10-01 Right Triangle Trigonometry





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526 #1, 5, 9, 13, 15, 17, 21, 23, 25, 29, 33, 37, 39, 45, 49, 51, 53, 55, 58, 60 = 20

10-02 Angles and Radian Measure





Algebra 2 10-02	Name:
Convert the degree measure to radians, or the radian measure to degrees.	
135°	
5π	
4	
Sector	sector
• of a circle	
Arc Length	(🗸) length
$s = r\theta$	soutrol
θ must be in radians!	
Area of Sector	
- 1	
$A = \frac{1}{2}r^2\theta$	
θ must be in radians!	
Find the length of the outfield fance if it is 220 ft from home plate	
Find the length of the outliefd lence if it is 220 it from nome plate.	
	Uutfield
	tence
Find the area of the baseball field.	
	90°

534 #1, 3, 5, 7, 9, 11, 13, 15, 19, 21, 23, 25, 29, 31, 33, 40, 42, 45, 46, 49 = 20

Algebra 2 10-03

Algebra 2

10-03 Trigonometric Functions of Any Angle



Evaluate the six trigonometric functions of θ .



Quadrantal Angles

Evaluate the six trigonometric functions of θ . $\theta = 180^{\circ}$

Reference Angle

- Angle between ______ side and ______
- Has the same values for trig functions as _____ quadrant angles
- You just have to add the ______ signs •

A

х

3		Name:					
Sketch the angle. Then find its reference angle.							
	$\frac{23\pi}{4}$						
		Î					
	<						
	e. Then find its reference angle.	e. Then find its reference angle. $\frac{23\pi}{4}$					



sin(-150°)						
1						
← →						
Ļ						

Estimate the horizontal distance traveled by a Red Kangaroo who jumps at an angle of 8° and with an initial speed of 53 feet per second (35 mph).

542 #1, 3, 5, 7, 9, 11, 13, 15, 17, 21, 25, 29, 33, 35, 41, 51, 53, 57, 58, 59 = 20

10-04 Graphing Sine and Cosine Functions



• _____ *y* = *k*

Graphing sine and cosine

- 1. Identify the ______, _____, _____, shift, and ______ shift
- 2. Draw the _____, *y* = *k*
- 3. Find the 5 key points (3 zeros, 1 max, 1 min)



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10-05 Graphing Other Trigonometric Functions





10-06 Modeling with Trigonometric Functions

Trigonometric functions are
Useful for modeling motions or patterns
• Period (<i>T</i>)
• Time of
• Unit:
• Frequency (f)
 Cycles per
• Unit:
$T = \frac{1}{c}$
Find the frequency
$y = 2\cos 3x$ $y = \sin 3\pi x$
y = 2 cos ox
Write Trigonometric Models
1. Find the of max and min)
2. Find the
3. Find the
4. If the situation starts at zero, use
a. If starts decreasing
5. If the situation starts at a maximum or minimum use
a If starts at max
b If starts at min
An audiometer produces a pure tone with a frequency f of 1000 hertz (cycles per second). The maximum pressure P produced
by the tone is 20 millipascals. Write a sine model that gives the pressure <i>P</i> as a function of the time <i>t</i> (in seconds).



the ground and the lowest point is 2 inches above the ground. Each rope makes 2 revolutions per second. Write a model for the height h (in inches) of one of the ropes as a function of the time t (in seconds) given that the rope is at its lowest point when t = 0.



The tables show the average monthly low temperatures D (in degrees Fahrenheit) in Erie, Pennsylvania, where $t = 1$					
repre	sents	Ja	nuary	. Writ	e a model that gives <i>D</i> as a function of <i>t</i> and interpret the period of its graph. Use technology.
t	D		t	D	

t	D	t	D
1	21	7	64
2	21	8	62
3	28	9	56
4	38	10	45
5	48	11	37
6	58	12	27

568 #1, 3, 5, 7, 9, 11, 12, 13, 15, 17, 19, 20, 21, 23, 25, 32, 33, 37, 45, 47 = 20

 $\sec(-u) = \sec u$

 $\tan(-u) = -\tan u$

 $\cot(-u) = -\cot u$

Algebra 2

10-07 Using Trigonometric Identities

Even/Odd Identities

 $\cos(-u) = \cos u$

 $\sin(-u) = -\sin u$

 $\csc(-u) = -\csc u$

Cofunction Identities

 $\sin\left(\frac{\pi}{2}-u\right) = \cos u \qquad \cot\left(\frac{\pi}{2}-u\right) = \tan u$

 $\cos\left(\frac{\pi}{2} - u\right) = \sin u \qquad \sec\left(\frac{\pi}{2} - u\right) = \csc u$ $\tan\left(\frac{\pi}{2} - u\right) = \cot u \qquad \csc\left(\frac{\pi}{2} - u\right) = \sec u$

Trigonometric Identity

• Statement showing relationship between two quantities that are always

 $\csc u = \frac{1}{\sin u}$

 $\sec u = \frac{1}{\cos u}$

 $\cot u = \frac{1}{\tan u}$

 $\cot u = \frac{\cos u}{\sin u}$

Reciprocal Identities

 $\sin u = \frac{1}{\csc u}$ $\cos u = \frac{1}{\sec u}$ $\tan u = \frac{1}{\cot u}$

Quotient Identities

 $\tan u = \frac{\sin u}{\cos u}$

Pythagorean Identities

 $\sin^2 u + \cos^2 u = 1$ $\tan^2 u + 1 = \sec^2 u$

 $1 + \cot^2 u = \csc^2 u$

Given that $\sin \theta = -\frac{5}{13}$ and $\pi < \theta < \frac{3\pi}{2}$, find the values of the other five trigonometric functions of θ .

