

More Trig Functions

Converting Degrees to Radians:

$$\text{radians} = \text{degrees} \times \frac{\pi}{180}$$

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Examples:

1). 90° 2). 120°

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3). 240° 4). 330°

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Converting Radians to Degrees:

$$\text{degrees} = \text{radians} \times \frac{180}{\pi}$$

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Examples:

1). $\pi/9$

2). $2\pi/5$

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3). 3π

4). $3\pi/4$

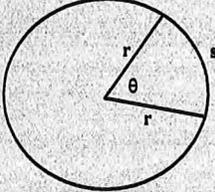
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Arc Length
Remember to $S=\theta r$

The length, s , of an arc of a circle radius r subtended by θ (in *radians*) is given by:

$s=\theta r$

If r is in meters, s will also be in meters. Likewise, if r is in cm, s will also be in cm.



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1) Find the length of the arc of a circle with radius 4 cm and central angle 5.1 radians.

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2) The pendulum of a clock makes an angle of 2.5 radians as its tip travels 18 feet. What is the length of the pendulum?

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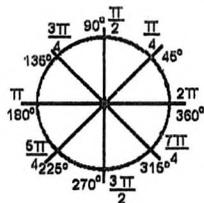
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Day 1 CW/HW

- 1) Expressed in degrees, $\frac{8\pi}{3}$ is equivalent to
A) 480° C) 240°
B) 420° D) 300°
- 2) The number of degrees equal to $\frac{4\pi}{9}$ radians is
A) 80° C) 60°
B) 270° D) 130°
- 3) In which quadrant does the terminal ray of a standard position angle of $\frac{16\pi}{5}$ radians lie?
A) *I* C) *III*
B) *II* D) *IV*
- 4) Convert 30° to radian measure and express the answer in terms of π .
- 5) Convert 40° to radian measure and express the answer in terms of π .
- 6) Convert 45° to radian measure and express the answer in terms of π .
- 7) Convert 216° to radian measure and express the answer in terms of π .
- 8) Convert 540° to radian measure and express the answer in terms of π .

- 9) Convert -140° to radian measure and express the answer in terms of π .
- 10) Express $\frac{5\pi}{9}$ radians in degrees.
- 11) Express 300° in radian measure.
- 12) If placed in standard position, an angle of $\frac{11\pi}{6}$ radians has the same terminal side as an angle of
- | | |
|----------------|-----------------|
| A) 240° | C) -30° |
| B) 150° | D) -150° |
- 13) Find the length of the arc on a circle with a radius of 20 ft and is intercepted by a central angle measuring $2\frac{1}{2}$ radians.
- 14) In a circle with a radius of 2.5 centimeters, a central angle has a measure of 5 radians. What is the length, in centimeters, of the arc intercepted by the central angle?
- 15) Find the radius of a circle on which a central angle measuring $\frac{3}{4}$ radians intercepts an arc on the circle with a length of 18 miles. [*Answer may be expressed in terms of π .*]
- 16) Find the radius of a circle on which a central angle measuring $\frac{5\pi}{6}$ radians intercepts an arc on the circle with a length of 35π cm. [*Answer may be expressed in terms of π .*]
- 17) As a seat on a Ferris wheel travels through one-quarter of a revolution of the wheel, the length of the arc traveled by the seat is 5π feet. Find the radius of the Ferris wheel.

Evaluating Trigonometric Functions with Radians



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1). Find the exact value of the following:

a. $\tan(\pi/3)$

b. $\cos(4\pi/3)$

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c. $\sin 3\pi$

d. $\sec(-2\pi/3)$

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2). If $f(x) = \cos 3x$, find $f(\pi/6)$

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3). If $g(x) = \sin(x/2)$, find $g(5\pi/3)$

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4). If $h(x) = \sin x \cos 2x$, find $h(\pi)$

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Day 2 Classwork/ Homework

θ in Degrees	0°	30°	45°	60°	90°	180°	270°
θ in Radians							
$\sin \theta$							
$\cos \theta$							
$\tan \theta$							

In 3–12, find the exact function value of each of the following if the measure of the angle is given in radians.

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

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

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

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

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

8. $\sin \frac{4\pi}{3}$

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

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

11. $\csc \pi$

12. $\cot \frac{\pi}{4}$

25. If $f(x) = \sin\left(\frac{1}{3}x\right)$, find $f\left(\frac{\pi}{2}\right)$.

26. If $f(x) = \cos 2x$, find $f\left(\frac{3\pi}{4}\right)$.

27. If $f(x) = \sin 2x + \cos 3x$, find $f\left(\frac{\pi}{4}\right)$.

28. If $f(x) = \tan 5x - \sin 2x$, find $f\left(\frac{\pi}{6}\right)$.

Day 3
Cofunctions

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Cofunctions: Any trigonometric function of an acute angle is equal to the complement of its cofunction.

Cosine is the cofunction of Sine
Cosecant is the cofunction of Secant
Cotangent is the cofunction of Tangent

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*****Remember - the angles of cofunctions are complementary**

Find the value of θ :

1) $\tan 48^\circ = \cot \theta$ 2) $\sec \theta = \csc(\theta + 60)^\circ$

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3). $\tan(\theta + 10)^\circ = \cot(3\theta + 8)^\circ$ 4). $\sin(\theta + 20)^\circ = \csc(\theta + 10)^\circ$

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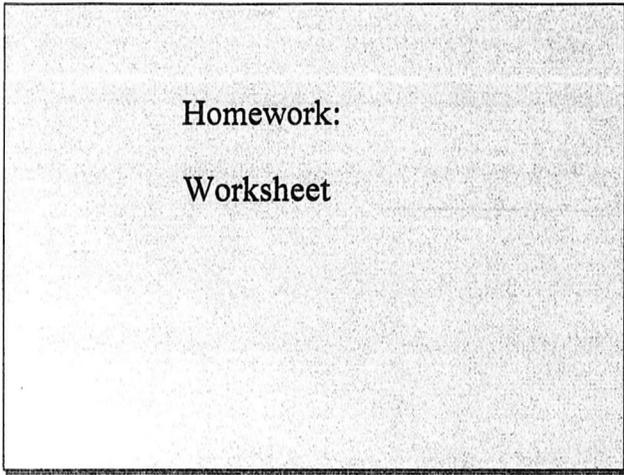
Write each expression as a function of a positive acute angle, whose measure is less than 45° .

1). $\tan 72^\circ$ 2). $\sin 280^\circ$

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3). $\cot(-277^\circ)$ 4). $\sec(600^\circ)$

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Day 4 Review for quiz

- 1) The number of degrees equal to $\frac{4\pi}{9}$ radians is
A) 270° C) 130°
B) 80° D) 60°
- 2) In which quadrant does the terminal ray of a standard position angle of $\frac{16\pi}{5}$ radians lie?
A) *I* C) *III*
B) *II* D) *IV*
- 3) Convert 135° to radian measure and express the answer in terms of π .
- 4) Convert 220° to radian measure and express the answer in terms of π .
- 5) Convert 240° to radian measure and express the answer in terms of π .
- 6) Convert -15° to radian measure and express the answer in terms of π .
- 7) Convert $\frac{\pi}{6}$ radians to degrees.
- 8) Convert $\frac{4\pi}{15}$ radians to degrees.
- 9) Find the length of the arc on a circle with a radius of 12 in. and is intercepted by a central angle measuring 3 radians. [*Answer may be expressed in terms of π .*]
- 10) Find the length of the arc on a circle with a radius of 20 ft and is intercepted by a central angle measuring $2\frac{1}{2}$ radians.

