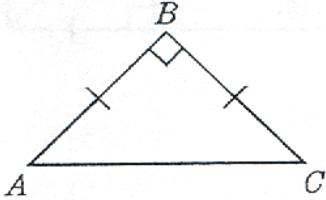
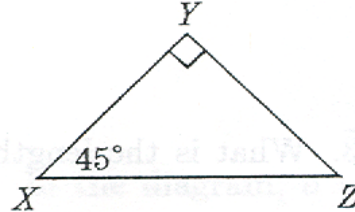


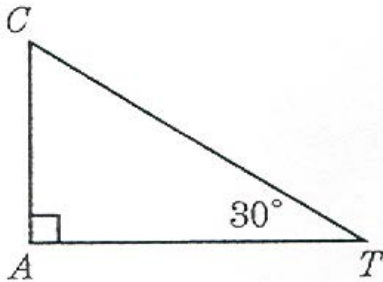
1. If $AB = 2\sqrt{2}$, find the length of AC .



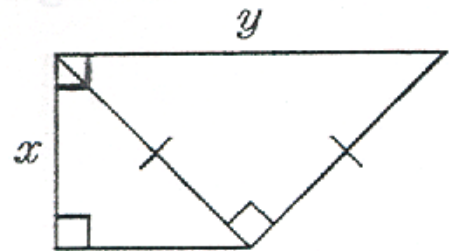
2. If $YZ = 4k\sqrt{6}$, express XZ in terms of k .



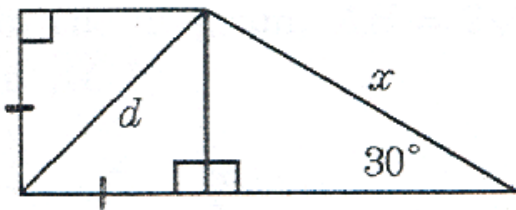
3. If $CA = 3m\sqrt{3}$, express AT in term of m .



4. If $x = 12$, find the value of y .

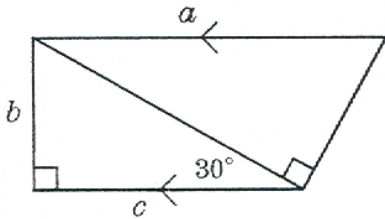


5. If $d = 3\sqrt{2}$, find the value of x .



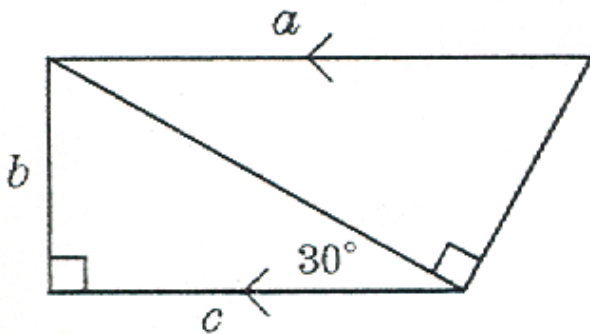
6. An isosceles right triangle has a leg of $8\sqrt{6}$ units. What is its perimeter?

7. If $a = 16$, find the values of b and c . Explain why you know that both triangles are 30-60-90s.

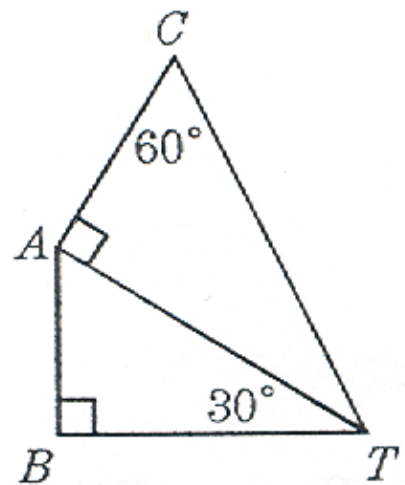


8. What is the altitude of an equilateral triangle with a perimeter of 30 units?

9. If $a = 10\sqrt{3}$, find the values of b and c .

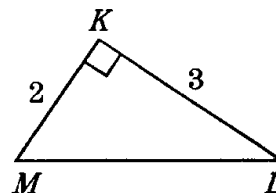


10. If $CT = 2x$, express BT in terms of x .



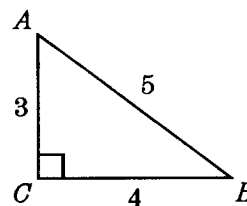
For problems 1-4, use the diagram of $\triangle KLM$ and find.

