Pre-Calculus A
Section 4.1 Quiz Review

Name : Key
Date : _____

Convert the angle to radians. Leave your answer in terms of π (Give an EXACT answer).

1. $-15° \cdot \frac{\pi}{180} = \frac{-15\pi}{180} = \boxed{\frac{-\pi}{12}}$

2. $36° \cdot \frac{\pi}{180} = \frac{36\pi}{180} = \boxed{\frac{\pi}{5}}$

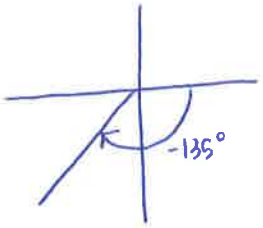
Convert the radian measure to degrees. Round to the nearest hundredth (two places) if necessary.

3. $\frac{9\pi}{8} \cdot \frac{180}{\pi} = \frac{1620}{8} = \boxed{202.5°}$

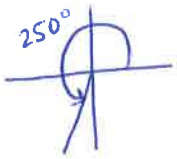
4. 5 radians $\cdot \frac{180}{\pi} = \frac{900}{\pi} \approx \boxed{286.48°}$

Sketch each angle in standard position.

5. -135°



6. $\frac{25\pi}{18} \cdot \frac{180}{\pi} = \frac{4500}{18} = 250°$



Find both the complement and supplement **in radians** (if possible) for each angle measure given. If it is not possible, explain why.

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

Comp: $\frac{\pi}{2} - \frac{2\pi}{5} = \frac{5\pi}{10} - \frac{4\pi}{10} = \frac{\pi}{10}$

Supp: $\frac{\pi}{1} - \frac{2\pi}{5} = \frac{5\pi}{5} - \frac{2\pi}{5} = \frac{3\pi}{5}$

8. $\frac{2\pi}{45}$

Comp: $\frac{\pi}{2} - \frac{2\pi}{45} = \frac{45\pi}{90} - \frac{4\pi}{90} = \frac{41\pi}{90}$

Supp: $\frac{\pi}{1} - \frac{2\pi}{45} = \frac{45\pi}{45} - \frac{2\pi}{45} = \frac{43\pi}{45}$

9. $-\frac{3\pi}{7}$: no complement or supplement because both angles have to be positive

10. $\frac{2\pi}{3}$

Comp: $\frac{\pi}{2} - \frac{2\pi}{3} = \frac{3\pi}{6} - \frac{4\pi}{6} = -\frac{\pi}{6}$ ← no comp; both angles have to be positive

Supp: $\frac{\pi}{1} - \frac{2\pi}{3} = \frac{3\pi}{3} - \frac{2\pi}{3} = \frac{\pi}{3}$

Find a positive and a negative coterminal angle **in radians** for each angle measure given.

11. $\theta = -\frac{\pi}{6}$

pos: $-\frac{\pi}{6} + \frac{2\pi}{1} = -\frac{\pi}{6} + \frac{12\pi}{6} = \frac{11\pi}{6}$

neg: $-\frac{\pi}{6} - \frac{2\pi}{1} = -\frac{\pi}{6} - \frac{12\pi}{6} = -\frac{13\pi}{6}$

12. $\theta = \frac{2\pi}{3}$

pos: $\frac{2\pi}{3} + \frac{2\pi}{1} = \frac{2\pi}{3} + \frac{6\pi}{3} = \frac{8\pi}{3}$

neg: $\frac{2\pi}{3} - \frac{2\pi}{1} = \frac{2\pi}{3} - \frac{6\pi}{3} = -\frac{4\pi}{3}$

13. $\theta = -\frac{5\pi}{4}$

pos: $-\frac{5\pi}{4} + \frac{8\pi}{4} = \frac{3\pi}{4}$

neg: $-\frac{5\pi}{4} - \frac{8\pi}{4} = -\frac{13\pi}{4}$

Convert the angle to decimal degrees and round to the nearest hundredth.

14. 56° 54'8"

$\frac{54 \text{ min}}{1} \cdot \frac{1 \text{ deg}}{60 \text{ min}} = .9 \text{ degree}$

$\frac{8 \text{ sec}}{1} \cdot \frac{1 \text{ min}}{60 \text{ sec}} = \frac{.1333 \text{ min}}{1} \cdot \frac{1 \text{ deg}}{60 \text{ min}} = .0022 \text{ deg}$ → .9022

56.9022°

15. 31° 8'17"

$\frac{8 \text{ min}}{1} \cdot \frac{1 \text{ deg}}{60 \text{ min}} = .1333 \text{ deg}$

$\frac{17 \text{ sec}}{1} \cdot \frac{1 \text{ min}}{60 \text{ sec}} = \frac{.2833 \text{ min}}{1} \cdot \frac{1 \text{ deg}}{60 \text{ min}} = .0047 \text{ deg}$ → .138

31.138°

Convert the angle to degrees, minutes, and seconds (DMS).

16. 120.98° D: 120° M: 58 S: 48

$\frac{.98 \text{ deg}}{1} \cdot \frac{60 \text{ min}}{1 \text{ deg}} = 58.8 \text{ min}$

$\frac{.8 \text{ min}}{1} \cdot \frac{60 \text{ sec}}{1 \text{ min}} = 48 \text{ sec}$

120° 58' 48"

17. 209.64° D: 209 M: 38 S: 24

$\frac{.64 \text{ deg}}{1} \cdot \frac{60 \text{ min}}{1 \text{ deg}} = 38.4 \text{ min}$

$\frac{.4 \text{ min}}{1} \cdot \frac{60 \text{ sec}}{1 \text{ min}} = 24 \text{ sec}$

209° 38' 24"

Convert the degree measure to **radians**. Round to four decimal places.

