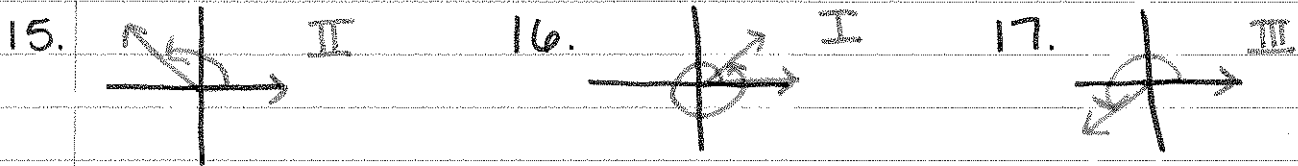
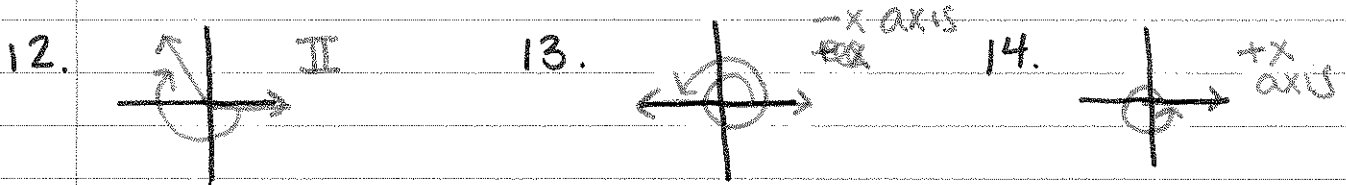
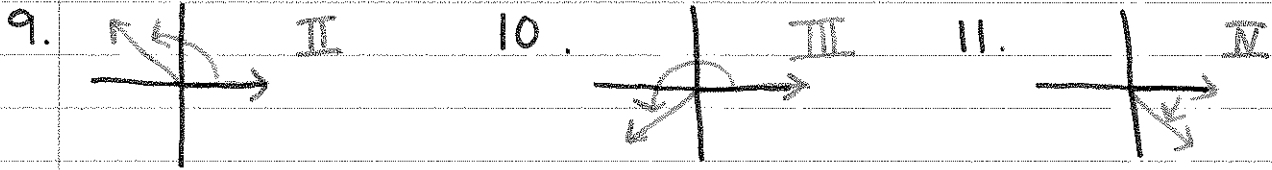


Unit 5 Study Guide Key

1. $\frac{5\pi}{6}$ 2. $\frac{7\pi}{6}$ 3. $\frac{\pi}{4}$ 4. $\frac{4\pi}{3}$

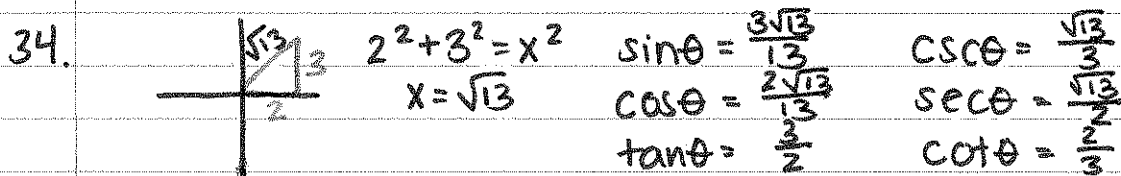
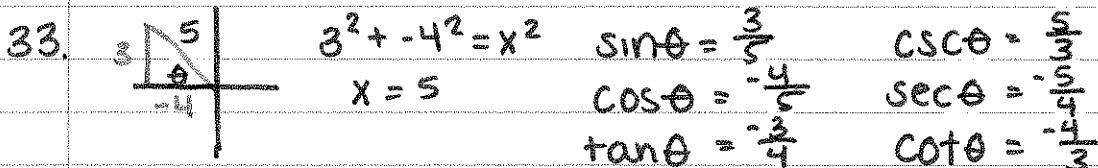
5. 30° 6. 45° 7. 150° 8. 210°



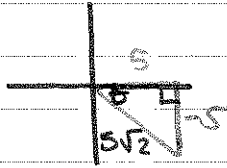
18. 336° 19. 30° 20. 30° 21. $\frac{\pi}{3}$ 22. $\frac{\pi}{3}$

