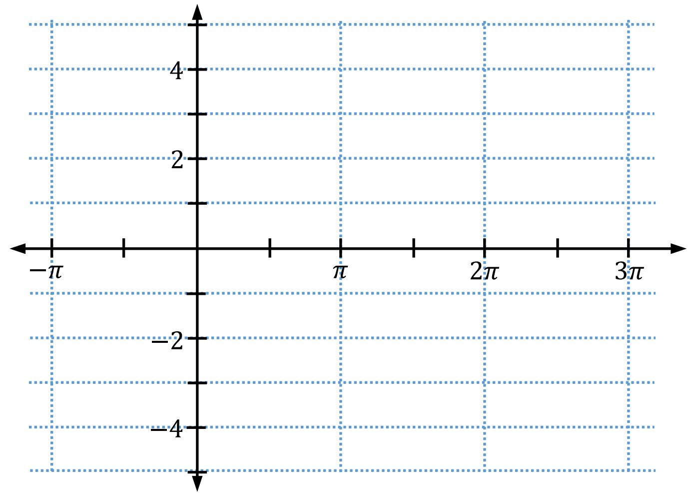
d) Since this function is periodic (does the same exact pattern forever to the left and to the right):

What is the domain for this function? __________________ What is the range for this function? _________________

e) At what locations (x-coordinate) is the value of the function (y-coordinate) equal to zero? _______________

f) What is the amplitude for $y = -\cos x$? _____

5. $y = 3\cos x + 1$ a) Using what you have learned about the sine function and your previous experience with functions in general, answer the following questions about the function $y = 3\cos x + 1$ after sketching it.



b) What is the highest value (y-coordinate) for this function? _____

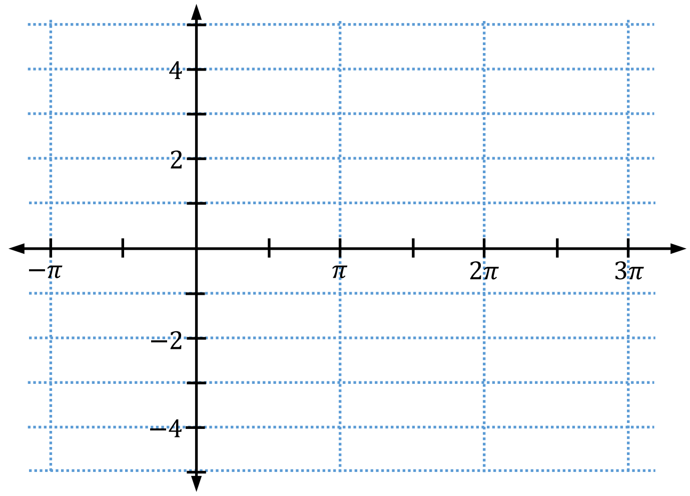
At what location (x-coordinate) does this occur? _____

c) What is the lowest value (y-coordinate) for this function? _____

At what location (x-coordinate) does this occur? _____

d) Using a different color, extend the pattern for the function in both directions so that it contains the x-values, $-\pi \le x \le 3\pi$.

6. $y = -2\cos\left(x - \frac{\pi}{2}\right)$ a) Using what you have learned about the sine function and your previous experience with functions in general, answer the following questions about the function $y = -2\cos\left(x - \frac{\pi}{2}\right)$ after sketching it.



b) What is the highest value (y-coordinate) for this function? ______

At what location (x-coordinate) does this occur? ______

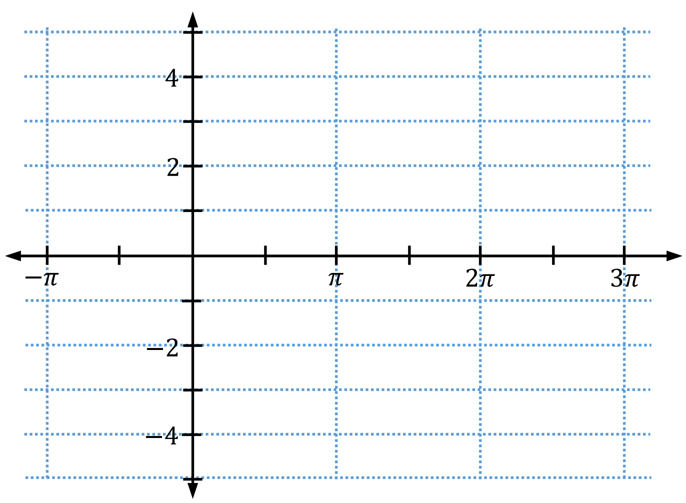
c) What is the lowest value (y-coordinate) for this function? ______

At what location (x-coordinate) does this occur? ______

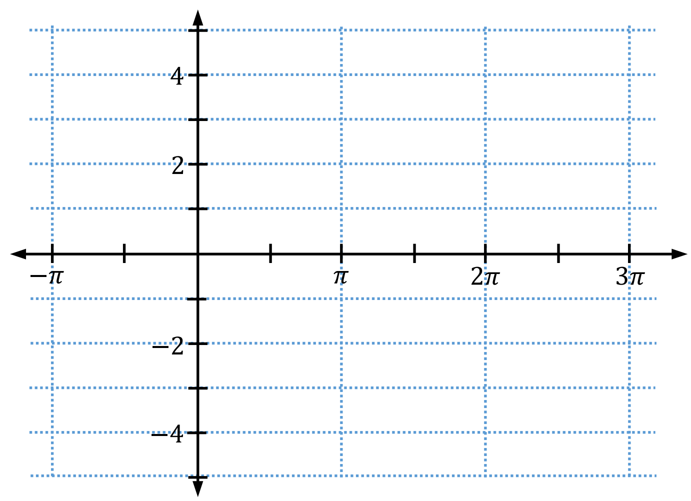
d) Using a different color, extend the pattern for the function in both directions so that it contains the x-values, $-\pi \le x \le 3\pi$.

[7-10]: Focus on the five key points for a trig function {beginning, middle, end, 1/4th, & 3/4th} to sketch the first period for each of the following functions in one color. Using a different color, extend the pattern for that function in both directions so that it contains the x-values $-\pi \le x \le 3\pi$.

