5. *Match each angle in Column I with its reference angle in Column II. Choices may be used once, more than once, or not a...*

98° $180 - 98 = 82$ C

6. 212° $212 - 180 = 32°$ f

7. -135° $-180° - (-135°) = 45°$ A

8. -60° $-90° - (-60°) = 30°$ D

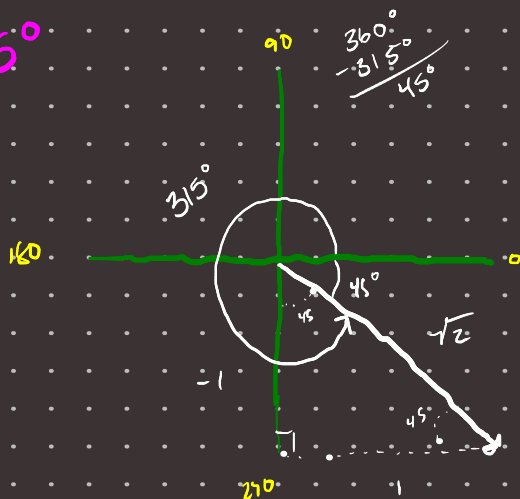9. 750° $810 - 750 = 60°$ B

10. 480° $540 - 480 = 60°$ B

20. *Find exact values of the six trigonometric functions of each angle. Rationalize denominators when applicable.*

315°

315° = Actual
45° = Ref

$Sin\ 315 = \frac{o}{H} = \frac{-1}{\sqrt{2}}$

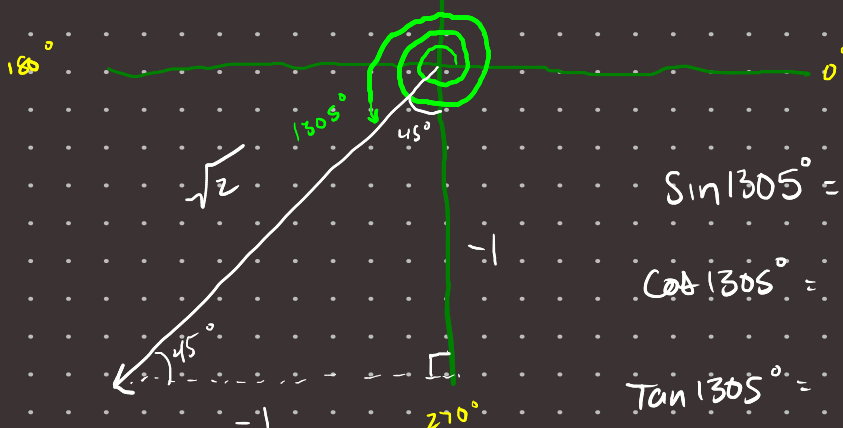$Cos\ 315 = \frac{A}{H} = \frac{-1}{\sqrt{2}}$

$Tan\ 315 = \frac{o}{A} = \frac{-1}{-1} = -1$

$Csc = \frac{H}{o} = \frac{\sqrt{2}}{1} = \sqrt{2}$

$Sec = \frac{H}{A} = \frac{\sqrt{2}}{-1} = -\sqrt{2}$

$Cot = \frac{A}{o} = \frac{-1}{1} = -1$

27. $1305°$

$1305° - 360° = 360° - 360° = 225°$

$270° - 225° = 45°$

(graph with angles labeled 90°, 180°, 0°, 270°, 1305°, 45°, $\sqrt{2}$, -1, $45°$, -1)

$\sin 1305° = \frac{O}{H} = \frac{-1}{\sqrt{2}}$ $\csc 1305° = \frac{H}{O} = \frac{\sqrt{2}}{-1} = -\sqrt{2}$

$\cos 1305° = \frac{A}{H} = \frac{-1}{\sqrt{2}}$ $\sec 1305° = \frac{H}{A} = \frac{\sqrt{2}}{-1} = -\sqrt{2}$

$\tan 1305° = \frac{O}{A} = \frac{-1}{-1} = 1$ $\cot 1305° = \frac{A}{O} = \frac{-1}{-1} = 1$

31.

$-510°$

(graph with angles labeled $-270°$, $-180°$, $-90°$, $30°$, $60°$, $-\sqrt{3}$, -1, 2)

$\sin\left(-510°\right) = \frac{O}{H} = \frac{-1}{2}$

$\cos\left(-510°\right) = \frac{A}{H} = \frac{-\sqrt{3}}{2}$

$\tan\left(-510°\right) = \frac{O}{A} = \frac{-1}{-\sqrt{3}} = \frac{1}{\sqrt{3}}$

$\csc\left(-510°\right) = \frac{H}{O} = \frac{2}{-1} = -2$

$\sec\left(-510°\right) = \frac{H}{A} = \frac{2}{-\sqrt{3}}$

$\cot\left(-510°\right) = \frac{A}{O} = \frac{-\sqrt{3}}{-1} = \sqrt{3}$

39. *Find the exact value of each expression*

$\cos\left(-510°\right)$

(graph with angles labeled $-270°$, $-180°$, $-90°$, 0, $30°$, $-510°$, $-\sqrt{3}$, -1, 2)