23. 40° 24. 80° 25. 220° 26. 339° 27. 96°

28. $2\pi, 0$ 29. $\frac{\pi}{2}$ 30. $\frac{5\pi}{3}$ 31. $\frac{5\pi}{3}$ 32. $\frac{10\pi}{13}$



35.



$$5^2 + (-5)^2 = x^2$$

$$x = 5\sqrt{2}$$

$$(\sqrt{50})$$

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

$$\cos\theta = \frac{\sqrt{2}}{2}$$

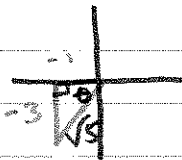
$$\tan\theta = -1$$

$$\csc\theta = -\sqrt{2}$$

$$\sec\theta = \sqrt{2}$$

$$\cot\theta = -1$$

36.



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

$$x = \sqrt{10}$$

$$\sin\theta = -\frac{3\sqrt{10}}{10}$$

$$\cos\theta = -\frac{\sqrt{10}}{10}$$

$$\tan\theta = 3$$

$$\csc\theta = -\frac{\sqrt{10}}{3}$$

$$\sec\theta = -\sqrt{10}$$

$$\cot\theta = \frac{1}{3}$$

37. $s = r\theta$

$s = 8(1)$

$= 8\text{m.}$

38. $r = 5(\theta)$

$\theta = 7/5\text{rad}$

$\frac{7}{5} \cdot \frac{180}{\pi} = 80.2^\circ$

39. $100 = r\theta$

$100 = r \left(\frac{5\pi}{9}\right)$

$r = 57.3\text{ft}$

$\theta = 100 \cdot \frac{\pi}{180} = \frac{5\pi}{9}$

40. $\theta = 52 \cdot \frac{\pi}{180} = \frac{13\pi}{45}$

$A = \frac{1}{2}(200)^2 \left(\frac{13\pi}{45}\right)$

$A = \frac{52000\pi}{9} \approx 18151.42$

41. $125 = \frac{1}{2}(25)^2\theta$

$\theta = .4\text{rad}$

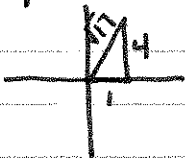
42. $-\frac{\sqrt{2}}{2}$ 43. 1 44. 2 45. $\sqrt{2}$ 46. $-\frac{1}{2}$ 47. 0

48. $-\frac{\sqrt{2}}{2}$ 49. $\frac{\sqrt{3}}{3}$ 50. $\sqrt{3}$ 51. $\frac{\sqrt{3}}{2}$

52. -2 53. 1 54. $\frac{\sqrt{3}}{2}$ 55. -1

56. $\tan \theta = 4 = \frac{y}{x}$ $\sin \theta < 0 \rightarrow y$ is negative...
so x must also be negative

$y = 4$ $x = -1$



$4^2 + 1^2 = x^2$
 $x = \sqrt{17}$

$\sin \theta = \frac{4\sqrt{17}}{17}$

$\csc \theta = \frac{\sqrt{17}}{4}$

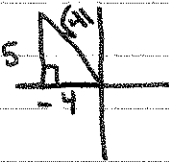
$\cos \theta = \frac{\sqrt{17}}{17}$

$\sec \theta = \sqrt{17}$

$\tan \theta = \frac{4}{1} = 4$

$\cot \theta = \frac{1}{4}$

57.



$(-4)^2 + 5^2 = x^2$
 $x = \sqrt{41}$

$\sin \theta = \frac{5\sqrt{41}}{41}$

$\csc \theta = \frac{\sqrt{41}}{5}$

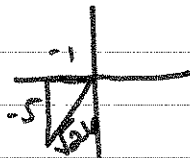
$\cos \theta = \frac{-4\sqrt{41}}{41}$

$\sec \theta = -\frac{\sqrt{41}}{4}$

$\tan \theta = \frac{-5}{-4} = \frac{5}{4}$

$\cot \theta = \frac{4}{5}$

58.



$(-1)^2 + (-5)^2 = x^2$
 $x = \sqrt{26}$

$\sin \theta = \frac{-5\sqrt{26}}{26}$

$\csc \theta = \frac{-\sqrt{26}}{5}$

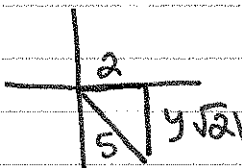
$\cos \theta = \frac{-\sqrt{26}}{26}$

$\sec \theta = -\sqrt{26}$

$\tan \theta = 5$

$\cot \theta = \frac{1}{5}$

59. $\cos \theta = \frac{2}{5}$ x $\sin \theta < 0 \rightarrow y$ is negative
5 Hyp.