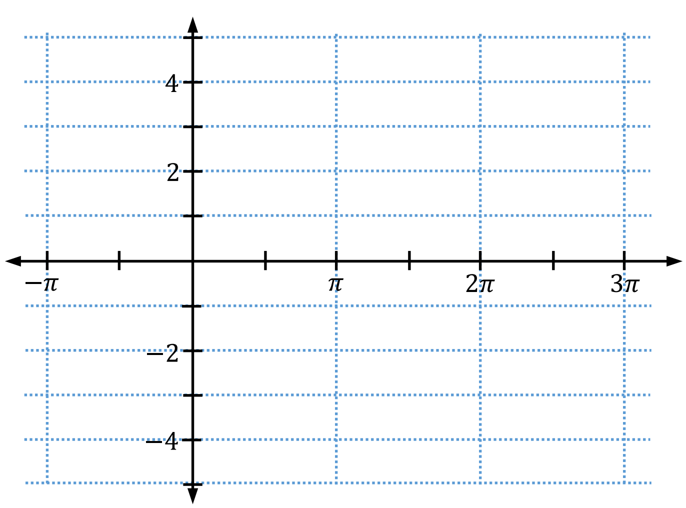
7. $f(x) = 3\cos\left(x - \frac{\pi}{2}\right) + 1$



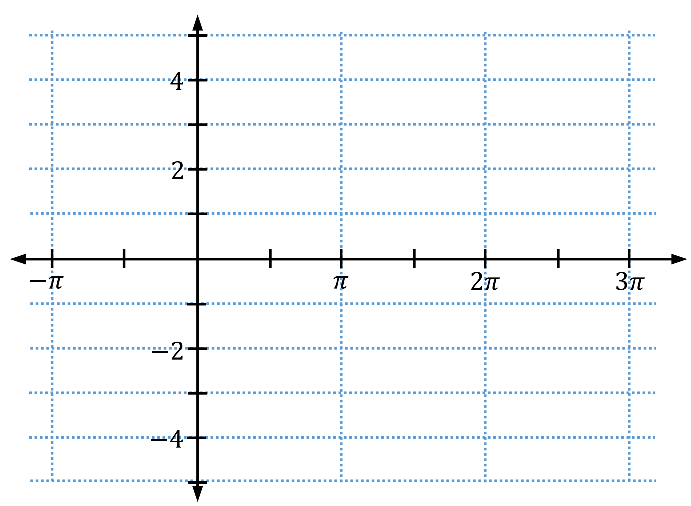
8. $f(x) = -\cos(x - \pi) + 2$



9. $f(x) = \frac{1}{2}\cos(x + \pi) + 3$



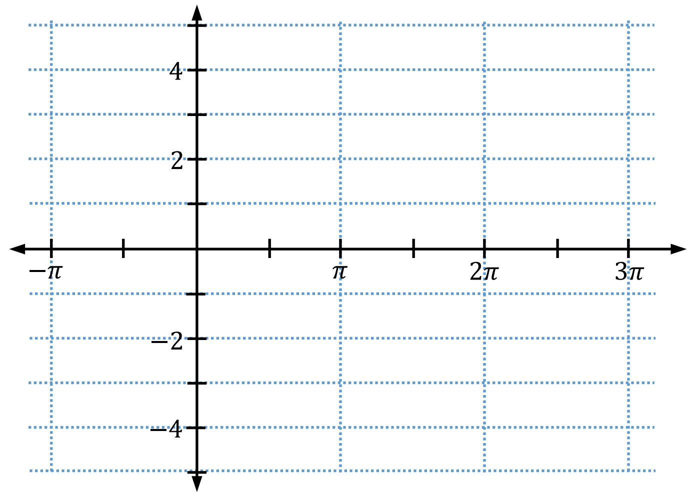
10. $f(x) = -2\cos\left(x + \frac{\pi}{2}\right) - 1$



Math 3 Unit 8 Worksheet 9 **Name:**________________________________
Solutions of Functions with Sine and Cosine Graphs **Date:**______________________**Per:**__________

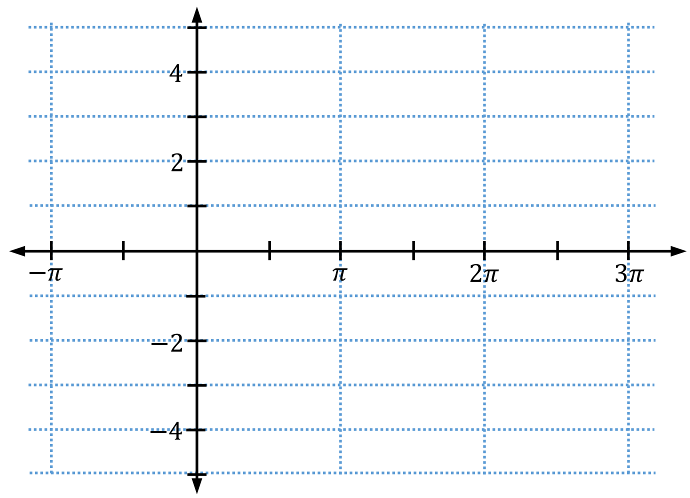
[1-6]: A) Sketch and label $f(x)$ & $g(x)$ on the same coordinate axes – use a different color for each. B) Mark the intersection where $f(x) = g(x)$. C) Follow that up with the algebraic solutions for $f(x) = g(x)$.