1. $\cos L$
2. $\sec L$
3. $\csc M$
4. $\cot M$



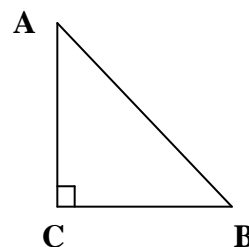
For problems 5-8, use the diagram of $\triangle ABC$ to find the letter of the missing angle that θ measures.

5. $\sin \theta = 3/5$
6. $\csc \theta = 5/4$
7. $\cot \theta = 3/4$
8. $\sec \theta = 3/5$



For problems 9-12, use the diagram of $\triangle ABC$ to find each side length:

9. If $\tan B = 7/5$, find AB
10. If $\sin B = 3/4$, find BC
11. If $\csc B = 7/3$, find BC
12. If $\sec A = 6/5$, find BC



Answer the following questions.

13. If $\cos \theta = 4/5$, what is $\tan \theta$?
14. If $\tan \theta = 3$, then what is $\sec \theta$?
15. If $\csc \theta = 7/3$, what is $\cot \theta$?
16. If $\cot \theta = 1/2$, what is $\sin \theta$?

Worksheet: Right Triangle Trigonometry

Use a calculator in degree mode to find the indicated function value correct to three decimal places:

17. $\sin 32^\circ$

18. $\cos 184^\circ$

19. $\cot 75^\circ$

20. $\sec 253.2^\circ$

21. $\csc 8.7^\circ$

22. $\tan 256^\circ$

23. $\sec 172.1^\circ$

24. $\cot 325^\circ$

Find the degree measure of the acute angle θ correct to three decimal places:

25. $\theta = \cos^{-1}.475$

26. $\sin \theta = .873$

27. $\theta = \cot^{-1} 1.756$

28. $\theta = \operatorname{arcsec}(2.217)$

29. $\csc \theta = 3.623$

30. $\theta = \sec^{-1} 1.689$

31. $\cot \theta = .769$

32. $\theta = \arctan(1.153)$

33. $\theta = \csc^{-1} 2.441$

1. $\frac{2}{\sqrt{13}}$

2. $\frac{\sqrt{13}}{2}$

3. $\frac{\sqrt{13}}{3}$

4. $\frac{2}{3}$

5. B

6. A

7. B

8. A

9. $\sqrt{74}$

10. $\sqrt{7}$

11. $2\sqrt{10}$

12. $\sqrt{11}$

13. $\frac{3}{4}$

14. $\sqrt{10}$

15. $\frac{2\sqrt{10}}{3}$

16. $\frac{2}{\sqrt{5}}$

17. .530

18. -.998

19. .268

20. -1.752

21. 6.611

22. 4.011

23. -1.010

24. -1.428

25. 61.641°

26. 60.809°

27. 29.660°

28. 63.188°

29. 16.022°

30. 53.696°

31. 52.440°

32. 49.065°

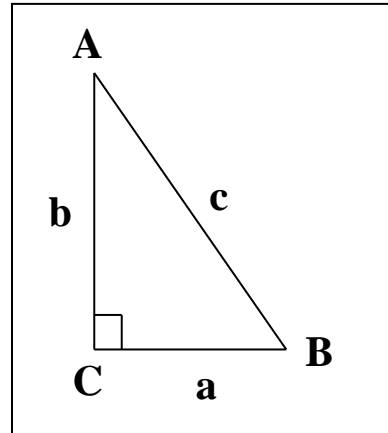
33. 24.184°

Name: _____

1.3 Right Triangle Applications

Solve each triangle (find all missing sides and missing angles). Round side measures to the nearest thousandth and angle measures to the nearest degree.