$2^2 + y^2 = 5^2$
 $y = \sqrt{21}$

$\sin \theta = \frac{\sqrt{21}}{5}$

$\csc \theta = \frac{5\sqrt{21}}{21}$

$\cos \theta = \frac{2}{5}$

$\sec \theta = \frac{5}{2}$

$\tan \theta = \frac{\sqrt{21}}{2}$

$\cot \theta = \frac{2\sqrt{21}}{21}$

60. $\sin \theta < 0 \rightarrow -y$ IV
 $\cos \theta > 0 \rightarrow +x$

61. $\tan \theta > 0 \rightarrow \frac{-y}{-x}$ III
 $\sin \theta < 0 \rightarrow -y$

62. $\sin \theta > 0 \rightarrow +y$ I
 $\cos \theta > 0 \rightarrow +x$

63. $\tan \theta < 0 \rightarrow \frac{+y}{+x}$ IV
 $\sin \theta < 0 \rightarrow -y$

64. $\tan \theta < 0 \rightarrow \frac{+y}{-x}$
 $\cos \theta < 0 \rightarrow -x$
II

$$65. r = 3 \quad \theta = 45 \cdot 2\pi = 90\pi \quad t = 1 \text{ min} \xrightarrow{60 \text{ sec}} \text{(in per second)}$$

$$v = \frac{3(90\pi)}{60} = \frac{9\pi}{2} \text{ m/sec} \approx 14.14 \text{ m/sec}$$

$$66. r = 3 \text{ ft} \quad \theta = 2250 \cdot 2\pi = 4500\pi \quad t = 1 \text{ min} \rightarrow 60 \text{ sec}$$

$$v = \frac{3(4500\pi)}{60} = 225\pi \text{ ft/sec} \approx 706.86 \text{ ft/sec}$$

$$\omega = \frac{4500\pi}{60} = 75\pi \text{ rad/sec} \approx 235.62 \text{ rad/sec}$$

$$67. \theta = 125^\circ \cdot \frac{\pi}{180} = \frac{25\pi}{36} \text{ rad} \quad r = 7 \text{ cm}$$

$$s = 7 \left(\frac{25\pi}{36} \right) = \frac{175\pi}{36} \approx 15.27$$

$$68. \theta = \frac{3\pi}{7} \quad r = 11$$

$$A = \frac{1}{2}(11)^2 \left(\frac{3\pi}{7} \right) = \frac{363\pi}{14} \text{ cm}^2 \approx 81.46 \text{ cm}^2$$

$$69. \theta = 5.8 \cdot 2\pi = 11.6\pi \quad t = 9 \text{ sec}$$

$$\omega = \frac{11.6\pi}{9} = \frac{58\pi}{45} \text{ rad/sec} \approx 4.05 \text{ rad/sec}$$

$$70. r = 3 \text{ ft} \quad \theta = 2.5 \cdot 2\pi = 5\pi \quad t = 1 \text{ min} = 60 \text{ sec}$$

$$\omega = \frac{5\pi}{60} = \frac{\pi}{12} \text{ rad/sec} = 0.26 \text{ rad/sec}$$

$$71. r = 15 \text{ in} \quad \theta = 141 \cdot 2\pi = 282\pi \quad t = 1 \text{ min} = \frac{1}{60} \text{ hr}$$

$$= .0002 \text{ mi.}$$

$$v = \frac{.0002(282\pi)}{\frac{1}{60}} = \frac{705\pi}{176} \approx 12.58 \text{ mph}$$

72. Amp = 1
 Pd = $2\pi/1/2 = 4\pi$
 P.S. = Right $\pi/2$
 Midline: $y = -2$

73. Amp = 1
 Pd = $2\pi/1 = 2\pi$
 P.S. = Left π
 Midline: $y = -2$

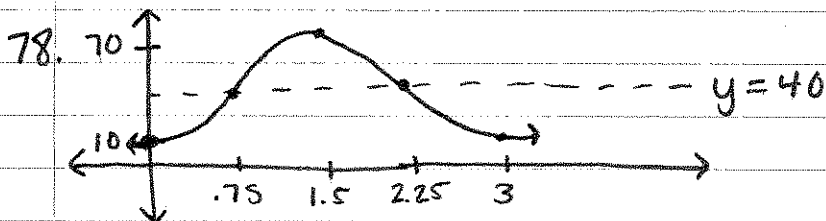
74. Amp = $1/2$
 Pd = $2\pi/2 = \pi$
 P.S. = Left $\pi/6$
 Midline: $y = -1$

