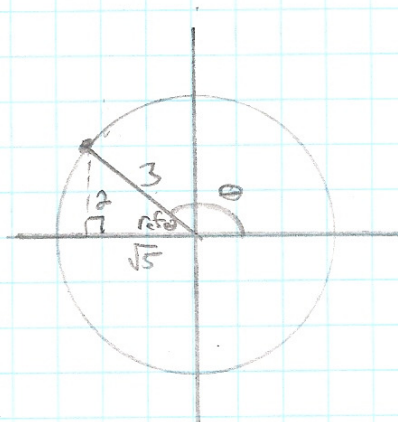


Solutions to Chpt. 7 and 8 Review

① a)



⑤

$$\sin \theta = \frac{2}{3}$$

$$\cos \theta = \frac{\sqrt{5}}{3}$$

$$\tan \theta = \frac{2}{\sqrt{5}} = \frac{2\sqrt{5}}{5}$$

$$\cot \theta = \frac{\sqrt{5}}{2}$$

$$\csc \theta = \frac{3}{2}$$

$$\sec \theta = \frac{3}{\sqrt{5}} = \frac{3\sqrt{5}}{5}$$

c) $\sin \theta_{\text{ref}} = \frac{2}{3}$

$$\sin^{-1} \frac{2}{3} = \theta_{\text{ref}}$$

$$41.810^\circ = \theta_{\text{ref}}$$

$$138.190 = \theta$$

② i) a) 0.698 radian b) 40° c) $\sin 140^\circ$ and $\cos 50^\circ$

ii) a) 5.061 rad. b) 70° c) $\sin 110^\circ$ and $\cos 20^\circ$

iii) a) 9.076 rad. b) 20° c) $\sin 20^\circ$ and $\cos 70^\circ$

iv) a) 60° b) 60° c) $\sin 120^\circ$ and $\cos 30^\circ$

v) a) 126° b) 54° c) $\sin 54^\circ$ and $\cos 36^\circ$

vi) a) 286.5° c) 73.5° c) $\sin 73.5^\circ$ and $\cos 16.5^\circ$

$$3) a) \theta = 30^\circ, 150^\circ$$

$$b) \theta = 78.5^\circ, 281.5^\circ$$

$$c) \theta = 30^\circ, 210^\circ$$

$$d) \theta = 194.5^\circ, 345.5^\circ$$

$$e) 4 + 3 \cos \theta = 1$$

$$3 \cos \theta = -3$$

$$\cos \theta = -1$$

$$\theta = \cos^{-1}(-1)$$

$$\boxed{\theta = 180^\circ}$$

$$f) (\sin \theta)^2 = \frac{1}{2}$$

$$\sin \theta = \pm \sqrt{\frac{1}{2}}$$

$$\sin \theta = \pm \frac{\sqrt{2}}{2}$$

$$\theta = \sin^{-1}\left(\pm \frac{\sqrt{2}}{2}\right)$$

$$\theta = 45^\circ, 135^\circ, 225^\circ, 315^\circ$$

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

$$\frac{r^2}{1} \left[\frac{y^2}{r^2} + \frac{x^2}{r^2} = 1 \right]$$

$$\boxed{y^2 + x^2 = r^2}$$

$$5) a) 2 \sin 30 \cos 30$$

$$= 2 \left(\frac{1}{2} \right) \cdot \frac{\sqrt{3}}{2}$$

$$= \boxed{\frac{\sqrt{3}}{2}}$$

$$b) \sin 45^\circ + \sin 60^\circ$$

$$= \frac{\sqrt{2}}{2} + \frac{1}{2}$$

$$= \boxed{\frac{1+\sqrt{2}}{2}}$$

$$c) \left(\frac{\frac{1}{2}}{\frac{\sqrt{3}}{2}} \right)^2 = \left(\frac{1}{2} \cdot \frac{2}{\sqrt{3}} \right)^2 = \left(\frac{1}{\sqrt{3}} \right)^2 = \boxed{\frac{1}{3}}$$

$$d) \cos 120^\circ \cdot \sin 30^\circ + \cos 30^\circ \cdot \sin 180^\circ$$

$$\frac{1}{2} \cdot \frac{1}{2} + \left(\frac{\sqrt{3}}{2} \right) (0)$$

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

$$e) \left(\cos \frac{\pi}{3} \right)^2 - \left(\sin \frac{\pi}{6} \right)^2$$

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

$$= \frac{1}{4} - \frac{1}{4} = \boxed{0}$$

$$d) 3 \cos \left(\frac{\pi}{3} \right) = \cos \pi$$

$$3 \left(\frac{1}{2} \right) \neq -1$$

False

$$6) a) \sin 90^\circ - \sin 60^\circ = \sin 30^\circ$$

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

False

$$e) \sin \theta = \sin (180^\circ - \theta)$$

True

b) **True** b/c the reference angle is the same and cos is positive in Quad. I and IV.

