REFERENCE ANGLES ARE ALWAYS POSITIVE AND ACUTE

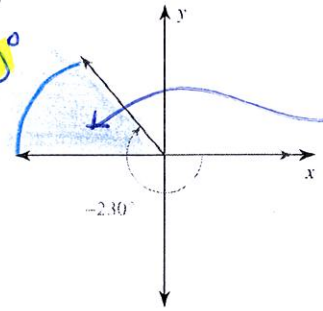
Kuta Software - Infinite Algebra 2 Name_____

Coterminal Angles and Reference Angles

Date_____ Period____

Find the reference angle.

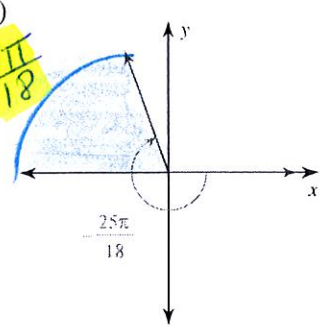
1)



50°

$-230^\circ + 360^\circ = 130^\circ$

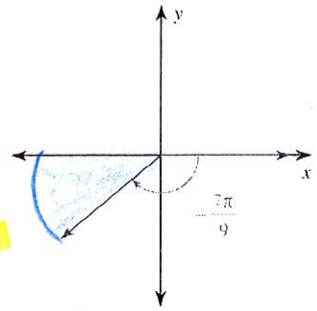
2)



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

$-\frac{25\pi}{18} + \frac{36\pi}{18} = \frac{11\pi}{18}$

3)

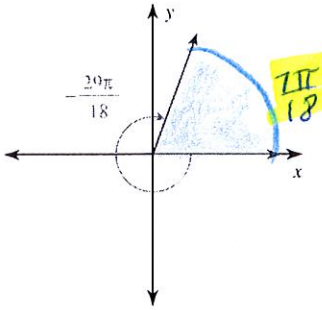


$\frac{2\pi}{9}$

$-\frac{7\pi}{9} + \frac{18\pi}{9}$

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

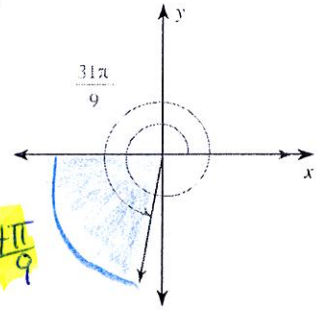
4)



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

$-\frac{29\pi}{18} + \frac{36\pi}{18} = \frac{7\pi}{18}$

5)

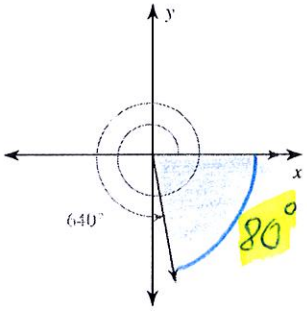


$\frac{4\pi}{9}$

$\frac{31\pi}{9} - \frac{18\pi}{9} =$

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

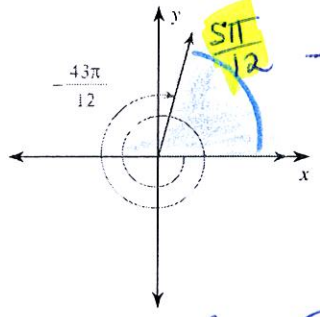
6)



80°

$640^\circ - 360^\circ = 280^\circ$

7)



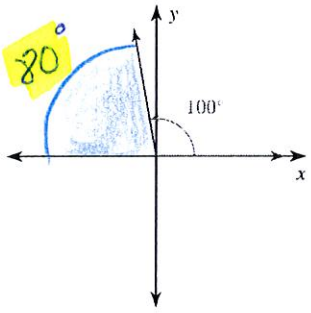
$\frac{5\pi}{12}$

$-\frac{43\pi}{12} + \frac{24\pi}{12}$

$= -\frac{19\pi}{12} + \frac{24\pi}{12}$

$= \frac{5\pi}{12}$

8)

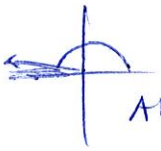


80°

9) $-510^\circ \rightarrow 210^\circ$

ANS: 30°

10) $-\frac{19\pi}{18} + \frac{36\pi}{18} = \frac{17\pi}{18}$



ANS: $\frac{\pi}{18}$

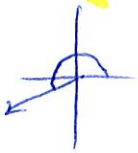
11) $-\frac{13\pi}{12} + \frac{24\pi}{12} = \frac{11\pi}{12}$

ANS: $\frac{\pi}{12}$

12) $-250^\circ \rightarrow 110^\circ$

ANS: 70°

13) $-\frac{5\pi}{6} + \frac{12\pi}{6} = \frac{7\pi}{6}$



ANS: $\frac{\pi}{6}$

14) $\frac{13\pi}{18}$

ANS: $\frac{5\pi}{18}$

State if the given angles are coterminal.

15) 240°, 600° YES
$+360°$

16) 90°, 290°
NO

17) 185°, −545°
NO

18) $\frac{41\pi}{36}$, $\frac{9\pi}{4}$ ← same as $\frac{81\pi}{36}$
NO

19) $\frac{17\pi}{36}$, $\frac{161\pi}{36}$ yes
$+\frac{72\pi}{36}$ $+\frac{72\pi}{36}$

20) $\frac{7\pi}{9}$, $-\frac{25\pi}{9}$
NO

Find a coterminal angle between 0° and 360°.

21) −330° 30°

22) −435° 285°

These are all called the "principle" angles

23) 640° 280°

24) −442° 278°

Find a coterminal angle between 0 and 2π for each given angle.

