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Practice – 4.1 Angles and Angle Measures

1. Convert each angle measure to **radians**.

a) $10° \left(\frac{\pi}{180°}\right)$ $= \frac{\pi}{18}$

b) $-240° \left(\frac{\pi}{180°}\right)$ $= -\frac{4\pi}{3}$

c) $390° \left(\frac{\pi}{180°}\right)$ $= \frac{13\pi}{6}$

d) $-120° \left(\frac{\pi}{180°}\right)$ $= -\frac{2\pi}{3}$

2. Convert each angle measure to **degrees**.

a) $\frac{\pi}{5} \left(\frac{180°}{\pi}\right)$ $36°$

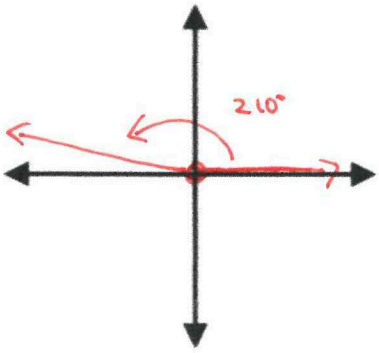
b) $\frac{5\pi}{3} \cdot \left(\frac{180°}{\pi}\right)$ $= 300°$

c) $-\frac{\pi}{2} \left(\frac{180°}{\pi}\right)$ $= -90°$

d) $4\pi \left(\frac{180°}{\pi}\right)$ $720°$

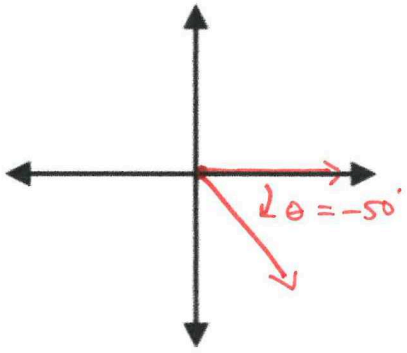
3. **Sketch** each angle in standard position. State the reference angle.

a) $210°$



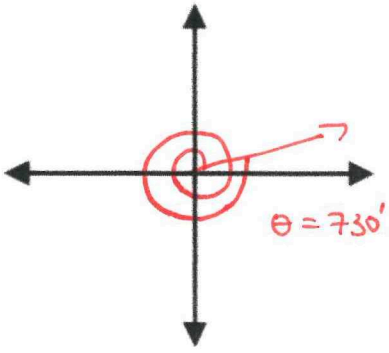
Reference Angle: $\theta_r = 30°$

b) $-50°$



Reference Angle: $\theta_r = 50°$

c) $730°$



Reference Angle: $\theta_r = 10°$

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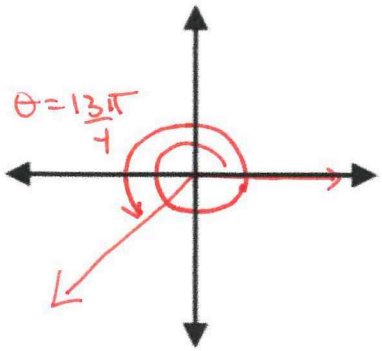
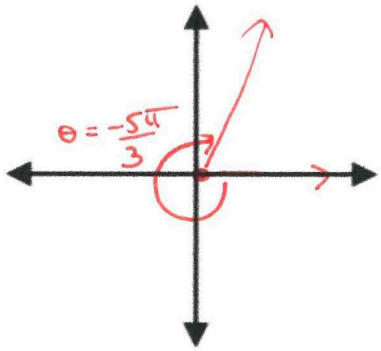
d) $\frac{13\pi}{4}$



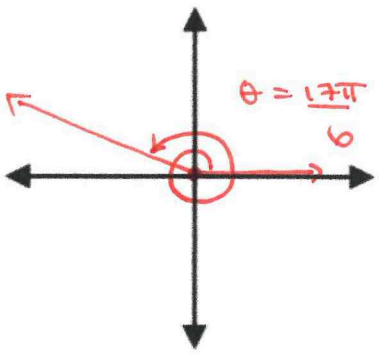
Reference Angle: $\theta_r = \pi/4$

e) $-\frac{5\pi}{3}$



Reference Angle: $\theta_r = \pi/3$

f) $\frac{17\pi}{6}$



Reference Angle: $\theta_r = \pi/6$

4. Determine one positive and one negative **coterminal angle** for each of the following.

a) 30°

390°, −330°

b) 135°

495°, −225°

c) −75°

285°, −435°

d) −148°

212°, 508°

5. Determine one positive and one negative **coterminal angle** for each of the following.

a) $\frac{\pi}{8}$ $\pm \frac{16\pi}{8}$

$\frac{17\pi}{8}$, $-\frac{15\pi}{8}$

b) $-\frac{\pi}{7}$ $\pm \frac{14\pi}{7}$

$-\frac{15\pi}{7}$, $+\frac{13\pi}{7}$.

c) $-\pi$ $\pm 2\pi$

-3π, π

d) $\frac{4\pi}{9}$ $\pm \frac{18\pi}{9}$

$\frac{22\pi}{9}$, $-\frac{14\pi}{9}$

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Practice – 4.2 Unit Circle

6. Determine if the following point $\left(\frac{12}{13}, \frac{5}{13}\right)$ lies on the **unit circle.** **Explain** how you know.

$\left(\frac{12}{13}\right)^2 + \left(\frac{5}{13}\right)^2$

$\frac{144}{169} + \frac{25}{169}$

$\frac{169}{169} = 1$

The point satisfies the equation of the unit circle $x^2 + y^2 = 1$ and ∴ is on the unit circle.

7. The following points lie on the unit circle. Determine the **missing coordinate** satisfying the given conditions.

a) $\left(\frac{2}{3}, y\right)$ in QIV

$x^2 + y^2 = 1$

$\left(\frac{2}{3}\right)^2 + y^2 = 1$

$y^2 = 1 - \frac{4}{9}$

$y^2 = \frac{9}{9} - \frac{4}{9}$

$y = \pm\sqrt{\frac{5}{9}}$

$y = -\sqrt{\frac{5}{9}} = -\frac{\sqrt{5}}{3}$

b) $\left(x, \frac{4}{5}\right)$ in Q2

$x^2 + y^2 = 1$

$x^2 + \left(\frac{4}{5}\right)^2 = 1$

$x^2 + \frac{16}{25} = 1$

$x^2 = \frac{25}{25} - \frac{16}{25}$

$x^2 = \frac{9}{25}$

$x = \pm\sqrt{\frac{9}{25}}$

$x = -\frac{3}{5}$