1. $f(x) = 4\cos x$ & $g(x) = 2$



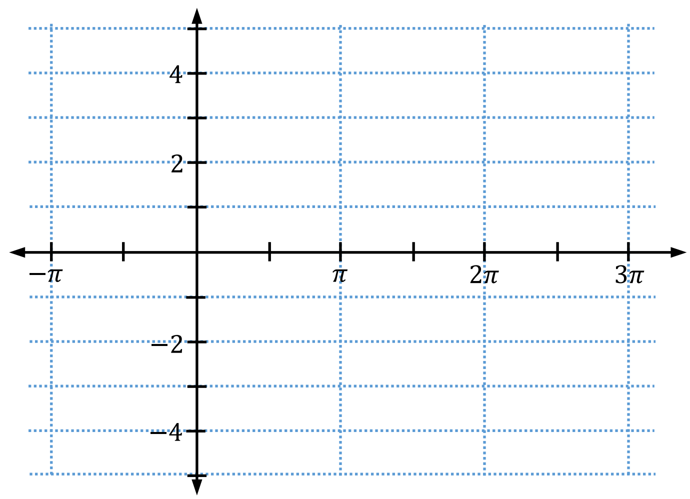
B.________________________________

2. $f(x) = -2\sin x + 1$ & $g(x) = 2$



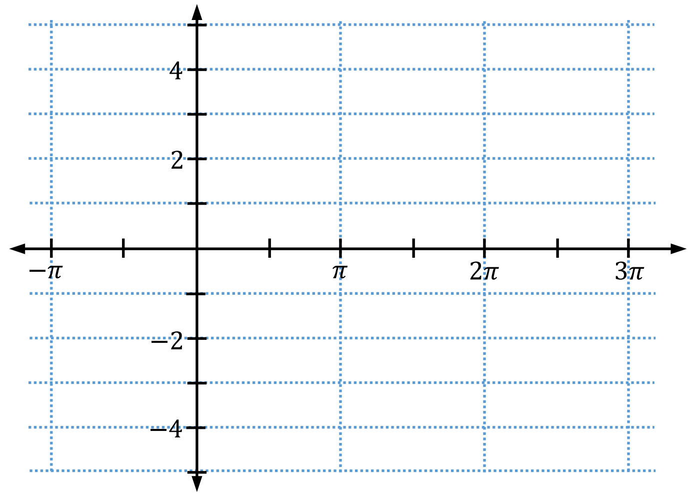
B.________________________________

3. $f(x) = 3\sin x$ & $g(x) = -3$



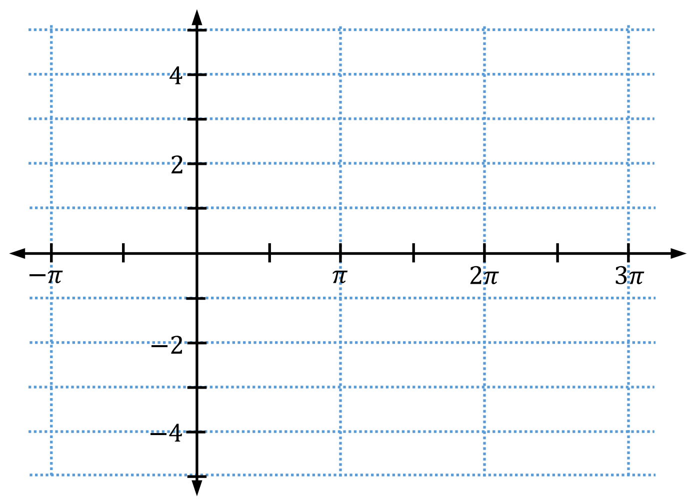
B.________________________________

4. $f(x) = 2\cos x - 3$ & $g(x) = -4$



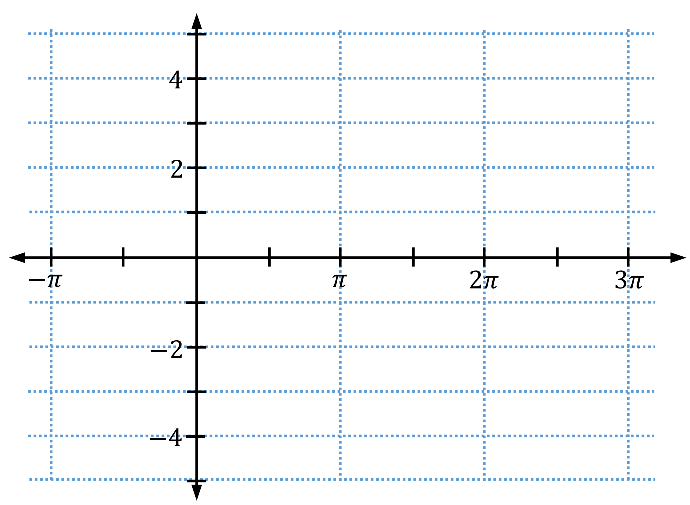
B.________________________________

5. $f(x) = \sin x$ & $g(x) = -\cos x$



B.________________________________

6. $f(x) = -3\cos x + 2$ & $g(x) = 5$



B.________________________________

[7-18]: Solve each of the following equations for θ such that $0 \le \theta < 2\pi$.

7. $\cos\theta = -\frac{1}{2}$

8. $\sin\theta = 0$

9. $\tan\theta = -\frac{\sqrt{3}}{3}$

10. $15\tan\theta + 5\sqrt{3} = 0$

11. $4\sin^2\theta - 3 = 0$

12. $4\sqrt{3}\cos\theta + 6 = 0$

13. $3\tan\theta + 3 = 0$

14. $24\cos^2\theta - 6 = 0$

15. $3\sin\theta\,(\sin\theta - 1) = 0$

[7-18] continued: Solve each of the following equations for θ such that $0 \leq \theta < 2\pi$.

16. $(\tan\theta - \sqrt{3})(\tan\theta - 1) = 0$

17. $(2\cos\theta + \sqrt{3})(2\cos\theta - 1) = 0$

18. $7\tan^2\theta - 21 = 0$

[19-21]: Continue solving for θ such that $0 \leq \theta \leq 2\pi$. ***Hint***: Begin by factoring each of the expressions on the left-side of equation.

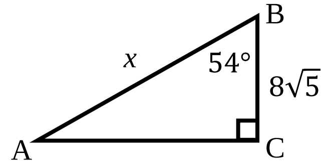
19. $4\sin\theta\cos\theta + 2\cos\theta = 0$

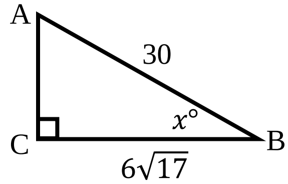
20. $2\sin^2\theta + \sin\theta - 1 = 0$

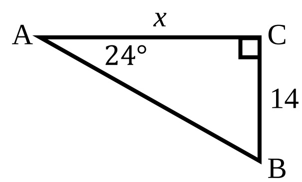
21. $2\cos^2\theta + 3\cos\theta + 1 = 0$

Math 3 Unit 8 **Name:**________________________________
Review Worksheet **Date:**______________________**Per:**_________
**** Scientific calculator <u>not</u> allowed ****

[1-8]: A) Use right-triangle trigonometry to write a valid equation that will allow you to solve for *x*. B) Solve for *x* without a calculator.

1.


2.


3.


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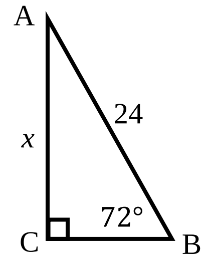

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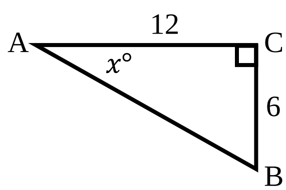
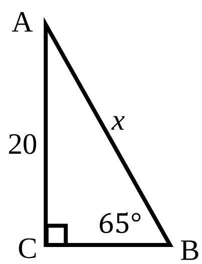
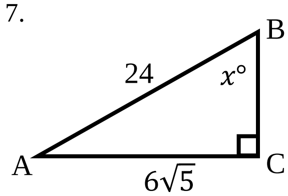
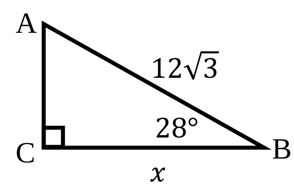


6.


