Secondary Math 3 Name_____ ID: 1

Unit 6.6 Review Date_____ Period____

Find a positive and a negative coterminal angle for each given angle.

1) 295° $295+360=655'$, $295-360=-65$

2) −65° $-65+360=295'$, $-65-360=-495'$

3) −390° $-390+360=-30'$, $-30+360=330'$

4) 615° $615-360=255'$, $255-360=-105'$

5) $\frac{13\pi}{12}$ $\frac{13\pi}{12}+\frac{24\pi}{12}=\frac{37\pi}{12}$, $\frac{13\pi}{12}-\frac{24\pi}{12}=\frac{-11\pi}{12}$

6) $\frac{-29\pi}{18}$ $\frac{-29\pi}{18}+\frac{36\pi}{18}=\frac{7\pi}{18}$, $\frac{-29\pi}{18}-\frac{36\pi}{18}=\frac{-65\pi}{18}$

7) $\frac{10\pi}{3}$ $\frac{10\pi}{3}+\frac{6\pi}{3}=\frac{16\pi}{3}$ OR $\frac{10\pi}{3}-\frac{6\pi}{3}=\frac{4\pi}{3}$, $\frac{4\pi}{3}-\frac{6\pi}{3}=\frac{-2\pi}{3}$

8) $-\frac{38\pi}{45}$ $-\frac{38\pi}{45}+\frac{90\pi}{45}=\frac{52\pi}{45}$, $-\frac{38\pi}{45}-\frac{90\pi}{45}=\frac{-135\pi}{45}$

Find the measure and the reference angle of each angle.

Notice direction spiral going

9) $90°=\frac{\pi}{2}$, $\frac{8\pi}{4}$, $\frac{4\pi}{4}$, $\frac{8\pi}{4}-\frac{4\pi}{4}=\frac{4\pi}{4}=\frac{2\pi}{4}$, $\frac{\pi}{4}$, $\frac{15\pi}{4}$

$\frac{2\cdot\pi}{2\cdot2}-\frac{\pi}{4}$, $\frac{2\pi}{4}-\frac{\pi}{4}=\frac{\pi}{4}=R$

10) $R=10°$, -360, -90, -80, $-530°$

11) $R=90-75=15°$, $R=15'$, $270+75$, $345°$

12) $\frac{6\pi}{3}-\frac{\pi}{3}=\frac{5\pi}{3}$, $R=\pi/3$

13) $\frac{3\pi}{3}\Rightarrow\frac{6\pi}{6}$, $\frac{\pi}{2}\Rightarrow\frac{3\pi}{6}$, $\frac{\pi}{6}\Rightarrow\frac{\pi}{6}+\frac{5\pi}{3}$, $\frac{10\pi}{6}=\frac{5\pi}{3}$, $-\pi/3$ or $\frac{5\pi}{3}$, $R=\pi/3$

$3\cdot\frac{\pi}{3}-\frac{\pi}{6}=\frac{3\pi}{6}-\frac{\pi}{6}=\frac{2\pi}{6}=\frac{\pi}{3}$

14) $R=30°$, $360+360+180+30$, $920°$

onvert each degree measure into radians and each radian measure into degrees.

15) $\frac{17\pi}{12} \cdot \frac{180}{\pi} = 255°$

16) $-150° \cdot \frac{\pi}{180} = -\frac{5\pi}{6}$ rad.

17) $215° \cdot \frac{\pi}{180} = \frac{43\pi}{36}$ rad.

18) $-930° \cdot \frac{\pi}{180} = -\frac{31\pi}{6}$ rad.

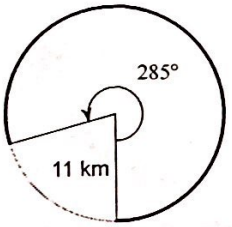
19) $\frac{7\pi}{6} \cdot \frac{180}{\pi} = 210°$

20) $-\frac{29\pi}{6} \cdot \frac{180}{\pi} = -870°$

Find the length of each arc. Round your answers to the nearest tenth.