Simplify $(1 + \cos \theta)(1 - \cos \theta)$

 $\sin x \cot x$

Algebra 2 10-07	Name:
Verify Trigonometric Identities	
Show that trig identities are true by turning into the	-
Guidelines	
1. Work with at a time. Start with the more side.	
2. Try, add, etc.	
3. Use	
4. If the above doesn't work, try rewriting in and	
$\frac{5. \text{Iry}_{}!}{\sin x - \cos x}$	
Verify $\frac{\sin x}{\csc x} + \frac{\cos x}{\sec x} = 1$ $\cos\left(\frac{\pi}{2} - x\right)\cot x = \cos x$	

575 #1, 3, 5, 7, 9, 11, 14, 15, 17, 19, 21, 23, 25, 33, 35, 39, 41, 42, 45, 46 = 20

10-Review

Take this test as you would take a test in class. When you are finished, check your work against the answers. <u>10-01</u>

Evaluate the six trigonometric function for the following triangle if *a* = 9 and *c* = 10. Find exact answers.



1. Using angle A (sin A, cos A, etc.)

2. Using angle B (sin B, cos B, etc.)

3. A diagonal beam on a trestle bridge makes an angle of 30° with the horizontal base. If the beam is 20 ft long, how high will the end of the beam be above the horizontal base?

<u>10-02</u>

Consider an angle in standard position that measures $\frac{5\pi}{4}$ for the following problems.

- 4. Determine two coterminal angles (one positive and one negative).
- 5. Find the reference angle in radians.

Convert the degree measure to radians or the radian measure to degrees. Find the exact answers.

convert the degree measure to radians t	of the faulan measure to degrees. I me	a the cract answe						
6. 300°	8. $\frac{5\pi}{12}$							
7. $\frac{2\pi}{3}$	12							
<u>10-03</u>								
Evaluate the function. Find the exact ans	swers.							
9. $\csc \frac{2\pi}{3}$	11. $\cot \frac{\pi}{4}$	13. $tan \frac{\pi}{6}$						
10. cos –150°	12. $\sin \frac{5\pi}{3}$							
A point on angle θ is (4, 3). Find the following.								
14. $\sin \theta$	16. $\tan \theta$	18. csc θ						
15. cos <i>θ</i>	17. sec <i>θ</i>	19. cot <i>θ</i>						
<u>10-04, 10-05</u>								
Consider the following function.								

- $y = 10 \sin 2(x + 4) 3$ for the following problems. 20. Find the period 22.
- 21. Find the horizontal shift

- 22. Find the midline
- 23. Find the amplitude

<u>10-06</u>

24. Consider the graph. Find a function to model the graph.



<u>10-07</u>

Use trigonometric identities to simplify.

25. $-\frac{\tan\theta}{\sec\theta}$

Verify the identities.

27.
$$\frac{1-\cos^2\theta}{\sec^2\theta} - \sin^2\theta = -\sin^4\theta$$

Answers

1.
$$\sin A = \frac{9}{10}, \cos A = \frac{\sqrt{19}}{10}, \tan A = \frac{9\sqrt{19}}{19}, \csc A = \frac{10}{9}, \sec A = \frac{10\sqrt{19}}{19}, \cot A = \frac{\sqrt{19}}{9}$$

2. $\sin B = \frac{\sqrt{19}}{10}, \cos B = \frac{9}{10}, \tan B = \frac{\sqrt{19}}{9}, \csc B = \frac{10\sqrt{19}}{19}, \sec B = \frac{10}{9}, \cot B = \frac{9\sqrt{19}}{19}$
3. 10 feet
4. $\frac{13\pi}{4}, -\frac{3\pi}{4}$
5. $\frac{\pi}{4}$
6. $\frac{5\pi}{3}$
7. 120°
8. 75°
9. $\frac{2\sqrt{3}}{3}$
10. $-\frac{\sqrt{3}}{2}$
11. 1
12. $-\frac{\sqrt{3}}{2}$
13. $\frac{\sqrt{3}}{3}$
14. $\frac{3}{5}$
15. $\frac{4}{5}$
16. $\frac{3}{4}$
17. $\frac{5}{4}$
18. $\frac{5}{3}$
19. $\frac{4}{3}$
20. π
21. -4
22. $y = -3$
23. 10

26. $\sin\theta \sec\theta$

$28. \ \csc x + \cot x = \frac{\sin x}{1 - \cos x}$

24. $y = -0.5 \cos \pi x$ 25. $-\sin\theta$ 26. $\tan \theta$ 27. $\frac{1-\cos^2\theta}{\sec^2\theta} - \sin^2\theta$ $\frac{1}{\sec^2\theta} - \frac{\cos^2\theta}{\sec^2\theta} - \sin^2\theta$ $\cos^2\theta - \cos^2\theta\cos^2\theta - \sin^2\theta$ $\cos^2\theta (1 - \cos^2\theta) - \sin^2\theta$ $\cos^2\theta\sin^2\theta - \sin^2\theta$ $\sin^2\theta (\cos^2\theta - 1)$ $\sin^2\theta$ ($-\sin^2\theta$) $-\sin^4 \theta$ $28. \ \frac{\sin x}{1 - \cos x}$ $\frac{\sin x}{1+\cos x}$ $1 - \cos x$ $1 + \cos x$ $\sin x(1 + \cos x)$ $1-\cos^2 x$ $\sin x(1 + \cos x)$ $\sin^2 x$ $1 + \cos x$ sin x $\frac{1}{\sin x} + \frac{\cos x}{\sin x}$ $\csc x + \cot x$

Name: ____