7.


8.


[9-20]: A) Sketch each angle in standard position. B) Identify the quadrant for the terminating ray. C) Find the reference angle, θ'.

9. $\theta = 320°$
b) Quadrant _____
c) $Ref\angle\theta' =$ _____

10. $\theta = 165°$
b) Quadrant _____
c) $Ref\angle\theta' =$ _____

11. $\theta = \frac{17\pi}{12}$
b) Quadrant _____
c) $Ref\angle\theta' =$ _____

12. $\theta = \frac{13\pi}{5}$
b) Quadrant _____
c) $Ref\angle\theta' =$ _____

13. $\theta = 128°$
b) Quadrant _____
c) $Ref\angle\theta' =$ _____

14. $\theta = 336°$
b) Quadrant _____
c) $Ref\angle\theta' =$ _____

15. $\theta = \frac{7\pi}{9}$
b) Quadrant _____
c) $Ref\angle\theta' =$ _____

16. $\theta = \frac{8\pi}{5}$
b) Quadrant _____
c) $Ref\angle\theta' =$ _____

17. $\theta = -400°$
b) Quadrant _____
c) $Ref\angle\theta' =$ _____

18. $\theta = -170°$
b) Quadrant _____
c) $Ref\angle\theta' =$ _____

19. $\theta = -\frac{11\pi}{8}$
b) Quadrant _____
c) $Ref\angle\theta' =$ _____

20. $\theta = -\frac{14\pi}{9}$
b) Quadrant _____
c) $Ref\angle\theta' =$ _____

[21-32]: A) Convert each angle from degrees to radian measure or radians to degrees, whichever is appropriate. B) Find one positive coterminal angle <u>and</u> one negative coterminal angle for each original θ.

21. $\theta = 220°$
a) ________
b) $Pos\angle =$ _____
c) $Neg\angle =$ _____

22. $\theta = 65°$
a) ________
b) $Pos\angle =$ _____
c) $Neg\angle =$ _____

23. $\theta = \frac{7\pi}{12}$
a) ________
b) $Pos\angle =$ _____
c) $Neg\angle =$ _____

24. $\theta = \frac{11\pi}{5}$
a) ________
b) $Pos\angle =$ _____
c) $Neg\angle =$ _____

25. $\theta = 108°$
a) ________
b) $Pos\angle =$ _____
c) $Neg\angle =$ _____

26. $\theta = 36°$
a) ________
b) $Pos\angle =$ _____
c) $Neg\angle =$ _____

27. $\theta = \frac{8\pi}{3}$
a) ________
b) $Pos\angle =$ _____
c) $Neg\angle =$ _____

28. $\theta = \frac{7\pi}{2}$
a) ________
b) $Pos\angle =$ _____
c) $Neg\angle =$ _____

29. $\theta = -450°$
a) ________
b) $Pos\angle =$ _____
c) $Neg\angle =$ _____

30. $\theta = -130°$
a) ________
b) $Pos\angle =$ _____
c) $Neg\angle =$ _____

31. $\theta = -\frac{3\pi}{8}$
a) ________
b) $Pos\angle =$ _____
c) $Neg\angle =$ _____

32. $\theta = -5\pi$
a) ________
b) $Pos\angle =$ _____
c) $Neg\angle =$ _____

[33-44]: A) Sketch the reference angle for each in the correct quadrant. B) Find $\sin\theta$, $\cos\theta$, & $\tan\theta$.

33. $\theta = \frac{4\pi}{3}$
b) $\sin\theta =$ _____
$\cos\theta =$ _____
$\tan\theta =$ _____

34. $\theta = \frac{5\pi}{6}$
b) $\sin\theta =$ _____
$\cos\theta =$ _____
$\tan\theta =$ _____

35. $\theta = -\frac{7\pi}{4}$
b) $\sin\theta =$ _____
$\cos\theta =$ _____
$\tan\theta =$ _____

36. $\theta = -\frac{\pi}{6}$
b) $\sin\theta =$ _____
$\cos\theta =$ _____
$\tan\theta =$ _____

37. $\theta = \frac{8\pi}{3}$
b) $\sin\theta =$ _____
$\cos\theta =$ _____
$\tan\theta =$ _____

38. $\theta = \frac{13\pi}{4}$
b) $\sin\theta =$ _____
$\cos\theta =$ _____
$\tan\theta =$ _____

39. $\theta = -\frac{5\pi}{4}$
b) $\sin\theta =$ _____
$\cos\theta =$ _____
$\tan\theta =$ _____

40. $\theta = -\frac{7\pi}{3}$
b) $\sin\theta =$ _____
$\cos\theta =$ _____
$\tan\theta =$ _____

41. $\theta = -\frac{11\pi}{6}$
b) $\sin\theta =$ _____
$\cos\theta =$ _____
$\tan\theta =$ _____

42. $\theta = -\frac{2\pi}{3}$
b) $\sin\theta =$ _____
$\cos\theta =$ _____
$\tan\theta =$ _____

43. $\theta = \frac{7\pi}{4}$
b) $\sin\theta =$ _____
$\cos\theta =$ _____
$\tan\theta =$ _____

44. $\theta = \frac{7\pi}{6}$
b) $\sin\theta =$ _____
$\cos\theta =$ _____
$\tan\theta =$ _____

[45-50]: A) Sketch each angle. B) Find $\sin\theta$, $\cos\theta$, & $\tan\theta$.

45. $\theta = 4\pi$
b) sin _____ = _____
cos _____ = _____
tan _____ = _____

46. $\theta = -3\pi$
b) sin _____ = _____
cos _____ = _____
tan _____ = _____

47. $\theta = -\frac{5\pi}{2}$
b) sin _____ = _____
cos _____ = _____
tan _____ = _____

48. $\theta = -\frac{3\pi}{2}$
b) sin _____ = _____
cos _____ = _____
tan _____ = _____

49. $\theta = 5\pi$
b) sin _____ = _____
cos _____ = _____
tan _____ = _____

50. $\theta = \frac{7\pi}{2}$
b) sin _____ = _____
cos _____ = _____
tan _____ = _____

[51-18]: Solve each of the following equations for θ such that $0 \le \theta < 2\pi$.