1. $c = 10$
 $m\angle B = 50^\circ$



2. $a = 4$
 $c = 7$

3. $b = 3.5$
 $m\angle A = 72^\circ$

Draw a picture and solve the problem. Round all side measures to three decimal places and all angles measures to the nearest degree

4. A 24 foot ladder leaning against a wall makes a 75° angle with the ground.
- How high up the wall does the ladder reach?
 - How far is the base of the ladder from the wall?
5. A plane passes directly over your head an altitude of 500 feet. Two seconds later you observe that its angle of elevation is 42°
- How far did the plane travel during those two seconds.
 - How fast is the plane traveling in **miles per hour**?
6. From a window 35 meters high, the angle of depression to the top of a nearby streetlight is 55° . The angle of depression to the base of the streetlight is 61° . How tall is the streetlight?

Draw a diagram and solve each problem. Round all side measures to three decimal places and all angle measures to the nearest degree.

7. Your cat Fuzzy is trapped in tree 8.2 meters above the ground. Your ladder is only 8.7 meters long. If you place the ladder's tip right next to Fuzzy, what angle will the ladder make with the ground?

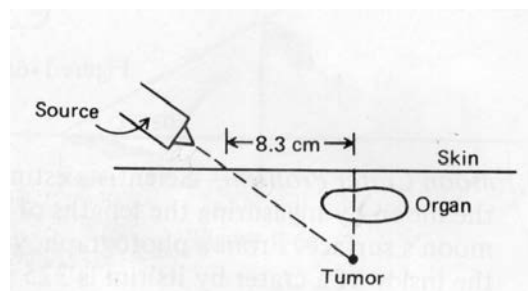
8. A rocket shoots straight up from a launch pad. Five seconds after lift-off, Billy, who is standing 2 miles away, notes that the rocket's angle of elevation is 4.6° . Four seconds after that, the angle of elevation is 38° . How far did the rocket rise during those four seconds?

9. A man in a forest stands 20 feet from a huge pine tree. The angle of elevation from eye level to the top of the tree is 36° , and the angle of depression to the base of the tree is 11° . How tall is the tree?

10. A beam of gamma rays is to be used to treat a tumor known to be 5.7 cm beneath the patient's skin. To avoid damaging a vital organ, the radiologist moves the radiation source over 8.3 cm.

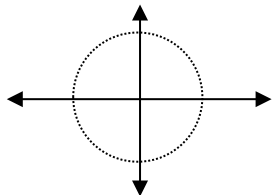
a.) At what angle to the patient's skin must the radiologist aim the gamma ray source to hit the tumor?

b.) How far will the beam have to travel through the patient's body before reaching the tumor?

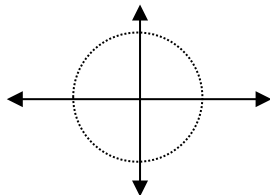


Sketch a graph of each angle. Determine the quadrant of the terminal side of the angle in standard position.

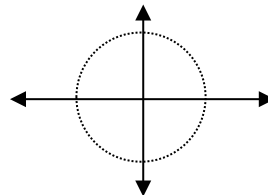
1. -160°



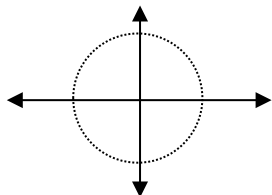
2. 280°



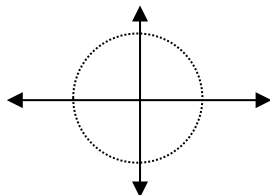
3. 452°



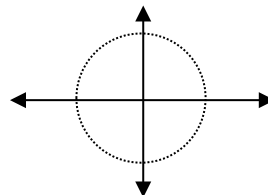
4. -827°



5. 1150°



6. -455°



Determine the measure of an angle θ coterminal with the give angle that satisfies the specified condition.

7. 48° ; $360^\circ \leq \theta \leq 720^\circ$

8. 110° ; $-360^\circ \leq \theta \leq 0^\circ$

9. -15° ; $180^\circ \leq \theta \leq 540^\circ$

10. -250° ; $360^\circ \leq \theta \leq 720^\circ$

Determine two different coterminal angles, one with positive measures, and one with negative measures for each angle.