Arc length

21)

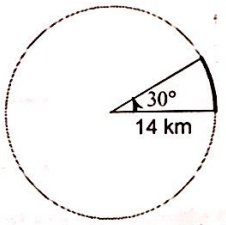


$\frac{285}{360} \cdot \frac{2\pi \cdot 11}{1}$

$\frac{6270\pi}{360}$

$\frac{209\pi}{12}$ or 54.7 km

22)



$\frac{30}{360} \cdot \frac{2\pi \cdot 14}{1} = \frac{840\pi}{360}$

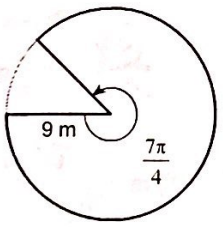
$\frac{7\pi}{3}$ OR 7.3 km

23) $r = 13$ mi, $\theta = 225°$

$\frac{225}{360} \cdot \frac{2\pi \cdot 13}{1} = \frac{5850\pi}{360} = \frac{65\pi}{4}$ OR 51.1 mi

Find the area of each sector. Round to the nearest hundredth.

24)

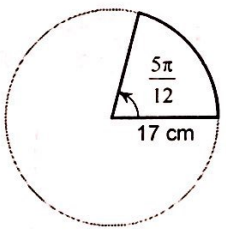


$\frac{\frac{7\pi}{4}}{2\pi} \cdot \pi \cdot 9^2$

$\frac{7\pi}{4} \cdot \frac{1}{2} \cdot \frac{9^2}{1}$

$\frac{567\pi}{8}$ OR 222.66 m^2

25)



$\frac{\frac{5\pi}{12}}{2\pi} \cdot \frac{\pi \cdot 17^2}{1}$

$\frac{5\pi}{12} \cdot \frac{1}{2} \cdot \frac{17^2}{1}$

$\frac{1445\pi}{24}$ OR 189.15 cm^2

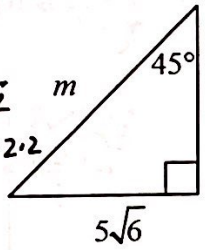
26) $r = 13$ cm $\theta = \frac{\pi}{2}$

$\frac{\frac{\pi}{2}}{2\pi} \cdot \pi \cdot 13^2$

$\frac{\pi}{2} \cdot \frac{1}{2} \cdot \frac{13^2}{1} = \frac{169\pi}{4}$ or 132.73 cm^2

...he missing sides using special right triangle rules ($30° - 60° - 90°$ or $45° - 45° - 90°$). Leave answer in simplest ...ical form.

27.



$n = 5\sqrt{6}$

$n = 5\sqrt{6} \cdot \sqrt{2}$

$m = 5\sqrt{12} \quad 3 \cdot 2 \cdot 2$

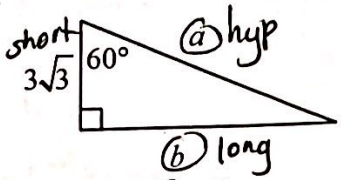
$5 \cdot 2\sqrt{3}$

$m = 10\sqrt{3}$

$m =$ $10\sqrt{3}$

$n =$ $5\sqrt{6}$

28.



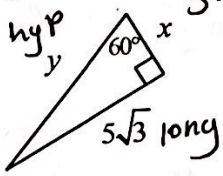
$3\sqrt{3} \cdot 2 = 6\sqrt{3}$

$3\sqrt{3} \cdot \sqrt{3} = 3 \cdot 3 = 9$

ⓐ = $6\sqrt{3}$

ⓑ = 9

29.



$5 \cdot 2 = 10$

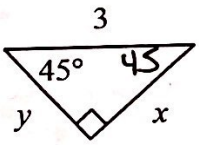
short

$\frac{5\sqrt{3}}{\sqrt{3}} = 5$

(x) = 5

(y) = 10

30.