51. $12\cos\theta - 6\sqrt{3} = 0$

52. $\sqrt{2}\tan\theta + \sqrt{6} = 0$

53. $4\sqrt{3}\sin\theta + 6 = 0$

54. $8\sin\theta - 4\sqrt{2} = 0$

55. $18\tan^2\theta - 6 = 0$

56. $24\sin^2\theta - 6 = 0$

57. $12\cos^2\theta - 9 = 0$

58. $3\tan^2\theta - 3 = 0$

59. $2\tan\theta\,(\cos\theta + 1) = 0$

60. $4\cos\theta\left(\tan\theta + \sqrt{3}\right) = 0$

61. $\left(2\sin\theta + \sqrt{3}\right)(\tan\theta - 1) = 0$

62. $\left(2\cos\theta - \sqrt{3}\right)(2\cos\theta + 1) = 0$

63. $6\tan\theta\sin\theta - 2\sqrt{3}\sin\theta = 0$

64. $4\tan\theta\cos\theta + 4\sqrt{3}\cos\theta = 0$

65. $2\,cos^2\theta + \cos\theta - 1 = 0$

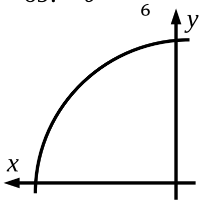
66. $2\sin^2\theta - 3\sin\theta + 1 = 0$

67. $2\sin^2\theta - \sin\theta - 1 = 0$

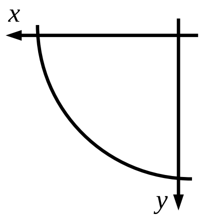
68. $2\cos^2\theta - 3\cos\theta + 1 = 0$

[69-34]: Find the ordered pair on the unit circle for each angle.

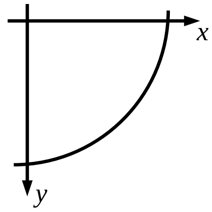
69. $\theta = \frac{5\pi}{6}$



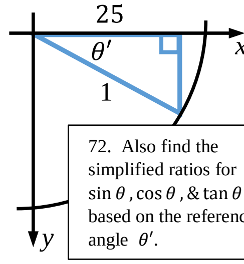
70. $\theta = \frac{4\pi}{3}$



71. $\theta = \frac{7\pi}{4}$



72. $\frac{24}{25}$



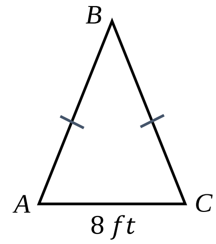
72. Also find the simplified ratios for $\sin\theta$, $\cos\theta$, & $\tan\theta$ based on the reference angle θ'.

$\sin\theta =$ _____

$\cos\theta =$ _____

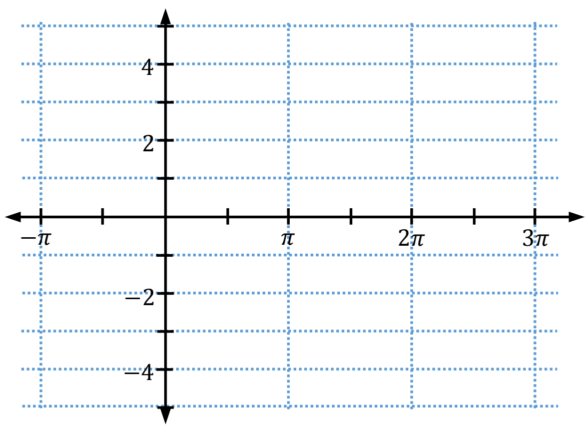
$\tan\theta =$ _____

73. If $\cos A = \frac{2}{5}$, then find the perimeter and area for ΔABC.

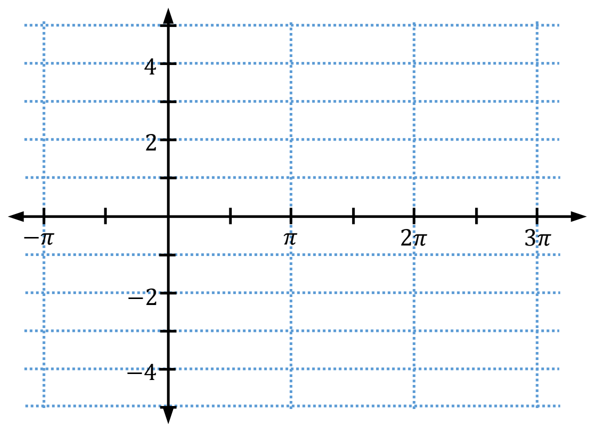


[74-77]: Focus on the five key points for a trig function {beginning, middle, end, 1/4th, & 3/4th} to sketch the first period for each of the following functions in one color.

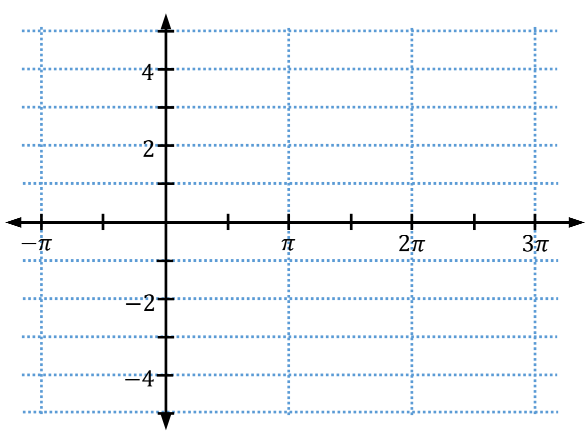
74. $f(x) = 2\cos\left(x + \frac{\pi}{2}\right) + 1$



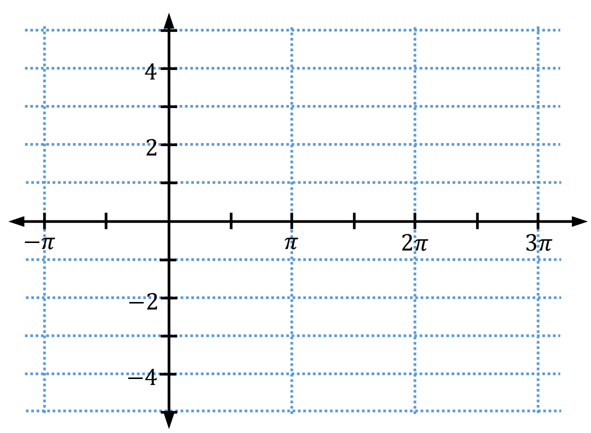
75. $f(x) = -3\sin(x - \pi) + 2$



76. $f(x) = \frac{5}{2}\sin\left(x + \frac{\pi}{2}\right) - 1$

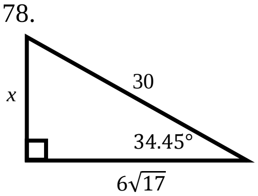


77. $f(x) = -\frac{1}{2}\cos\left(x - \frac{\pi}{2}\right) - 2$



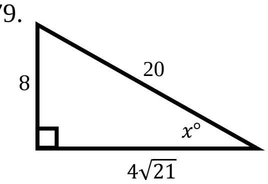
[78-79] Multiple Choice: Choose the one equation that will not accurately solve for *x*.