$$f) \cos \frac{3\pi}{4} \neq 135^\circ$$

$$\cos 135^\circ \neq 135^\circ$$

$$\frac{\sqrt{2}}{2} \neq 135^\circ$$

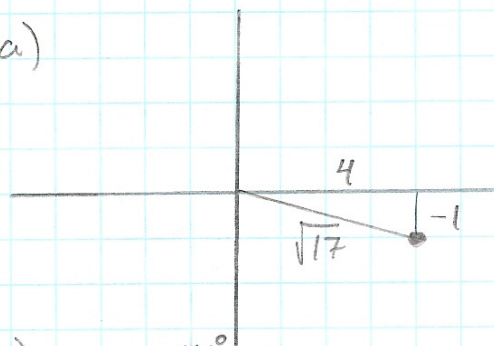
False

$$c) \sec 45^\circ = \sqrt{2}$$

$$\cos 45^\circ = \frac{1}{\sqrt{2}} = \frac{\sqrt{2}}{2}$$

True

7) a)



b) $\Theta_{ref} = 14^\circ$

$\Theta = 360 - 14 = 346^\circ$

c) $\sin \Theta = \frac{-1}{\sqrt{17}} = \frac{-\sqrt{17}}{17}$

$\cos \Theta = \frac{4}{\sqrt{17}} = \frac{4\sqrt{17}}{17}$

d) True when $\Theta = 346$

e) $\tan \Theta = \frac{7}{4}$

$7^2 + 4^2 = x^2$

$49 + 16 = x^2$

$65 = x^2$

$\sqrt{65} = x$

$\Theta = \tan^{-1}\left(\frac{7}{4}\right)$

$\boxed{\Theta = 60.3^\circ}$

9) a) $7(x-9) = 4x - 3(2-x)$

$7x - 63 = 4x - 6 + 3x$

$7x - 63 = 7x - 6$

$\boxed{\text{No Solution}}$

d) $x^2 - 7x + 8 = 4 - 2x$

$x^2 - 5x + 4 = 0$

$(x-4)(x-1) = 0$

$\boxed{x = 1, 4}$

b) $\frac{1}{5} \cdot 3^x = 18$

$3^x = 90$

$\log_3 3^x = \log_3 90$

$\boxed{x = 4.096}$

c) $x^3 - 7x + 6 = 0$

$$\begin{array}{r|rrrr} 2 & 1 & 0 & -7 & 6 \\ & & 2 & 4 & -6 \\ \hline & 1 & 2 & -3 & 0 \end{array}$$

$(x-2)(x^2+2x-3) = 0$

$(x-2)(x+3)(x-1) = 0$

$\boxed{x = 2, -3, 1}$

c) $\log_4 x = -2$

$x = 4^{-2}$

$\boxed{x = \frac{1}{16}}$

f) $0.4e^{3x} = 100$

$e^{3x} = 250$

$3x = \ln 250$

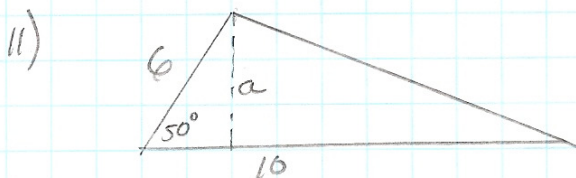
$\boxed{x = 1.840}$

10) a) $C = 2\pi r$
 $C = 2\pi(50)$
 $C = 100\pi \text{ ft}$

b) $\frac{100\pi}{360^\circ} = \frac{x}{60^\circ}$
 $360x = 6000\pi$
 $x = \frac{50\pi}{3}$

c) $C = \frac{\theta}{360} \cdot 2\pi r$ in degrees

$S = \frac{180}{\pi} \cdot \frac{\theta}{360} \cdot 2\pi r$
 $S = \theta r$ in radians



$\sin 50^\circ = \frac{a}{6}$

$a = 4.596$

$A = \frac{1}{2}(10)(4.596)$

$A = 22.98 \text{ ft}^2$

12) a) The graph is reflected over the x -axis

b) The graph is stretched vertically 2 units where amplitude is 2.

c) The sine graph cycles 2 times in the normal x values.

d) The graph is shifted horizontally 90° .