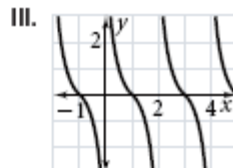
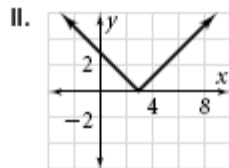
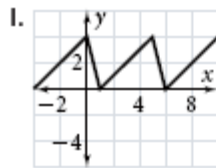


35. A periodic function goes through 5 complete cycles in 4 min. What is the period of the function? **C**  
 A.  $\frac{1}{5}$  min      B.  $\frac{1}{4}$  min      C. 48 s      D. 75 s
36. The period of a periodic function is 8 s. How many cycles does it go through in 30 s? **G**  
 F.  $\frac{4}{15}$  cycle      G. 3.75 cycles      H. 22 cycles      J. 240 cycles
37. Which graph is NOT the graph of a periodic function? **B**



- A. I only      B. II only      C. III only      D. II and III

38. The amplitude of a periodic function is 2.5 and its minimum value is 0. What is the function's maximum value? **J**  
 F. -2.5      G. 0      H. 2.5      J. 5.0
39. A periodic function completes  $m$  cycles in  $n$  seconds. What is the period of the function? Show your work. **See margin.**

**39. [2] A period is the length of 1 cycle, so**  

$$\frac{n \text{ seconds}}{m \text{ cycles}} = \frac{x \text{ seconds}}{1 \text{ cycle}}$$
**Then  $xm = n$ , or**  

$$x = \frac{n}{m}. \text{ The period is } \frac{n}{m} \text{ seconds.}$$

**[1] answer only with no explanation**

63. Which angle, in standard position, is NOT coterminal with the others? **A**  
 A.  $-190^\circ$       B.  $-170^\circ$       C.  $190^\circ$       D.  $550^\circ$
64. An angle drawn in standard position has a terminal side that passes through the point  $(\sqrt{2}, -\sqrt{2})$ . What is one possible measure of the angle? **H**  
 F.  $45^\circ$       G.  $225^\circ$       H.  $315^\circ$       J.  $330^\circ$
65. An angle of  $120^\circ$  is in standard position. What are the coordinates of the point at which the terminal side intersects the unit circle? **D**  
 A.  $(\frac{1}{2}, \frac{\sqrt{3}}{2})$       B.  $(-\frac{1}{2}, -\frac{\sqrt{3}}{2})$       C.  $(-\frac{\sqrt{3}}{2}, \frac{1}{2})$       D.  $(-\frac{1}{2}, \frac{\sqrt{3}}{2})$
66. An angle of  $-225^\circ$  is in standard position. Which points can lie on the terminal side of the angle? **H**  
 I.  $(\frac{\sqrt{2}}{2}, -\frac{\sqrt{2}}{2})$       II.  $(-\frac{\sqrt{2}}{2}, \frac{\sqrt{2}}{2})$       III.  $(-\frac{\sqrt{2}}{2}, -\frac{\sqrt{2}}{2})$       IV.  $(-1, 1)$   
 F. I and II      G. II and III      H. II and IV      J. I and III
67. What is the exact value of  $\cos(-210^\circ)$ ? Show your work. **See back of book.**
58. Which pairs of measurements represent the same angle measures? **C**  
 I.  $240^\circ, \frac{7\pi}{6}$  radians      II.  $135^\circ, \frac{3\pi}{4}$  radians      III.  $150^\circ, \frac{5\pi}{6}$  radians  
 A. I and II only      B. I and III only      C. II and III only      D. I, II, and III

59. What is the exact value of  $\cos\left(\frac{5\pi}{4}\right)$  radians? **G**  
 F.  $-\frac{\sqrt{3}}{2}$       G.  $-\frac{\sqrt{2}}{2}$       H.  $-\frac{1}{2}$       J.  $\frac{\sqrt{2}}{2}$
60. In a circle, an arc of length  $8\pi$  cm is intercepted by a central angle of  $\frac{2\pi}{3}$  radians. What is the radius of the circle? **D**  
 A.  $\frac{3\pi}{16}$  cm      B.  $\frac{16\pi}{3}$  cm      C.  $\frac{16\pi^2}{3}$  cm      D. 12 cm
61. Two arcs have the same length. One arc is intercepted by an angle of  $\frac{3\pi}{2}$  radians in a circle of radius 15 cm. If the radius of the other circle is 25 cm, what central angle intercepts the arc? **G**  
 F.  $\frac{3\pi}{2}$  radians      G.  $\frac{9\pi}{10}$  radians      H.  $\frac{3\pi}{2}$  radians      J.  $\frac{5\pi}{3}$  radians
62. Describe the relationship between a central angle of one radian and the radius of the circle. **See margin.**