11. 55°

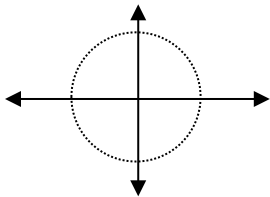
12. -150°

13. -22°

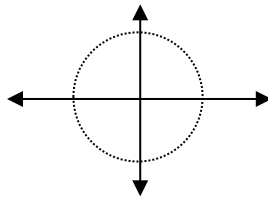
14. 410°

Find the reference angle for each of the following

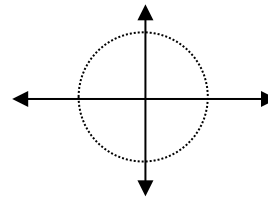
12. 125°



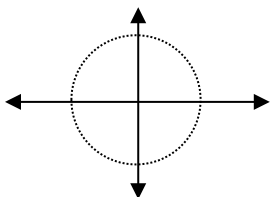
16. -110°



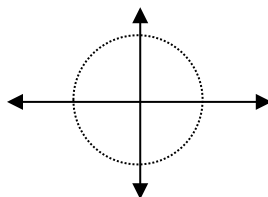
17. 400°



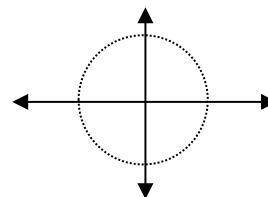
18. 22°



17. 245°



20. -385°



Find the exact values of the six trig functions of an angle θ whose terminal side passes through the given point.

21. $(3, -4)$

22. $(-7, -5)$

Find the exact value of the other five trig functions of θ if θ terminates in the given quadrant and has the given function value.

23. QII, $\sec \theta = -\frac{5}{4}$

24. QIII, $\tan \theta = \frac{1}{3}$

Name: _____

1.5 Radians Day 1

Find the radian measure of the angle with the given degree measure

1. 72°

2. -45°

3. -75°

4. 1080°

Find the degree measure of the angle with the given radian measure

5. $\frac{7\pi}{6}$

6. $-\frac{5\pi}{4}$

7. $\frac{5\pi}{18}$

8. 13

Find two positive and two negative coterminal angles for the given radian measure