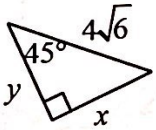


$\frac{3\sqrt{2}}{\sqrt{2}\sqrt{2}} = \frac{3\sqrt{2}}{2}$

$x =$ $3\sqrt{2}/2$

$y =$ $3\sqrt{2}/2$

31.

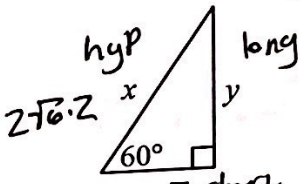


$\frac{4\sqrt{6}\,3}{\sqrt{2}} = 4\sqrt{3}$

(x) = $4\sqrt{3}$

(y) = $4\sqrt{3}$

32.



$2\sqrt{6} \cdot \sqrt{3}$

$2\sqrt{18}$

$2 \cdot 3 \cdot 3$

long $2 \cdot 3\sqrt{2}$

$2\sqrt{6} \cdot 2$

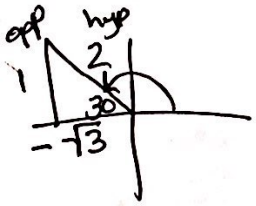
$2\sqrt{6}$ short

$x =$ $4\sqrt{6}$

$y =$ $6\sqrt{2}$

Draw a reference triangle for the given angle. Decide which type of special triangle it is and use the rules to find the missing sides. **Give the exact value of each trig function without using a calculator.**

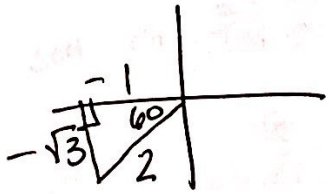
33. $\sin 150° = \frac{1}{2}$



$180 - 150$

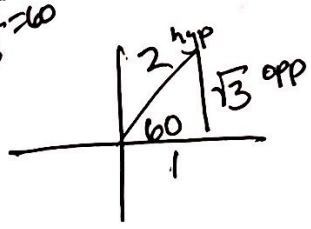
34. $\cos 240° = -\frac{1}{2}$

$240 - 180$

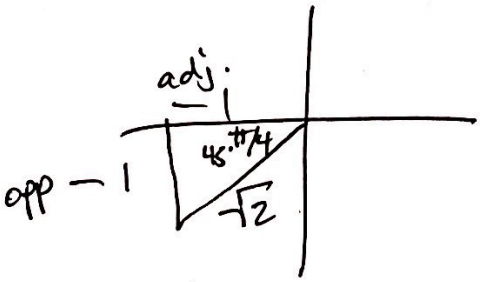


35. $\sin\frac{\pi}{3} = \frac{\sqrt{3}}{2}$ SOH

$\frac{\pi}{3} = 60°$

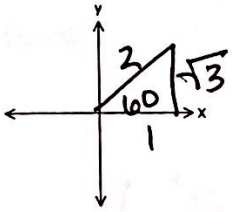


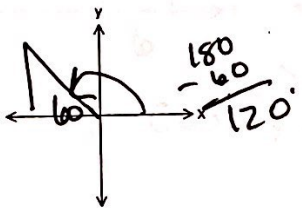
$\pi/4 = 45°$ 36. $\tan\frac{5\pi}{4} = 1$ TOA



...e acute angles, θ, that satisfy the given equation by drawing the triangles. Give θ in both **degrees** and **radians**. ...should do these problems without a calculator.

