Homework 7-5

1. 4

2a. 7/25 b. -24/25 c. -7/24 d. 163.7°

3a. -5/13 b. -12/13 c. 5/12 d. 202.6°

4. $\sin(\theta) = -3/5$ $\cos(\theta) = -4/5$ $\tan(\theta)=3/4$ d. 216.9°

5. $\sin(\theta) = 5/\sqrt{29}$ $\cos(\theta) = -2/\sqrt{29}$ $\tan(\theta)= -5/2$

6. A 7. 3

Aug 13-7:55 PM

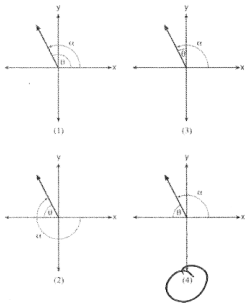
Name: Key

Period :

Algebra 2 Homework 7-5

1. Which diagram(right) represents an angle, α, measuring $\frac{13\pi}{20}$ radians drawn in standard position, and its reference angle, θ? **(Regents question)**

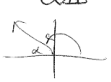
Here, α = whole ✱
θ = Ref ✱
(opposite of normal notation)



For #2 - 4: a. What is $\sin(\theta)$?
b. What is $\cos(\theta)$?
c. What is $\tan(\theta)$?
d. Find angle θ to the nearest tenth.

2. The angle θ corresponds to the angle between the positive x-axis and the line between the origin and the point $\left(\frac{-24}{25}, \frac{7}{25}\right)$ on the unit circle. State your answers as an exact expressions. QII

a) 7/25
b) -24/25
c) $\frac{7/25}{-24/25} = -7/24$
d) $\alpha = \sin^{-1}(7/25) = 16.3°$
$\theta = 180 - 16.3 = 163.7°$

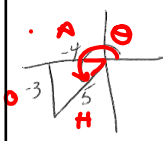


3. The angle θ corresponds to the angle between the positive x-axis and the line between the origin and the point $\left(\frac{-12}{13}, \frac{-5}{13}\right)$ on the unit circle. State your answers as an exact expressions.

a) -5/13
b) -12/13
c) $\frac{-5/13}{-12/13} = \frac{5}{12}$
d) $\alpha = \sin^{-1}\left(\frac{5}{13}\right) = 22.6°$
$\theta = 180 + 22.6 = 202.6°$

QIII

4. P(-4, -3) is a point on the terminal side of θ in standard position. Find the exact values of sin(θ), cos(θ) and tan(θ).



$\sin(\theta) = \frac{-3}{5}$

$\cos(\theta) = \frac{-4}{5}$

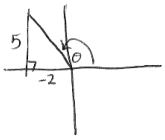
$\tan(\theta) = \frac{-3}{-4} = \frac{3}{4}$

$180+36.9$

$\tan^{-1}(\frac{3}{4}) : 36.9$

$\theta : 216.9°$

5. P(-2, 5) is a point on the terminal side of θ in standard position. Find the exact values of sin(θ), cos(θ) and tan(θ).



$2^2 + 5^2 = x^2$

$4 + 25 = x^2$

$\sqrt{29} = \sqrt{x^2}$

$x = \sqrt{29}$

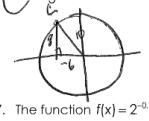
$\sin(\theta) = \frac{5}{\sqrt{29}}$

$\cos(\theta) = \frac{-2}{\sqrt{29}}$

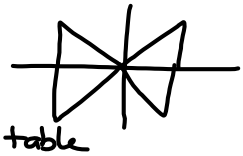
$\tan(\theta) = \frac{5}{-2}$

6. A circle centered at the origin has a radius on 10 units. The terminal side of an angle, θ, intercepts the circle in Quadrant II at point C. The y-coordinate of point C is 8. What is the value of cos(θ)? **(Regents question)**

(a.) $-\frac{3}{5}$ b. $-\frac{3}{4}$ c. $\frac{3}{5}$ d. $\frac{4}{5}$



$\cos(\theta) = \frac{-6}{10} = \frac{-3}{5}$



7. The function $f(x) = 2^{-0.25x} \cdot \sin\left(\frac{\pi}{2}x\right)$ represents a damped sound wave function. What is the average rate of change for this function on the interval $[-7,7]$, to the *nearest hundredth*?

(Regents Question)

(1) -3.66
(2) -0.30
(3) -0.26
(4) 3.36

radians

y= table

$\frac{\Delta y}{\Delta x}$

$f(7) = 2^{-.25(7)} \sin\left(\frac{\pi}{2}(7)\right) = -.297$

$f(-7) = 2^{-.25(-7)} \sin\left(\frac{\pi}{2}(-7)\right) = 3.364$

$\text{ROC} = \frac{\Delta y}{\Delta x} = \frac{-.297 - 3.364}{7-(-7)} = -.2615$

Day 6: Pythagorean Identity

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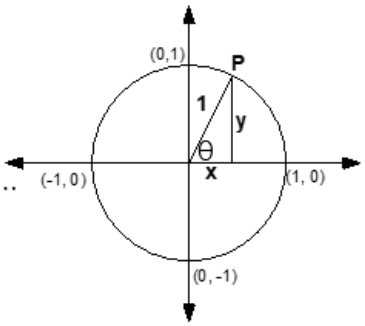
Pythagorean Theorem: $a^2+b^2=c^2$

On the unit circle: $x^2+y^2=1$

Remember: x = $\cos(\theta)$ and y = $\sin(\theta)$, so...