78.



A) $\cos 55.55° = \frac{x}{30}$
B) $(6\sqrt{17})^2 + x^2 = 900$
C) $\sin 34.45° = \frac{x}{30}$
D) $x^2 = 30^2 - 36 \cdot 17$
E) $\tan 55.55° = \frac{x}{6\sqrt{17}}$

79.



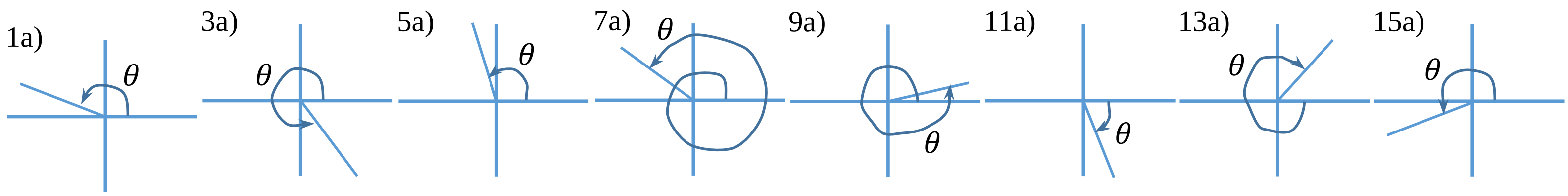
A) $\cos x = \frac{\sqrt{21}}{5}$
B) $x = \arctan\left(\frac{2\sqrt{21}}{21}\right)$
C) $\cos(90 - x) = \frac{2}{5}$
D) $\arcsin(2.5) = x$
E) $\sin^{-1}(0.4) = x$

Math 3 Unit 8 Worksheet – Selected Answers

Math 3 Unit 8 Worksheet 1

1. $\sin A = \frac{8}{17}; \cos A = \frac{15}{17}; \tan A = \frac{8}{15}; \sin B = \frac{15}{17}; \cos B = \frac{8}{17}; \tan B = \frac{15}{8}$
3. $\sin A = \frac{3}{5}; \cos A = \frac{4}{5}; \tan A = \frac{3}{4}; \sin B = \frac{4}{5}; \cos B = \frac{3}{5}; \tan B = \frac{4}{3}$
5. $x = 18\cos 25° \approx 16.314$ 7. $x° = \tan^{-1}\left(\frac{8}{13}\right) \approx 31.608°$ 9. $x = \frac{9\sqrt{7}}{\cos 58°} \approx 44.935$
11. $x = \frac{8}{\tan 12°} \approx 37.637$ 13. $a = 5; c = 10; B = 60°$
15. $\sin 30° = \frac{a}{2a} = \frac{1}{2}; \cos 30° = \frac{a\sqrt{3}}{2a} = \frac{\sqrt{3}}{2}; \tan 30° = \frac{a}{a\sqrt{3}} = \frac{1}{\sqrt{3}}\ or\ \frac{\sqrt{3}}{3}$
17. $\sin 45° = \frac{a}{a\sqrt{2}} = \frac{1}{\sqrt{2}}\ or\ \frac{\sqrt{2}}{2}; \cos 45° = \frac{a}{a\sqrt{2}} = \frac{1}{\sqrt{2}}\ or\ \frac{\sqrt{2}}{2}; \tan 45° = \frac{a}{a} = 1$
19. $horizontal\ \&\ vertical\ side = \frac{1}{\sqrt{2}}\ or\ \frac{\sqrt{2}}{2}$

Math 3 Unit 8 Worksheet 2



1) b) Q2 c) 20°   3) b) Q4 c) 50°   5) b) Q2 c) 80°   7) b) Q2 c) 40°   9) b) Q1 c) 25°   11) b) Q4 c) 70°
13) b) Q1 c) 50°   15) b) Q3 c) 15°
17) a) $\frac{4}{5}$ b) $\sin\theta = \frac{4}{5}; \cos\theta = -\frac{3}{5}; \tan\theta = -\frac{4}{3}$ 18) a) $-\frac{5}{13}$ b) $\sin\theta = -\frac{5}{13}; \cos\theta = -\frac{12}{13}; \tan\theta = \frac{5}{12}$
19) a) $\frac{15}{17}$ b) $\sin\theta = -\frac{8}{17}; \cos\theta = \frac{15}{17}; \tan\theta = -\frac{8}{15}$ 20) 60°   21) 30°   22) 60°   23) 45°   24) 45°   25) 60°
26) 45°   27) 30°   28) $\sin A = \frac{5}{13}, \cos A = \frac{12}{13},\ \&\ \tan A = \frac{5}{12}$ 29) $\sin A = \frac{7}{25}, \cos A = \frac{24}{25},\ \&\ \tan A = \frac{7}{24}$

Math 3 Unit 8 Worksheet 3

[1-5]: These are the most common answers; however, there are an infinite number of correct responses.

1. $460°\ \&\ -260°$ 3. $410°\ \&\ -310°$ 5. $320°\ \&\ -40°$
7. B) Q3 C) $\theta' = 60°$ D) $\sin 240° = -\frac{\sqrt{3}}{2}; \cos 240° = -\frac{1}{2}; \tan 240° = \sqrt{3}$
9. B) Q2 C) $\theta' = 30°$ D) $\sin 150° = \frac{1}{2}; \cos 150° = -\frac{\sqrt{3}}{2}; \tan 150° = -\frac{\sqrt{3}}{3}$
11. B) Q4 C) $\theta' = 45°$ D) $\sin 315° = -\frac{\sqrt{2}}{2}; \cos 315° = \frac{\sqrt{2}}{2}; \tan 315° = -1$
13. B) Q3 C) $\theta' = 45°$ D) $\sin 225° = -\frac{\sqrt{2}}{2}; \cos 225° = -\frac{\sqrt{2}}{2}; \tan 225° = 1$
15. B) Q1 C) $\theta' = 60°$ D) $\sin(-300°) = \frac{\sqrt{3}}{2}; \cos(-300°) = \frac{1}{2}; \tan(-300°) = \sqrt{3}$
17. B) Q2 C) $\theta' = 30°$ D) $\sin(-210°) = \frac{1}{2}; \cos(-210°) = -\frac{\sqrt{3}}{2}; \tan(-210°) = -\frac{\sqrt{3}}{3}$
19. B) Q4 C) $\theta' = 30°$ D) $\sin 690° = -\frac{1}{2}; \cos 690° = \frac{\sqrt{3}}{2}; \tan 690° = -\frac{\sqrt{3}}{3}$
21. $\sin 90° = 1; \cos 90° = 0; \tan 90°\ is\ undefined$
23. $\sin 180° = 0; \cos 180° = -1; \tan 180° = 0$
25. $\sin 630° = -1; \cos 630° = 0; \tan 630°\ is\ undefined$
27. $\sin(-450°) = -1; \cos(-450°) = 0; \tan(-450°)\ is\ undefined$
29. $\sin 1080° = 0; \cos 1080° = 1; \tan 1080° = 0$
31. $Q3\ \&\ Q4$ 33. $Q2\ \&\ Q4$ 35. $Q2\ \&\ Q3$ 37. $Q1\ \&\ Q2$ 39. $all\ 4\ Q$