9. $\frac{3\pi}{4}$

10. $\frac{-5\pi}{8}$

Find an angle between 0 and 2π that is coterminal with the given angle

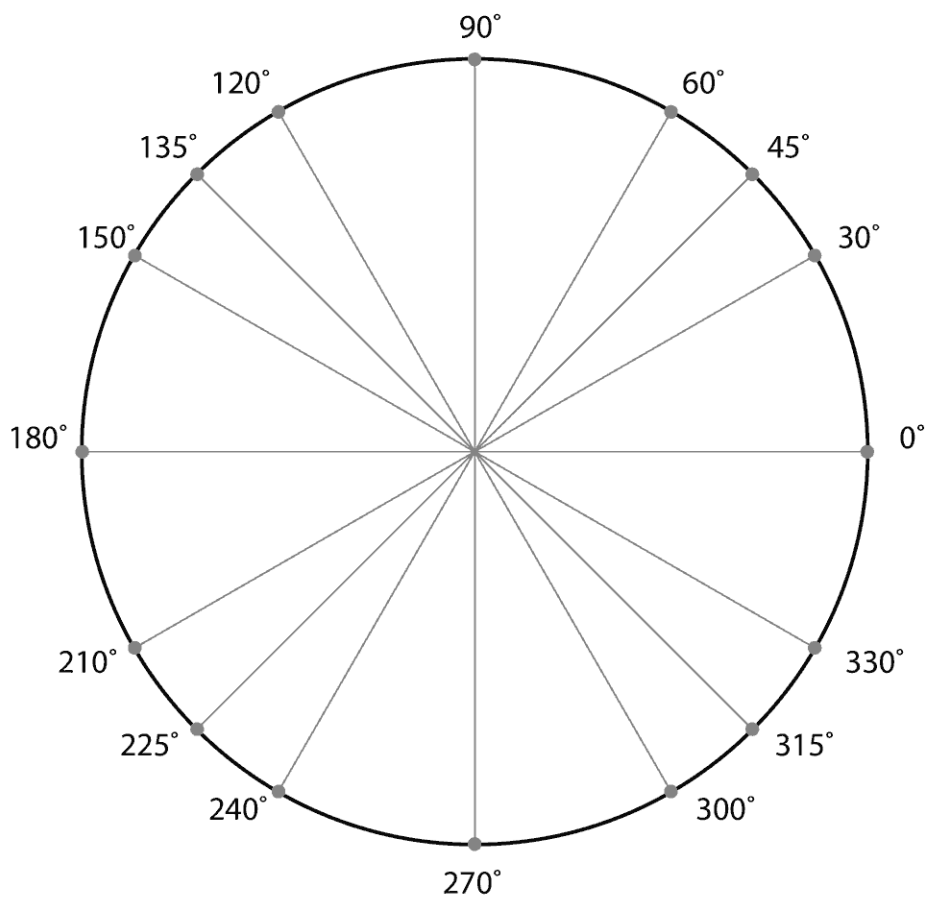
11. $\frac{17\pi}{6}$

12. $-\frac{7\pi}{3}$

13. 87π

14. $\frac{17\pi}{4}$

WITHOUT NOTES: Fill in the radian values. Try to look at the values as a part to the whole circle instead of converting every degree value.



Post It Note / Sticky Note: 2" X 2"

$$\frac{11\pi}{2}$$

$$\frac{-5\pi}{6}$$

$$\frac{3\pi}{10}$$

$$\frac{-4\pi}{3}$$

$$\frac{4\pi}{7}$$

$$\frac{-23\pi}{11}$$

$$\frac{5\pi}{4}$$

$$\frac{-15\pi}{8}$$

$$\frac{6\pi}{12}$$

$$\frac{-3\pi}{5}$$

$$\frac{20\pi}{9}$$

$$\frac{-14\pi}{13}$$

Post It Note / Sticky Note: 2" X 2"

$$\frac{-\pi}{2}$$

$$\frac{17\pi}{6}$$

$$\frac{-11\pi}{10}$$

$$\frac{11\pi}{3}$$

$$\frac{-13\pi}{7}$$

$$\frac{8\pi}{11}$$

$$\frac{-9\pi}{4}$$

$$\frac{4\pi}{8}$$

$$\frac{-27\pi}{12}$$

$$\frac{6\pi}{5}$$

$$\frac{-17\pi}{9}$$

$$\frac{30\pi}{13}$$

Post It Note / Sticky Note: 2" X 2"

$$\frac{9\pi}{2}$$

$$\frac{-\pi}{6}$$

$$\frac{29\pi}{10}$$

$$\frac{-7\pi}{3}$$

$$\frac{18\pi}{7}$$

$$\frac{-7\pi}{11}$$

$$\frac{15\pi}{4}$$

$$\frac{-3\pi}{8}$$

$$\frac{23\pi}{12}$$

$$\frac{-17\pi}{5}$$

$$\frac{11\pi}{9}$$

$$\frac{-26\pi}{13}$$

Name: _____

1.6 Radians Day 2

Graph the following angles. Label π and 2π on your graph with a common denominator. Remember to find a coterminal angle between 0 and 2π if necessary.

1. $\frac{\pi}{5}$

2. $-\frac{7\pi}{8}$

3. $\frac{25\pi}{12}$

4. $\frac{8\pi}{9}$

Draw the terminal side of each angle and find the corresponding reference angle

5. $\frac{13\pi}{9}$

6. $-\frac{2\pi}{5}$

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

8. $\frac{14\pi}{3}$

9. $-\frac{15\pi}{8}$

10. $-\frac{20\pi}{7}$

11. $\frac{7\pi}{6}$

12. $\frac{3\pi}{2}$

13. A clothes dryer rotates 500 revolutions every minute. Determine its angular velocity in radians per second.

14. A bike wheel makes 1.8 revolutions in 5 seconds and has a radius of 25 inches. Determine its angular velocity and its linear velocity.

15. The minute hand of a clock is 27 millimeters long. Find the linear velocity in millimeters per second.

16. Assume the hard drive on a computer is circular and rotates at 7200 revolutions per minute. What is the angular velocity in radians per minute? What is the linear velocity in inches per minute of a particle located 2 inches from the center of the hard drive? What is the linear velocity in miles per hour?