18. -25° 36′ = -25.6°

$\frac{36\ \text{min}}{1} \cdot \frac{1\ \text{deg}}{60\ \text{min}} = .6\ \text{deg}$

$\frac{-25.6^\circ}{1} \cdot \frac{\pi}{180} = \frac{-25.6\pi}{180} =$ **-0.4468 rad**

19. 13° 4′ 17″ = 13.0714°

$\frac{4\ \text{min}}{1} \cdot \frac{1\ \text{deg}}{60\ \text{min}} = .0667\ \text{deg}$

$\frac{17\ \text{sec}}{1} \cdot \frac{1\ \text{min}}{60\ \text{sec}} = \frac{0.2833\ \text{min}}{1} \cdot \frac{1\ \text{deg}}{60\ \text{min}} = .0047\ \text{deg}$ (.0714)

$\frac{13.0714^\circ}{1} \cdot \frac{\pi}{180} =$ **0.2281 rad**

20. Find the length (s) of an arc intercepted by a central angle $\frac{\pi}{35}$ (θ) in a circle of radius 17.05 feet (r). Round your answer to two decimal places.

$s = \theta r$

$s = \frac{\pi}{35}(17.05)$

$s = 1.53$ ft

21. A circle has a radius of 5 feet (r). Find the length of the arc (s) intercepted by a central angle of 120° (θ).

$\frac{120^\circ}{1} \cdot \frac{\pi}{180} = \frac{120\pi}{180} = \frac{2\pi}{3}$

↑ Convert θ to radians!

$s = \theta r$

$s = \frac{2\pi}{3}(5)$

$s = 10.5$ ft

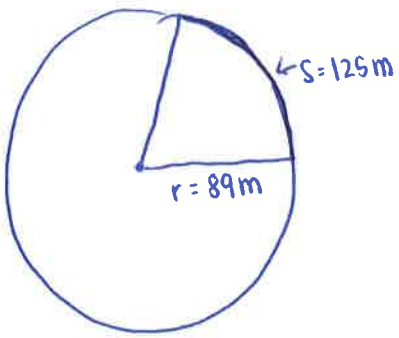
22. A man was jogging on a circular track with radius 89 meters. If the man was jogging at a speed of 25 meters per minute, what was the central angle generated by the man after 5 minutes in radians **and** in degrees?

$r = 89$ m

$s = 125$ m

$\theta = ?$

He jogged 25 m every 1 min, so after 5 mins, he jogged $5 \times 25 = 125$ m



$s = \theta r$

$125 = \theta(89)$

$\theta = 1.40$ radians

$\frac{1.4\ \text{rad}}{1} \cdot \frac{180}{\pi} = \frac{252}{\pi} =$ **80.2°**

23. Pittsburgh, Pennsylania and Miami, Florida, lie approximately on the same longitude. Pittsburgh has a latitude of 40.325° N and Miami has a latitude of 25.025° N. Find the distance between these two cities. (The radius of the earth is 3960 miles).

diff in latitudes: $40.325 - 25.025 = 15.3°$

$\frac{15.3^\circ}{1} \cdot \frac{\pi}{180} = \frac{15.3\pi}{180} = 0.267$ radians

$S = \theta r$

$S = (0.267)(3960)$

$S = 1057.32$ miles

24. Dallas, Texas and Omaha, Nebraska lie approximately on the same longitude. Dallas has a latitude of 32°47'39" N and Omaha has a latitude of 41°15'50" N. Find the distance between these two cities. Assume the earth has a radius of 4,000 miles.

Dallas: $\frac{47 \text{min}}{1} \cdot \frac{1 \text{deg}}{60 \text{min}} = 0.7833°$ → .7941

$\frac{39 \text{sec}}{1} \cdot \frac{1 \text{min}}{60 \text{sec}} = \frac{.65 \text{min}}{1} \cdot \frac{1 \text{deg}}{60 \text{min}} = .0108°$

Omaha: $\frac{15 \text{min}}{1} \cdot \frac{1 \text{deg}}{60 \text{min}} = 0.25°$ → .2639

$\frac{50 \text{sec}}{1} \cdot \frac{1 \text{min}}{60 \text{sec}} = \frac{.8333 \text{min}}{1} \cdot \frac{1 \text{deg}}{60 \text{min}} = .0139°$

Diff in latitudes: Omaha - Dallas: $41.2639° - 32.7941° = 8.4698°$

$\frac{8.4698^\circ}{1} \cdot \frac{\pi}{180} = \frac{8.4698\pi}{180} = 0.1478$ radians

$S = \theta r$

$S = (0.1478)(4000)$

$S = 591.2$ miles

25. Assuming that Earth is a sphere of radius 4,000 miles, what is the difference in the latitudes of Buffalo, New York and Durham, North Carolina, where Buffalo is about 688 miles due north of Durham?

r

s

$S = \theta r$

$688 = \theta(4000)$

$\theta = 0.172$ rad.

$\frac{0.172}{1} \cdot \frac{180}{\pi} = \frac{30.96}{\pi} = 9.8549°$

$.8549 \text{deg} \cdot \frac{60 \text{min}}{1 \text{deg}} = 51.294$ min

$.294 \text{min} \cdot \frac{60 \text{sec}}{1 \text{min}} = 17.64$ sec

$9° 51' 17"$