Math 3 Unit 8 Worksheet 4 (except sketches)

1. $Q1\ \&\ Q4$ 3. $Q1\ \&\ Q3$ 5. $Q3\ \&\ Q4$ 7. $All\ 4\ Quadrants$ 9. ∅, why?
11. $\{30°, 150°\}$ 13. $\{135°, 315°\}$ 15. $\{45°, 135°, 225°, 315°\}$
17. $\{30°, 150°, 210°, 330°\}$ 19. ∅, why?   21. $\{120°, 300°, 45°, 225°\}$
22. $perimeter = 90\ units;\ area = 300\ units^2$

Math 3 Unit 8 Worksheet 5 (except sketches)

1. b. Q2 c. $\frac{2\pi}{5}$ 3. b. Q1 c. $\frac{5\pi}{18}$ 5. b & c. Quadrantal between Q3 & Q4 7. b. Q2 c. $\frac{\pi}{4}$
9. b. Q3 c. $\frac{2\pi}{5}$ 11. b & c. Quadrantal between Q1 & Q2 13. b & c. Quadrantal between Q2 & Q3
15. b. Q2 c. $\frac{3\pi}{8}$ 17. b. Q4 c. $\frac{\pi}{4}$ 19. $C = \frac{\pi}{10}$ & $S = \frac{3\pi}{5}$ 21. $C = \frac{\pi}{14}$ & $S = \frac{4\pi}{7}$ 23. $C = \frac{\pi}{4}$ & $S = \frac{3\pi}{4}$
25. $\left\{\ldots, -\frac{\pi}{4}, \frac{15\pi}{4}, \ldots\right\}$ 27. $\left\{\ldots, -\frac{2\pi}{3}, \frac{10\pi}{3}, \ldots\right\}$ 29. $\left\{\ldots, -\frac{\pi}{6}, \frac{23\pi}{6}, \ldots\right\}$ 31. $\left(\frac{\sqrt{2}}{2}, -\frac{\sqrt{2}}{2}\right)$ 33. $\left(-\frac{8}{17}, \frac{15}{17}\right)$

Math 3 Unit 8 Worksheet 6 (except sketches)

1. $\frac{3\pi}{4}$ 3. $252°$ 5. $\frac{11\pi}{6}$ 7. $337.5°$ 9. $-\frac{5\pi}{6}$ 11. $-540°$ 13. $\sin\frac{5\pi}{4} = -\frac{\sqrt{2}}{2}$, $\cos\frac{5\pi}{4} = -\frac{\sqrt{2}}{2}$, & $\tan\frac{5\pi}{4} = 1$
15. $\sin\frac{5\pi}{6} = \frac{1}{2}$, $\cos\frac{5\pi}{6} = -\frac{\sqrt{3}}{2}$, & $\tan\frac{5\pi}{6} = -\frac{\sqrt{3}}{3}$ 17. $\sin\frac{5\pi}{3} = -\frac{\sqrt{3}}{2}$, $\cos\frac{5\pi}{3} = \frac{1}{2}$, & $\tan\frac{5\pi}{3} = -\sqrt{3}$
19. $\sin\left(\frac{-\pi}{6}\right) = -\frac{1}{2}$, $\cos\left(\frac{-\pi}{6}\right) = \frac{\sqrt{3}}{2}$, & $\tan\left(\frac{-\pi}{6}\right) = -\frac{\sqrt{3}}{3}$ 21. $\sin\left(\frac{-5\pi}{4}\right) = \frac{\sqrt{2}}{2}$, $\cos\left(\frac{-5\pi}{4}\right) = -\frac{\sqrt{2}}{2}$, & $\tan\left(\frac{-5\pi}{4}\right) = -1$
23. $\sin\frac{7\pi}{4} = -\frac{\sqrt{2}}{2}$, $\cos\frac{7\pi}{4} = \frac{\sqrt{2}}{2}$, & $\tan\frac{7\pi}{4} = -1$ 25. $\sin\frac{3\pi}{2} = -1$, $\cos\frac{3\pi}{2} = 0$, & $\tan\frac{3\pi}{2}$ $is\ undefined$
27. $\sin\frac{5\pi}{2} = 1$, $\cos\frac{5\pi}{2} = 0$, & $\tan\frac{5\pi}{2}$ $is\ undefined$ 29. $\sin\left(\frac{-5\pi}{2}\right) = -1$, $\cos\left(\frac{-5\pi}{2}\right) = 0$, & $\tan\left(\frac{-5\pi}{2}\right)$ $is\ undefined$
31. $\left(-\frac{\sqrt{2}}{2}, \frac{\sqrt{2}}{2}\right)$ 33. $\left(\frac{1}{2}, -\frac{\sqrt{3}}{2}\right)$ 35. $P = \left(8 + 4\sqrt{29}\right)ft \approx 29.541\ ft$; $A = 40\ ft^2$

Math 3 Unit 8 Worksheet 9 (except sketches)