25) $\frac{11\pi}{3}$ $-\frac{6\pi}{3} = \frac{5\pi}{3}$

26) $-\frac{35\pi}{18}$ $+\frac{36\pi}{18} = \frac{\pi}{18}$

27) $\frac{15\pi}{4}$ $-\frac{8\pi}{4} = \frac{7\pi}{4}$

28) $-\frac{19\pi}{12}$ $+\frac{24\pi}{12} = \frac{5\pi}{12}$

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

29) $\frac{5\pi}{4}$ $\frac{13\pi}{4}$, $-\frac{3\pi}{4}$

30) $\frac{25\pi}{36}$ $\frac{97\pi}{36}$, $-\frac{47\pi}{36}$

31) $-\frac{7\pi}{6}$ $\frac{5\pi}{6}$, $-\frac{19\pi}{6}$

32) $\frac{29\pi}{45}$ $\frac{119\pi}{45}$, $-\frac{61\pi}{45}$

33) $\frac{7\pi}{9}$ $\frac{25\pi}{9}$, $-\frac{11\pi}{9}$

34) $\frac{3\pi}{4}$ $\frac{11\pi}{4}$, $-\frac{5\pi}{4}$

Section 1 Intro to Trig Review for Quiz Name_____

Convert each degree measure into radians and each radian measure into degrees:

1. 125° $\frac{25\pi}{36}$

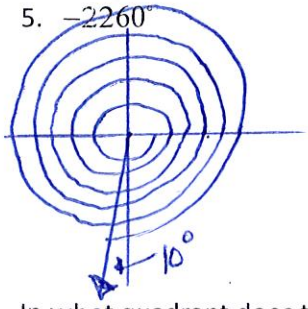
2. $-\frac{3\pi}{4}$ -135°

3. $\frac{13\pi}{12}$ 195°

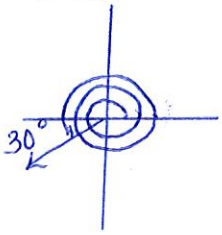
4. -412° $-\frac{103\pi}{45}$

Sketch each angle in standard position:

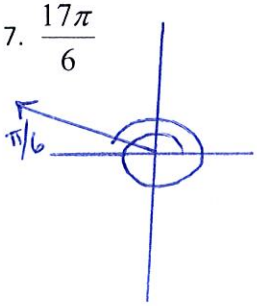
5. -2260°



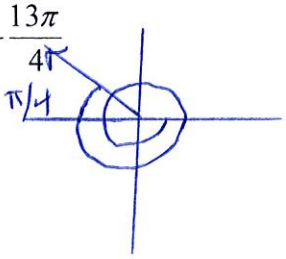
6. 930°



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



8. $-\frac{13\pi}{4}$



In what quadrant does the angle terminate?

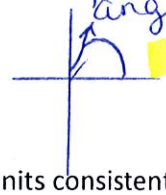
9. -808°

272° is the principle angle

Q4

10. 1885°

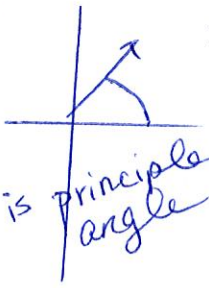
85° is the principle angle



Q1

11. $-\frac{17\pi}{3}$

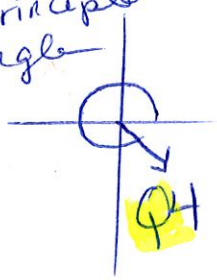
Q1



$\pi/3$ is principle angle

12. $\frac{23\pi}{4}$

$\frac{7\pi}{4}$ is principle angle



Q4

Find the reference angle. Keep units consistent!

13. -650°

P.A. $= 70^\circ$

R.A. $= 70^\circ$

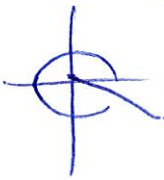
14. 1880°

P.A. $= 80^\circ$

R.A. $= 80^\circ$

15. $-\frac{39\pi}{18} + \frac{36\pi}{18} + \frac{36\pi}{18}$

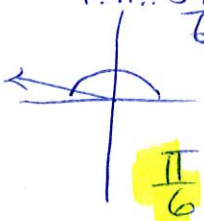
$\frac{33\pi}{18}$



$\frac{3\pi}{18}$ or $\frac{\pi}{6}$

16. $\frac{65\pi}{6}$

P.A.: $\frac{5\pi}{6}$



$\frac{\pi}{6}$

Find a positive and a negative conterminal angle for the given angle. Keep units consistent!

There is more than 1 answer!

17. -865°

$215^\circ, -145^\circ$

18. 992°

632°, -88°

19. $\frac{55\pi}{4} \pm \frac{8\pi}{4}$

$-\frac{\pi}{4}, \frac{47\pi}{4}$

20. $-\frac{69\pi}{45}$

$\pm \frac{90\pi}{45}$

$\frac{21\pi}{45}, -\frac{159\pi}{45}$

Find the complement and supplement of each angle (if possible). Keep units consistent.

21. 64°

C: 26°

S: 116°

22. 158°

C: does not exist

S: 22°

23. $\frac{7\pi}{12}$

C: does not exist

S: $\frac{5\pi}{12}$

24. $\frac{11\pi}{18}$

C: does not exist

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

COMPLEMENTARY ANGLES ADD TO 90°

SUPPLEMENTARY ANGLES ADD TO 180°

Convert to degree-decimal to the nearest thousandth (three decimal places)

25. $73^\circ 35'$

73.583°

26. $-88^\circ 17' 55''$

-88.299°

Convert to DMS

27. 327.55°

$327^\circ 33'$

28. -366.15°

$-366^\circ 9'$