37. $\sin\theta = \frac{\sqrt{3}}{2}$ opp / hyp — pos. — S | A / T | C



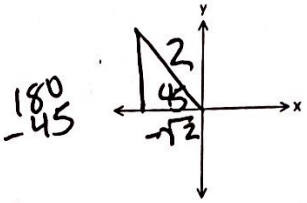


$\theta =$ 60°, 120°

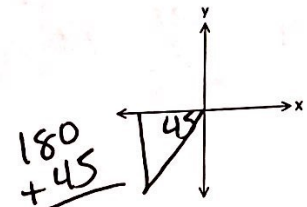
and

$\theta =$ $\frac{\pi}{3}$, $\frac{2\pi}{3}$

38. $\cos\theta = -\frac{\sqrt{2}}{2}$ adj / hyp — CAH — neg. — S | A / T | C



180 − 45



180 + 45

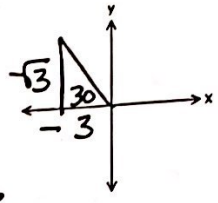
$\theta =$ 135°, 225°

and

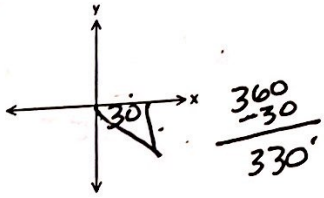
$\theta =$ $\frac{3\pi}{4}$, $\frac{5\pi}{4}$

39. $\tan\theta = \frac{-\sqrt{3}}{3}$ opp / adj — TOA — S | A / T | C

$\sqrt{3}\cdot\sqrt{3} = 3$



180 − 30 = 150



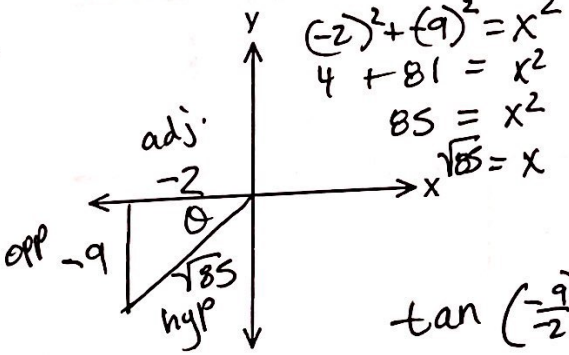
$\theta =$ 150°, 330°

and

$\theta =$ $\frac{5\pi}{6}$, $\frac{11\pi}{6}$

Find the exact values of $\sin\theta$, $\cos\theta$, $\tan\theta$, $\csc\theta$, $\sec\theta$, and $\cot\theta$ where θ is an angle in standard position whose terminal side contains the given point. Write answers in simplest form.

40. $(-2, -9)$



$(-2)^2 + (-9)^2 = x^2$

$4 + 81 = x^2$

$85 = x^2$

$\sqrt{85} = x$

SOH $\sin\theta = \frac{-9}{\sqrt{85}} \cdot \frac{\sqrt{85}}{\sqrt{85}} = \frac{-9\sqrt{85}}{85}$ $\csc\theta = \frac{1}{\sin} = \frac{-\sqrt{85}}{9}$

CAH $\cos\theta = \frac{-2}{\sqrt{85}} \cdot \frac{\sqrt{85}}{\sqrt{85}} = \frac{-2\sqrt{85}}{85}$ $\sec\theta = \frac{1}{\cos} = \frac{-\sqrt{85}}{2}$

TOA $\tan\theta = \frac{-9}{-2} = \frac{9}{2}$ $\cot\theta = \frac{2}{9}$

$\tan\left(\frac{-9}{-2}\right) = 77.5°$

$\theta =$ 77.5°

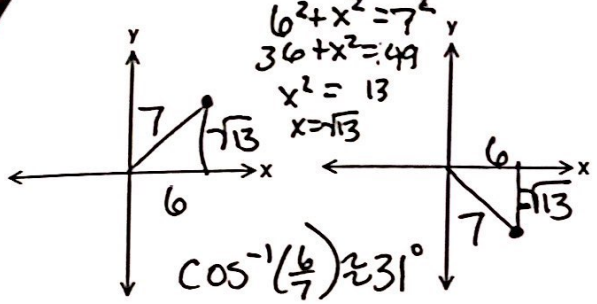
...e two triangles for the trig functions and find the coordinates that go with it. There will be 2 answers. Leave ...ers in simplest radical form. (Remember All Students Take Calculus). Then find the angles from [0, 360°) in ...ndard position (round to the nearest tenth of a degree).

