

Determine in which quadrant the angle lies.

1. 130°

II

2. 8.3°

I

3. $-132^\circ 50'$

III

4. -260°

II

Determine two coterminal angles (one positive and one negative) for each angle.

Give your answer in degrees.

5. 45°



$$405^\circ, -315^\circ$$

6. 120°



$$480^\circ, -240^\circ$$

Convert each angle into radians. Give answer in terms of pi.

7. 30°

$$\frac{\pi}{6}$$

8. 315°

$$\frac{7\pi}{4}$$

9. -20°

$$-\frac{\pi}{9}$$

$$-20 \cdot \frac{\pi}{180}$$

10. -270°

$$-\frac{3\pi}{2}$$

Convert each angle into degrees.

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

$$270^\circ$$

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

$$-105^\circ$$

13. $\frac{7\pi}{3}$

$$420^\circ$$

14. $\frac{11\pi}{6}$

$$330^\circ$$

Convert to radians. Round to the nearest thousandth.

15. 115°

$$115 \cdot \frac{\pi}{180}$$

$$2.007$$

16. 87.4°

$$87.4 \cdot \frac{\pi}{180}$$

$$1.525$$

Convert to degrees. Round to the nearest thousandth.

17. $\frac{15\pi}{8}$

$$\frac{15\pi}{8} \cdot \frac{180}{\pi}$$

$$337.5^\circ$$

18. 4.8

$$4.8 \cdot \frac{180}{\pi}$$

$$275.02^\circ$$

19. -2

$$-2 \cdot \frac{180}{\pi}$$

$$-114.592^\circ$$

Convert to decimal.

20. $85^\circ 18' 30''$

$$85.308^\circ$$

21. $-135^\circ 36''$

$$-135.01^\circ$$

Convert to DMS form.

22. -345.12°

$$-345^\circ 7' 12''$$

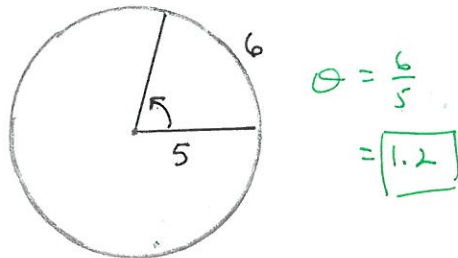
23. 2.5

$$2.5 \left(\frac{180}{\pi} \right) = 143.239$$

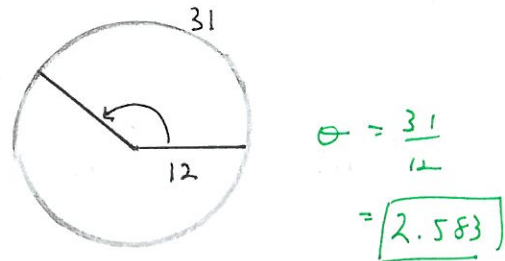
$$143^\circ 14' 22.016''$$

Find each angle in radians.

24.



25.



Find the radian measure of the central angle of a circle of the given radius that intercepts an arc of the given length.

26. radius=16 ft, arc length=40 ft

$\theta = \frac{40}{16}$
 $= \boxed{2.5}$

27. radius=80 km, arc length=160 km

$\theta = \frac{160}{80}$
 $= \boxed{2}$

Find the length of the arc on a circle of the given radius intercepted by the given central angle.

28. radius=9 ft, central angle=60°

$\frac{\pi}{3} = \frac{s}{9}$ $3s = 9\pi$
 $s = 3\pi \approx \boxed{9.425 \text{ ft}}$

29. radius=40 cm, central angle= $\frac{3\pi}{4}$

$\frac{3\pi}{4} = \frac{s}{40}$
 $4s = 120\pi$
 $s = 30\pi \approx \boxed{94.248 \text{ cm}}$

Find the distance between the cities. Assume that the earth is a sphere of radius 4000 miles and the cities are on the same meridian.

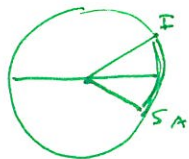
30. San Francisco, CA 37°46'30"N
 Seattle, WA 47°36'32"N



$\boxed{686.5 \text{ miles}}$

$\theta = 47.60888 - 37.775$
 $= 9.8339^\circ$
 $9.8339^\circ \cdot \frac{5000 \pi}{180} = 1.716 \text{ rad}$
 $1.716 = \frac{s}{4000}$

31. Johannesburg, South Africa 26°10'S
 Jerusalem, Israel 31°47'N



$\boxed{4045.67 \text{ miles}}$

$\theta = 26.167 + 31.783$
 $= 57.95^\circ$
 $57.95^\circ \cdot \frac{\pi}{180} = 1.011 \text{ rad}$
 $1.011 = \frac{s}{4000}$

32. Assuming that the earth is a sphere of radius 6378 km, what is the difference in latitude of two cities, one of which is 800 km due north of the other?



$\theta = \frac{800}{6378}$
 $= 0.1254 \text{ rad}$

$0.1254 \cdot \frac{180}{\pi} = 7.18667^\circ$
 $= \boxed{7^\circ 11' 12.036''}$