1. $\left\{\frac{\pi}{3}, \frac{5\pi}{3}\right\}$ & $coterminals$ or $\left\{-\frac{\pi}{3}, \frac{\pi}{3}, \frac{5\pi}{3}, \frac{7\pi}{3}\right\}$ $L\ to\ R\ in\ graph$ 3. $\left\{\frac{3\pi}{2}\right\}$ & $coterminals$ or $\left\{-\frac{\pi}{2}, \frac{3\pi}{2}\right\}$ $L\ to\ R\ in\ graph$
5. $\left\{\frac{3\pi}{4}, \frac{7\pi}{4}\right\}$ & $coterminals$ or $\left\{-\frac{\pi}{4}, \frac{3\pi}{4}, \frac{7\pi}{4}, \frac{11\pi}{4}\right\}$ $L\ to\ R\ in\ graph$ 7. $\left\{\frac{2\pi}{3}, \frac{4\pi}{3}\right\}$ 8. $\{0, \pi\}$ 9. $\left\{\frac{5\pi}{6}, \frac{11\pi}{6}\right\}$ 10. $\left\{\frac{5\pi}{6}, \frac{11\pi}{6}\right\}$
11. $\left\{\frac{\pi}{3}, \frac{2\pi}{3}, \frac{4\pi}{3}, \frac{5\pi}{3}\right\}$ 12. $\left\{\frac{5\pi}{6}, \frac{7\pi}{6}\right\}$ 13. $\left\{\frac{3\pi}{4}, \frac{7\pi}{4}\right\}$ 14. $\left\{\frac{\pi}{3}, \frac{2\pi}{3}, \frac{4\pi}{3}, \frac{5\pi}{3}\right\}$ 15. $\left\{0, \frac{\pi}{2}, \pi\right\}$ 16. $\left\{\frac{\pi}{3}, \frac{4\pi}{3}, \frac{\pi}{4}, \frac{5\pi}{4}\right\}$ 17. $\left\{\frac{5\pi}{6}, \frac{7\pi}{6}, \frac{\pi}{3}, \frac{5\pi}{3}\right\}$
18. $\left\{\frac{\pi}{3}, \frac{2\pi}{3}, \frac{4\pi}{3}, \frac{5\pi}{3}\right\}$ 19. $\left\{\frac{\pi}{2}, \frac{3\pi}{2}, \frac{7\pi}{6}, \frac{11\pi}{6}\right\}$ 20. $\left\{\frac{\pi}{6}, \frac{5\pi}{6}, \frac{3\pi}{2}\right\}$ 21. $\left\{\frac{2\pi}{3}, \frac{4\pi}{3}, \pi\right\}$

Math 3 Unit 8 Review Worksheet (except sketches)

1. $\cos 54° = \frac{8\sqrt{5}}{x} \rightarrow x = \frac{8\sqrt{5}}{\cos 54°}$ 3. $\tan 24° = \frac{14}{x} \rightarrow x = \frac{14}{\tan 24°}$ 5. $\tan x° = \frac{6}{12} \rightarrow x = \tan^{-1}\frac{1}{2}$
7. $\sin x° = \frac{6\sqrt{5}}{24} \rightarrow x = \sin^{-1}\frac{\sqrt{5}}{4}$ 9. $Q4;\ 40°\ ref$ 11. $Q3; \frac{5\pi}{12}\ ref$ 13. $Q2; 52°\ ref$ 15. $Q2; \frac{2\pi}{9}\ ref$ 17. $Q4; 40°\ ref$
19. $Q2; \frac{3\pi}{8}\ ref$ 21. $\frac{11\pi}{9}; \{\ldots, -140°, 580°, \ldots\}$ 23. $105°; \left\{\ldots -\frac{17\pi}{12}, \frac{31\pi}{12}, \ldots\right\}$ 25. $\frac{3\pi}{5}; \{\ldots, -252°, 468°, \ldots\}$
27. $480°; \left\{\ldots -\frac{4\pi}{3}, \frac{2\pi}{3}, \frac{14\pi}{3}, \ldots\right\}$ 29. $-\frac{5\pi}{2}; \{\ldots, -810°, -90°, 270°, \ldots\}$ 31. $-67.5°; \left\{\ldots -\frac{19\pi}{8}, \frac{13\pi}{8}, \ldots\right\}$
33. $\sin\theta = -\frac{\sqrt{3}}{2}$, $\cos\theta = -\frac{1}{2}$, $\tan\theta = \sqrt{3}$ 35. $\sin\theta = \frac{\sqrt{2}}{2}$, $\cos\theta = \frac{\sqrt{2}}{2}$, $\tan\theta = 1$ 37. $\sin\theta = \frac{\sqrt{3}}{2}$, $\cos\theta = -\frac{1}{2}$, $\tan\theta = -\sqrt{3}$
39. $\sin\theta = \frac{\sqrt{2}}{2}$, $\cos\theta = -\frac{\sqrt{2}}{2}$, $\tan\theta = -1$ 41. $\sin\theta = \frac{1}{2}$, $\cos\theta = \frac{\sqrt{3}}{2}$, $\tan\theta = \frac{\sqrt{3}}{3}$ 43. $\sin\theta = -\frac{\sqrt{2}}{2}$, $\cos\theta = \frac{\sqrt{2}}{2}$, $\tan\theta = -1$
45. $\sin\theta = 0$, $\cos\theta = 1$, $\tan\theta = 0$ 47. $\sin\theta = -1$, $\cos\theta = 0$, $\tan\theta$ $is\ undefined$ 49. $\sin\theta = 0$, $\cos\theta = -1$, $\tan\theta = 0$
51. $\left\{\frac{\pi}{6}, \frac{11\pi}{6}\right\}$ aka $\{30°, 330°\}$ 53. $\left\{\frac{4\pi}{3}, \frac{5\pi}{3}\right\}$ aka $\{240°, 300°\}$ 55. $\left\{\frac{\pi}{6}, \frac{5\pi}{6}, \frac{7\pi}{6}, \frac{11\pi}{6}\right\}$ aka $\{30°, 150°, 210°, 330°\}$
57. $\left\{\frac{\pi}{6}, \frac{5\pi}{6}, \frac{7\pi}{6}, \frac{11\pi}{6}\right\}$ aka $\{30°, 150°, 210°, 330°\}$ 59. $\{0, \pi\}$ aka $\{0°, 180°\}$
61. $\left\{\frac{4\pi}{3}, \frac{5\pi}{3}, \frac{\pi}{4}, \frac{5\pi}{4}\right\}$ aka $\{120°, 300°, 45°, 225°\}$
63. $\left\{0, \pi, \frac{\pi}{6}, \frac{7\pi}{6}\right\}$ aka $\{0°, 180°, 30°, 210°\}$ 65. $\left\{\frac{\pi}{3}, \frac{5\pi}{3}, \pi\right\}$ aka $\{60°, 300°, 180°\}$
67. $\left\{\frac{\pi}{2}, \frac{7\pi}{6}, \frac{11\pi}{6}\right\}$ aka $\{90°, 210°, 330°\}$ 69. $\left(-\frac{\sqrt{3}}{2}, \frac{1}{2}\right)$
71. $\left(\frac{\sqrt{2}}{2}, -\frac{\sqrt{2}}{2}\right)$ aka $\left(\frac{1}{\sqrt{2}}, -\frac{1}{\sqrt{2}}\right)$ 73. $P = 28\ ft; A = 8\sqrt{21}\ ft^2$ 79. D