41. $\cos\theta = \frac{6}{7}$ adj / hyp

S | A
T | C

Coordinates: $(6, \sqrt{13})$ and $(6, -\sqrt{13})$

$6^2 + x^2 = 7^2$
$36 + x^2 = 49$
$x^2 = 13$
$x = \sqrt{13}$



$\cos^{-1}\left(\frac{6}{7}\right) \approx 31°$

$360 - 31 = 329°$

Angles: 31° and 329°

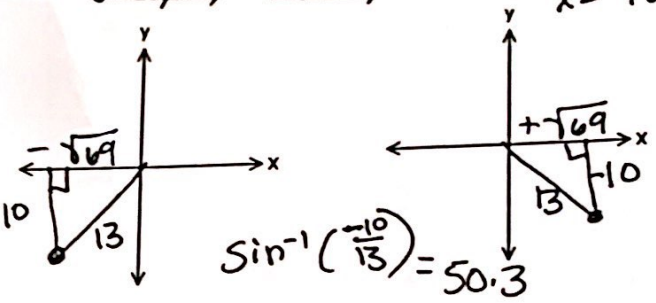
42. $\sin\theta = -\frac{10}{13}$ opp / hyp

Sot

S | A
T | C

Coordinates: $(-\sqrt{69}, -10)$ and $(\sqrt{69}, -10)$

$(-10)^2 + x^2 = 13^2$
$100 + x^2 = 169$
$x^2 = 69$
$x = \sqrt{69}$



$\sin^{-1}\left(\frac{-10}{13}\right) = 50.3$

$180 + 50.3 = 230.3°$

$360 - 50.3 = 309.7°$

Angles: 230.3° and 309.7°

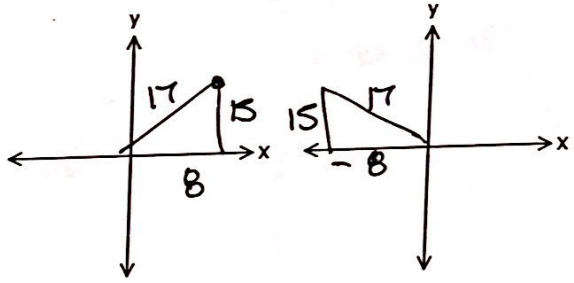
S | A
T | C

43. $\sin\theta = \frac{15}{17}$ opp / hyp

Sot

$\sin^{-1}\left(\frac{15}{17}\right) = 61.9$

Coordinates: $(8, 15)$ and $(-8, 15)$



Angles: 61.9° and 118.1°

$180 - 61.9 = 118.1°$

$15^2 + x^2 = 17^2$
$x^2 = 64$
$x = 8$

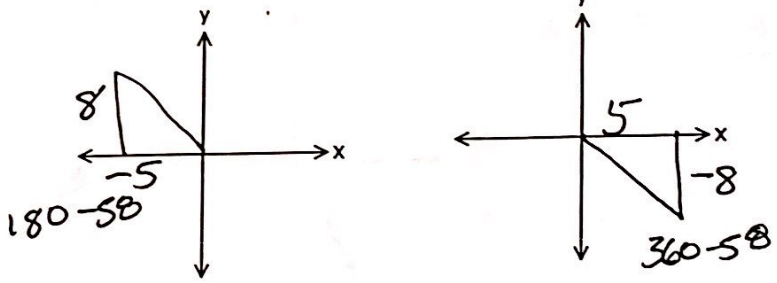
44. $\tan\theta = -\frac{8}{5}$ opp / adj

TOA

S | A
T | C

$\tan^{-1}\left(-\frac{8}{5}\right) = 58°$

Coordinates: $(-5, 8)$ and $(5, -8)$



$180 - 58 = 122°$

$360 - 58 = 302°$

Angles: 122° and 302°

$8^2 + (-5)^2 = x^2$
$64 + 25 = 89$ (don't need hyp.)