**62. [2] For a central angle of 1 radian, the length of the intercepted arc is the length of the radius.**

**[1] incomplete explanation**

60. Which value is NOT the same as the other three values? **C**  
 A.  $\sin 100^\circ$       B.  $\sin 80^\circ$       C.  $\sin -80^\circ$       D.  $\sin -260^\circ$
61. What is the amplitude of  $y = 3 \sin 4\theta$ ? **G**  
 F.  $\frac{4}{3}$       G. 3      H. 4      J.  $2\pi$
62. Which answer choice describes  $y = -\sin 2\theta$ ? **B**  
 A. amplitude  $-1$ , period  $4\pi$       B. amplitude 1, period  $\pi$   
 C. amplitude 2, period  $-\pi$       D. amplitude  $2\pi$ , period 1
63. Which function has a period of  $4\pi$  and an amplitude of 8? **G**  
 F.  $y = -8 \sin 8\theta$       G.  $y = -8 \sin \frac{1}{2}\theta$       H.  $y = 8 \sin 2\theta$       J.  $y = 4 \sin 8$
64. Find the value of  $\theta$  that is between  $90^\circ$  and  $180^\circ$  such that  $\sin \theta = \sin 60^\circ$ . Show your work. **See margin.**
65. The period of a sine function is  $30^\circ$  and its amplitude is 1. Write the function in the form  $y = a \sin b\theta$ , where  $\theta$  is in radians. Show your work. **See margin.**

64. [2] Since sine is always positive in the first and second quadrants, a value of  $\theta$  where its sine is equal to the  $\sin 60^\circ$  would have a reference angle of  $60^\circ$ .  $180^\circ - 60^\circ$  is equal to  $120^\circ$ .

[1] answer only, with no work shown

65. [4] The amplitude is 1, so  $a = 1$ .  
 $30^\circ \cdot \frac{\pi \text{ radians}}{180^\circ} = \frac{\pi}{6}$  radians, so  $b = 2\pi \div \frac{\pi}{6} = 2\pi \cdot \frac{6}{\pi} = 12$ .  
 The function is  $y = \sin 12\theta$ .

Multiple Choice

40. Which statement(s) is (are) true? **A**  
 I.  $\cos \theta = \cos(-\theta)$     II.  $\cos(\theta + 2\pi) = \cos \theta$     III.  $\cos \pi = -\cos \pi$   
 A. I and II only    B. II only    C. I and III only    D. I, II, and III

41. Which function has a period of  $2\pi$  and an amplitude of 4? **J**  
 F.  $f(x) = 2 \cos 4\theta$     G.  $f(x) = 2 \cos \theta$   
 H.  $f(x) = 4 \cos 2\theta$     J.  $f(x) = 4 \cos \theta$

42. Which equation corresponds to the graph shown at the right? The screen dimensions are  $-4\pi \leq x \leq 4\pi$  and  $-2 \leq y \leq 2$ . **A**

A.  $y = \frac{1}{2} \cos \frac{x}{4}$     B.  $y = \frac{1}{2} \cos 4x$   
 C.  $y = 2 \cos \frac{x}{4}$     D.  $y = 2 \cos 4x$



45. [2] amplitude = 0.2;  
 period = 6

[1] one computational error

46. [2] seven or eight correct:  
 0.35, 1.22, 1.92, 2.79,  
 3.49, 4.36, 5.06, 5.93

[1] two to six numbers correct

43. Which equation has the same graph as  $y = -\cos t$ ? **H**

F.  $y = \cos(-t)$     G.  $y = \sin(t - \pi)$     H.  $y = \cos(t - \pi)$     J.  $y = -\sin t$

44. How many solutions does the equation  $1 = -\sin 2t$  have for  $0 \leq t < 2\pi$ ?

A. 1    B. 2    C. 3    D. 4    **B**

Short Response

45. Find the amplitude and period of  $y = -0.2 \cos \frac{\pi}{3}\theta$ .

46. Solve  $75 \cos 4t = 12.5$  for  $t$  from 0 to  $2\pi$ . Round your result(s) to the nearest hundredth.

47. Which value is NOT defined? **C**  
 A.  $\tan 0$       B.  $\tan \pi$       C.  $\tan \frac{3\pi}{2}$       D.  $\frac{1}{\tan \frac{\pi}{4}}$
48. What is the exact value of  $\tan \frac{7\pi}{6}$ ? **H**  
 F.  $-\sqrt{3}$       G.  $-\frac{\sqrt{3}}{3}$       H.  $\frac{\sqrt{3}}{3}$       J.  $\sqrt{3}$
49. Which pair of values are NOT equal? **D**  
 A.  $\tan \frac{\pi}{4}, -\tan \frac{3\pi}{4}$       B.  $\tan \frac{\pi}{4}, \tan \frac{5\pi}{4}$   
 C.  $\tan \theta, -\tan (-\theta)$       D.  $\tan \theta, \tan (\pi - \theta)$
50. Which equation does NOT represent a vertical asymptote of the graph of  $y = \tan \theta$ ? **G**  
 F.  $\theta = -\frac{\pi}{2}$       G.  $\theta = 0$       H.  $\theta = \frac{\pi}{2}$       J.  $\theta = \frac{3\pi}{2}$
51. Which function has a period of  $4\pi$ ? **D**  
 A.  $y = \tan 4\theta$       B.  $y = \tan 2\theta$       C.  $y = \tan \frac{1}{2}\theta$       D.  $y = \tan \frac{1}{4}\theta$
52. Explain why there is no discussion of the amplitude of the tangent function in the lesson. **See margin.**