75. Amp = 1
 Pd = $2\pi/2 = \pi$
 P.S. = None
 midline: $y = 4$

76. Amp = 1
 Pd = $2\pi/1/2 = 4\pi$
 P.S. = None
 Midline: $y = 0$

77. Amp = 2
 Pd = $2\pi/1/2 = 4\pi$
 P.S. = None
 Midline: $y = -1$

*All of these were already factored. Be careful to check it is factored!



Amplitude: $\bullet 30$ (Reflection)

Period: $3 \rightarrow \frac{2\pi}{B} = 3 \rightarrow B = \frac{2\pi}{3}$

Phase Shift: None

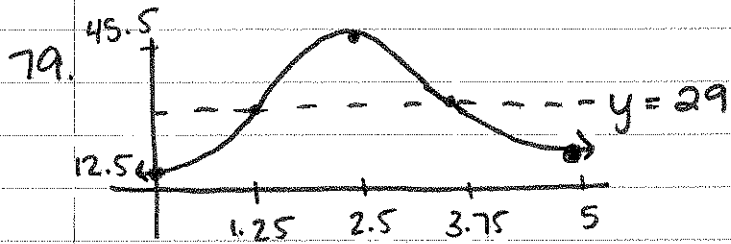
Vertical Shift: Up 40 (+40)

a. $y = -30 \cos\left(\frac{2\pi}{3}x\right) + 40$

b. $x = 1.25$, $y = 65.98$ ft above the ground

c. It would shift right

(don't worry about writing the equation)

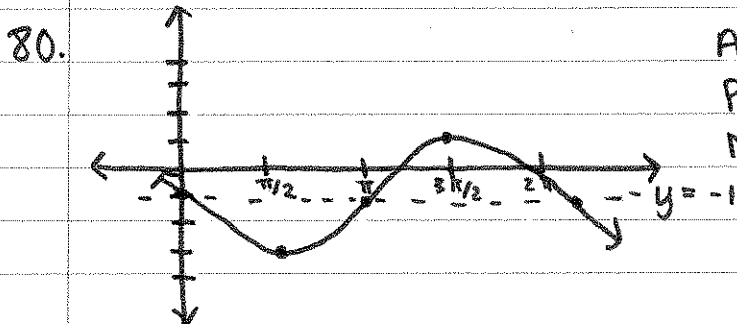


$$\frac{60 \text{ sec}}{12 \text{ rev}} = 1 \text{ rev per } 5 \text{ sec}$$

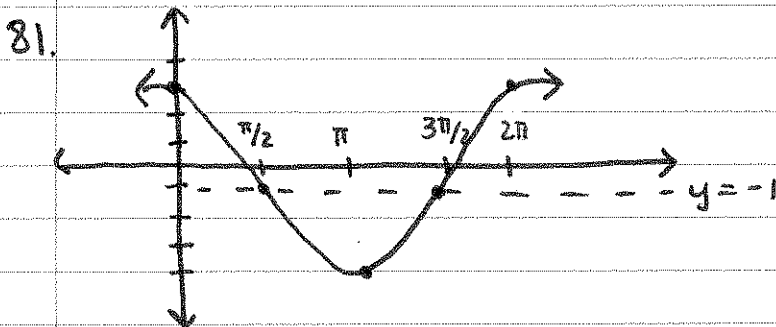
b. $y = -16.5 \cos\left(\frac{2\pi}{5}(x)\right) + 29$

c. $40 = -16.5 \cos\left(\frac{2\pi}{5}x\right) + 29$
 $x = 1.8 \text{ sec}$

d. $t = 23 \rightarrow 42.3 \text{ Ft}$
 down



Amplitude: 2 Period: 2π
 Phase shift: None
 Midline: $y = -1$



Amplitude: 3 Period: 2π
 Phase shift: None
 Midline: $y = -1$