Pythagorean Identity: $\sin^2\theta+\cos^2\theta=1$



Aug 9-4:53 PM

Examples:

1. Using the Pythagorean Identity, given sin(θ) = .6, find |cos(θ)| and |tan(θ)|.

$\sin^2(\theta)+\cos^2(\theta)=1$

$(.6)^2+\cos^2(\theta)=1$

$\cos^2(\theta)=1-.36$

$\sqrt{\cos^2(\theta)}=\sqrt{.64}$ (positive values)

$\cos(\theta)=\pm.8$ $\quad\cos(\theta)=.8$

$\tan(\theta)=\frac{\sin(\theta)}{\cos(\theta)}=\frac{.6}{.8}=\frac{3}{4}$

2. Using the Pythagorean Identity, given cos(θ) =5/13 , and angle θ is in quadrant IV, find sin(θ) and tan(θ).

S | A
T | C
sin −
tan −

$\sin^2\theta+\left(\frac{5}{13}\right)^2=1$ (negative)

$\sin^2\theta=1-\frac{25}{169}$

$\sqrt{\sin^2\theta}=\sqrt{\frac{144}{169}}$

$\sin\theta=\pm\frac{12}{13}$

$\sin(\theta)=-\frac{12}{13}$

$\tan(\theta)=\frac{\sin(\theta)}{\cos(\theta)}=\frac{-\frac{12}{13}}{\frac{5}{13}}=\frac{-12}{5}$

Aug 9-4:53 PM

3. Using the identity $\sin^2(\theta)+\cos^2(\theta)=1$, if $\cos(\theta)$ is -0.7 and θ is in Quad. II,
   a. Find $\sin(\theta)$ to the nearest tenth.

$\sin^2(\theta)+(-.7)^2=1$ $\quad \sin(\theta)=\pm.7$

$\sin^2(\theta)=1-.49$

$\sqrt{\sin^2(\theta)}=\sqrt{.51}$ $\quad \sin(\theta)=+.7$

S	A
T	C

   b. Find $\tan(\theta)$ and $m<\theta$ to the nearest tenth.

* use positive trig function
find the ref ∠
find the m∠θ

$\tan(\theta)=\frac{\sin(\theta)}{\cos(\theta)}=\frac{.7}{-.7}=-1$

$\sin^{-1}(.7)=44.4°$

QII: $180°-44.4°=135.6°$

Aug 9-4:54 PM

$\sin^2(\theta)+\cos^2(\theta)=1$

4. If $\sin^2(32°)+\cos^2(M)=1$, then M equals
   a. 32° b. 58° c. 68° d. 72°

① Plug in for m.
② Sto key

Calculator:
$(\sin(32))^2+(\cos(32))^2$

5. Using the Pythagorean Identity, given $\cos(\theta)=-0.5$, and angle θ is in quadrant III, find $\sin(\theta)$ and $\tan(\theta)$ to the nearest tenth.

$\sin^2(\theta)+(-.5)^2=1$

$\sin^2(\theta)=1-.25$

$\sqrt{\sin^2(\theta)}=\sqrt{.75}$

$\sin(\theta)=\pm.9$

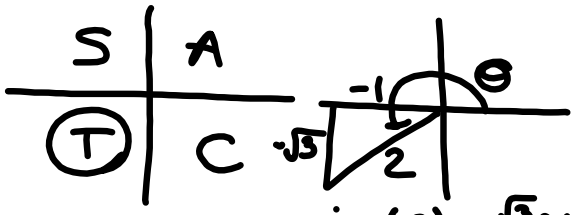
$\sin(\theta)=-.9$

S	A
T	C

$\tan(\theta)=\frac{-.9}{-.5}=\frac{9}{5}=1.8$

Aug 9-4:54 PM

6. Draw an angle in standard position given cos(θ) = - 1/2, and angle θ is in quadrant III. Use the triangle to find sin(θ) and tan(θ) to the nearest tenth.



$\sin(\theta) = -\frac{\sqrt{3}}{2} \approx -.9$

$\tan(\theta) = \sqrt{3} \approx 1.7$

or

$\sin^2(\theta) + (-\frac{1}{2})^2 = 1$

$\sin^2(\theta) = 1 - 1/4$

$\sqrt{\sin^2(\theta)} = \sqrt{3/4}$

$\sin(\theta) = \pm .9$

7. Using the Pythagorean Identity, given sin(θ) = - 7/10, and angle θ is in quadrant IV, find the exact values of cos(θ) and tan(θ).

$(-\frac{7}{10})^2 + \cos^2(\theta) = 1$

$\cos^2(\theta) = 1 - \frac{49}{100} = \frac{51}{100}$

$\sqrt{\cos^2(\theta)} = \sqrt{\frac{51}{100}}$

S | A

T | C

$\cos(\theta) = \pm\frac{\sqrt{51}}{10} = \frac{\sqrt{51}}{10}$

$\tan(\theta) = \frac{-7}{10} \cdot \frac{10}{\sqrt{51}} = \frac{-7}{\sqrt{51}}$

8. If $\sin^2(\theta)+\cos^2(\pi) = 1$, then θ equals

a. - θ b. π/3 c. π d. π/2

Aug 9-4:54 PM

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