Name: _____

1.7 Exact Values Day 1

Find the exact value of the trigonometric function at the given real number

1. $\sin \frac{2\pi}{3}$

2. $\cos \frac{2\pi}{3}$

3. $\tan \frac{2\pi}{3}$

4. $\sec \frac{2\pi}{3}$

5. $\sin \frac{5\pi}{6}$

6. $\cos \frac{5\pi}{6}$

7. $\tan \frac{5\pi}{6}$

8. $\csc \frac{5\pi}{6}$

9. $\sin \frac{-\pi}{3}$

10. $\cos \frac{-\pi}{3}$

11. $\tan \frac{-\pi}{3}$

12. $\cot \frac{-\pi}{3}$

13. $\sin \frac{5\pi}{4}$

14. $\cos \frac{5\pi}{4}$

15. $\tan \frac{5\pi}{4}$

16. $\csc \frac{5\pi}{4}$

17. $\sin \frac{23\pi}{6}$

18. $\cos \frac{23\pi}{6}$

19. $\tan \frac{23\pi}{6}$

20. $\cot \frac{23\pi}{6}$

Find the exact values of the six trig functions of an angle θ whose terminal side passes through the given point.

21. $(-3, 4)$

22. $(12, -5)$

Name: _____

1.8 The Unit Circle

Find the exact value:

1. $\tan \frac{3\pi}{2}$

2. $\cos \pi$

3. $\sin \left(-\frac{\pi}{2} \right)$

4. $\sec \frac{3\pi}{2}$

5. $\csc \frac{\pi}{2}$

6. $\cos \frac{5\pi}{2}$

7. $\tan 4\pi$

8. $\cot \frac{\pi}{2}$

9. If $\csc \theta > 0$, then θ lies in quadrant(s) _____

10. If $\csc \theta < 0$, and $\sec \theta > 0$ then θ lies in quadrant(s) _____

11. Which of the following points is not on the unit circle?

A) $(-1, 0)$

B) $\left(\frac{1}{2}, -\frac{1}{2} \right)$

C) $\left(\frac{\sqrt{2}}{2}, \frac{\sqrt{2}}{2} \right)$

12. Which radian value is associated with the coordinates $\left(-\frac{\sqrt{3}}{2}, \frac{1}{2} \right)$

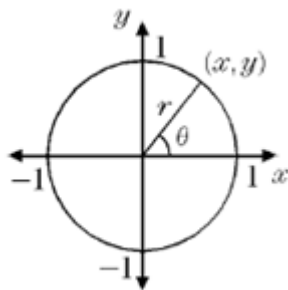
13. In the accompanying diagram of a unit circle, the ordered pair (x, y) represents the locus of points for the circle. Which ordered pair is equivalent to (x, y) ?

a) $(\sin \theta, \cos \theta)$

b) $(\cot \theta, \tan \theta)$

c) $(\tan \theta, \cot \theta)$

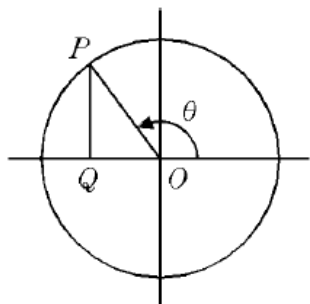
d) $(\cos \theta, \sin \theta)$



14. Find 2 negative and 3 positive angles, expressed in radians, for which the point on the unit circle corresponds to each angle is:

$\left(\frac{1}{2}, \frac{\sqrt{3}}{2} \right)$

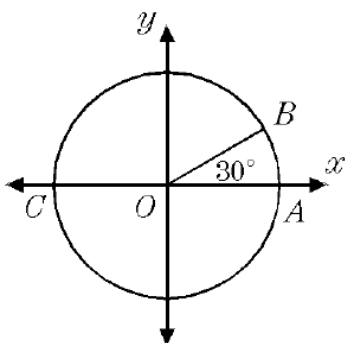
15. In the accompanying diagram, circle O is a unit circle. What function is represented by the length of segment OQ?