$\cos\left(-510°\right) = \frac{A}{H} = \frac{-\sqrt{3}}{2}$

$\cot^2 135° - \sin 30° + 4\tan 45°$

$180 - 135 = 45° = 60 + 135°$

$\tan 45 = \frac{o}{a}, \quad \cot 45 = \frac{a}{o} \qquad 1, 1, \sqrt{2}$

$\left(\frac{1}{1}\right)^2$

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

$\sin 30 = \frac{o}{H} = \frac{1}{2} \qquad\qquad 1, \sqrt{3}, 2$

$1^2 - \frac{1}{2} + 4$

$\tan 45 = \frac{o}{a} = \frac{1}{1} \qquad\qquad 1, 1, \sqrt{2}$

$1 - \frac{1}{2} + 4$

$\frac{1}{2} + 4$

$\boxed{4\frac{1}{2}}$

$\cos\left(30° + 60°\right) = \cos 30° + \cos 60°$

false, $\cos 90° \neq \cos 30° + \cos 60°$,

$\cos 90° = \frac{a}{H} = 0$

$\cos 60 = \frac{a}{H} = \frac{\sqrt{3}}{2}$,

$\cos 36 = \frac{a}{H} = \frac{1}{2}$

$0 \neq \dfrac{1 + \sqrt{3}}{2}$

54. $\sin 30° + \sin 60° = \sin(30° + 60°)$

false,

$\sin 90° \neq \sin 30° + \sin 60°$

$\sin 30 = \frac{o}{H} = \frac{1}{2}$

$\sin 60 = \frac{o}{H} = \frac{\sqrt{3}}{2}$

$\frac{1 + \sqrt{3}}{2} \neq 1$

$\sin 90 = 1$

56. $\cos 60 = 2\cos^2 30 - 1$

false

$\cos 60 = \frac{a}{H} = \frac{1}{2}$

$\frac{1}{2} \neq -\frac{1}{4}$

$\cos 30 = \frac{a}{H} = \frac{\sqrt{3}}{2}$

$2\left(\frac{\sqrt{3}}{2}\right)^2 = 2\left(\frac{3}{4}\right) = \frac{6}{8}$

$\frac{6}{8} - 1 = -\frac{2}{8} = -\frac{1}{4}$

Find all values of θ, if θ is in the interval [0°, 360°] and has the given function value.

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

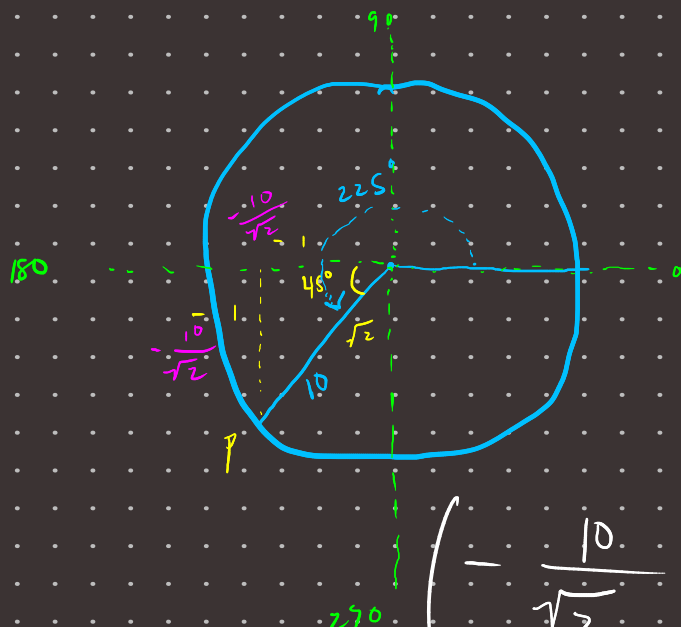$$\cos \emptyset = \frac{\sqrt{3}}{2} = \frac{a}{h} = \cos 30° \qquad \sec \emptyset = \frac{2}{\sqrt{3}}$$

$$\qquad\qquad\qquad\qquad\qquad\qquad \csc \emptyset = \frac{2}{1} = 2$$

$$\sin \emptyset = \frac{1}{2}$$

$$\tan \emptyset = \frac{1}{\sqrt{3}} \qquad\qquad\qquad \cot \emptyset = \frac{\sqrt{3}}{1} = \sqrt{3}$$

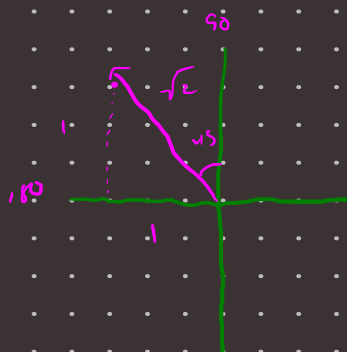**74.** *Find the coordinates of the point P on the circumference of each circle.*

$$225 - 180 = 45°$$

$$x, y = -\frac{10}{\sqrt{2}}$$

$$\left(-\frac{10}{\sqrt{2}}, -\frac{10}{\sqrt{2}} \right)$$

77. *Suppose θ is in the interval (90°, 180°). Find the sign of each of the following:*

$$\cos \frac{\emptyset}{2}$$

$$\cos 45 = \frac{a}{h} = \frac{1}{\sqrt{2}}$$