- a) $\cos \theta$
- b) $\sin \theta$
- c) $-\cos \theta$
- d) $-\sin \theta$

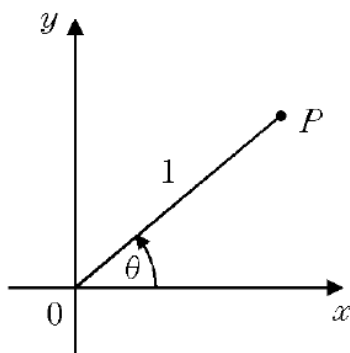
16. In the diagram of circle O $\overline{OA} = 1$ and $m\angle BOA = 30^\circ$. What are the coordinates of B?

- a) $\left(\frac{1}{2}, \frac{\sqrt{3}}{2}\right)$
- b) $\left(\frac{\sqrt{3}}{2}, \frac{1}{2}\right)$
- c) $\left(\frac{\sqrt{2}}{2}, \frac{\sqrt{2}}{2}\right)$
- d) $\left(\frac{\sqrt{2}}{2}, \frac{1}{2}\right)$



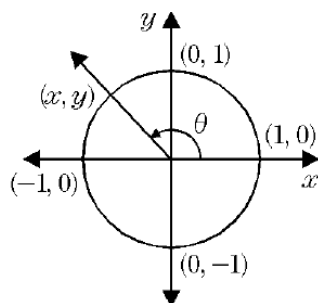
17. In the figure $\overline{OP} = 1$. What are the coordinates of point P?

- a) $(\sin \theta, \cos \theta)$
- b) $(-\sin \theta, -\cos \theta)$
- c) $(\cos \theta, \sin \theta)$
- d) $(-\cos \theta, -\sin \theta)$



18. In the diagram, the ordered pair (x,y) represents the point where the terminal side of θ intersects the unit circle. If $m\angle\theta = 120^\circ$, what is the value of x in simplest form?

- a) $-\frac{\sqrt{3}}{2}$
- b) $\frac{\sqrt{3}}{2}$
- c) $-\frac{1}{2}$
- d) $\frac{1}{2}$



1.9 More Exact Values

Name: _____

Find the exact value of each expression.

1. $\tan(-225^\circ)$

2. $\cos\left(-\frac{3\pi}{4}\right)$

3. $\csc\left(-\frac{17\pi}{6}\right)$

4. $\sin\left(-\frac{11\pi}{3}\right)$

5. $\cos 90^\circ + 5 \sin 270^\circ$

6. $2 \sin \frac{3\pi}{2} - 3 \cos \pi$

7. $2 \tan 45^\circ - \frac{3}{2} \tan(-225^\circ)$

8. $\sin \frac{2\pi}{3} - \cos \frac{4\pi}{3}$

9. $5 \sin \frac{11\pi}{6} - 2 \cos\left(-\frac{\pi}{6}\right)$

10. $\cot^2 330^\circ - \csc^2 330^\circ$

$$11. -5\cot^2 150^\circ - 2\sin^2 120^\circ$$

$$12. \sin \frac{2\pi}{3} \cos \frac{\pi}{6} + \cos \frac{2\pi}{3} \sin \frac{\pi}{6}$$

$$13. \frac{\sec 120^\circ}{\cos 120^\circ}$$

$$14. \frac{\cos \frac{5\pi}{3}}{\sin \frac{4\pi}{3}}$$

$$15. \sin^2 \frac{7\pi}{6} + \cos^2 \frac{\pi}{4}$$

$$16. \tan^2 \frac{2\pi}{3} \left(1 - \tan^2 \frac{7\pi}{6} \right)$$

17. If $\tan x = -\frac{2}{5}$ and x lies in QII, what is the value of $\cos x$?

18. If $\sin x = -\frac{3}{4}$ and $\tan x > 0$, what is the value of $\cos x$?

More Exact Values Key

1. -1

2. $-\frac{1}{\sqrt{2}}$

3. -2

4. $\frac{\sqrt{3}}{2}$

5. -5

6. 1

7. $7/2$

8. $\frac{1+\sqrt{3}}{2}$

9. $\frac{-5-2\sqrt{3}}{2}$

10. -1

11. $-33/2$

12. $\frac{1}{2}$

13. 4

14. $-\frac{1}{\sqrt{3}}$

15. $\frac{3}{4}$

16. 2

17. $-\frac{5}{\sqrt{29}}$

18. $-\frac{\sqrt{7}}{4}$