

2nd Six Weeks:

Give the transformation for each function.

*Becareful Must Factor for phase shift!*

44.  $y = -\cos\left(2x + \frac{\pi}{2}\right) + 3$   
 $y = -\cos 2\left(x + \frac{\pi}{4}\right) + 3$

A. amplitude	1
B. period length	$\pi$
C. vertical shift	up 3
D. phase shift	Left $\frac{\pi}{4}$

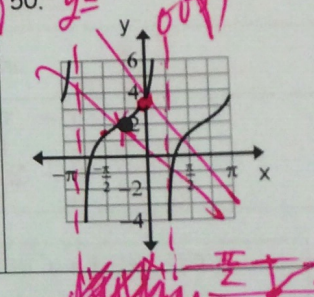
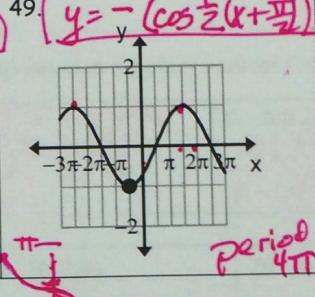
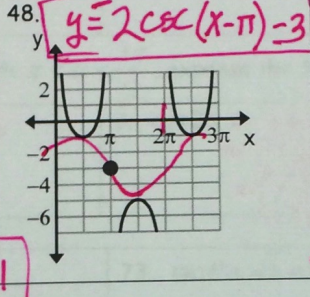
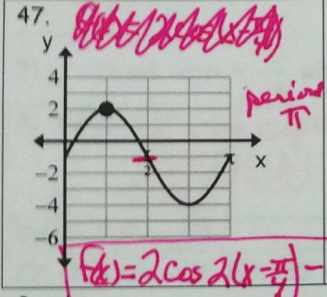
45.  $y = 2\sin 3\left(x - \frac{\pi}{2}\right) - 1$

A. amplitude	2
B. period length	$\frac{2\pi}{3}$
C. vertical shift	down 1
D. phase shift	Right $\frac{\pi}{2}$

46.  $y = -3\tan(4x - \pi) + 2$   
 $y = -3 + \tan 4\left(x - \frac{\pi}{4}\right) + 2$

A. amplitude	None Vert. Stretch 3
B. period length	$\frac{\pi}{4}$
C. vertical shift	up 2
D. phase shift	Right $\frac{\pi}{4}$

Write the equation for these graphs...



Graph. 51.  $y = \sin^{-1}x$  52.  $y = \cos^{-1}x$  53.  $y = \tan^{-1}x$

54. Evaluate each of the following. EXACT VALUE.

A. $\tan^{-1}(\sqrt{3}) = 60^\circ$ OR $\frac{\pi}{3}$	B. $\sin^{-1}\left(-\frac{\sqrt{2}}{2}\right) = -45^\circ$ OR $-\frac{\pi}{4}$	C. $\text{Arc cot}(-1) = 135^\circ$ OR $\frac{3\pi}{4}$	D. $\text{Arc sec}\left(\frac{2\sqrt{3}}{3}\right) = 30^\circ$ OR $\frac{\pi}{6}$
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55. The angle of depression from the top of a cliff 350 meters high to the foundation of a house is  $42.5^\circ$ . To the nearest tenth of a meter, how far is the home from the foot of the cliff?

$\tan 42.5^\circ = \frac{350}{x}$   
 $x \approx 382 \text{ meters}$

56. A 15-foot ladder is leaning against a house. The ladder reaches 11 feet up the side of the house. Find the angle that the ladder makes with the ground.

$\sin x = \frac{11}{15}$   
 $x \approx 47.2^\circ$

Match each expression in Column I to its equivalent "match" in column II (Identities).

Column I	Column II
57. $\frac{\cos \theta}{\sin \theta}$ D	A. $1 + \cot^2 \theta$
58. $\sin^2 \theta$ B	B. $1 - \cos^2 \theta$
59. $\tan \theta$ E	C. $\cot^2 \theta$
60. $\frac{1}{\cos^2 \theta}$ F	D. $\cot \theta$
61. $\frac{1}{\tan^2 \theta}$ C	E. $\frac{\sin \theta}{\cos \theta}$
62. $\csc^2 \theta$ A	F. $\sec^2 \theta$

Match each expression in Column I to its equivalent "match" in column II.

Column I	Column II
63. $\sin \theta \cdot \sec \theta$ A	A. $\tan \theta$ F. $\csc \theta$
64. $\tan \theta \cdot \csc \theta \cdot \cot \theta$ F	B. $\cot \theta$ G. $\tan^2 \theta$
65. $(1 - \cos^2 \theta)(-\csc^2 \theta)$ D	C. 1 H. $\cot^2 \theta$
66. $\sec \theta \cdot \frac{\sin \theta}{\cot \theta}$ G	D. -1 I. $\sin \theta$
	E. $\sec \theta$

$\frac{1}{\cos \theta} \cdot \frac{\sin \theta}{\frac{\cos \theta}{\sin \theta}} = \frac{\sin \theta}{\cos \theta} = \tan \theta$

3<sup>rd</sup> Six Weeks: Use your trig identities!

Find the exact value of each of the following. Express answers in simplest radical form.

67.  $\cos 75^\circ = \cos(120 - 45)$   
 $\cos 120 \cos 45 + \sin 120 \sin 45$   
 $-\frac{1}{2}(\frac{\sqrt{2}}{2}) + \frac{\sqrt{3}}{2}(\frac{\sqrt{2}}{2})$   
 $-\frac{\sqrt{2}}{4} + \frac{\sqrt{6}}{4}$

68.  $\tan \frac{\pi}{12} = \tan(\frac{\pi}{3} - \frac{\pi}{4})$   
 $= \frac{\frac{\sqrt{3}}{3} - 1}{1 + \frac{\sqrt{3}}{3}}$

69.  $\sin \frac{11\pi}{12} = \sin(\frac{2\pi}{3} - \frac{\pi}{4})$   
 $\frac{\sqrt{6} + \sqrt{2}}{4}$

70. Suppose  $\sin \alpha = \frac{5}{13}$  and  $\cos \beta = \frac{8}{17}$ , with  $90^\circ < \alpha < 180^\circ$  and  $0^\circ < \beta < 90^\circ$ . Evaluate...

A.  $\sin(\alpha + \beta) = \frac{-21}{221}$

B.  $\cos(\alpha - \beta) = \frac{-140}{221}$

C.  $\tan(\alpha + \beta) = \frac{21}{220}$

71. Given  $\cos \alpha = -\frac{3}{5}$  with  $\pi < \alpha < \frac{3\pi}{2}$ , express the following in simplest radical form.

A.  $\sin 2\alpha = 2 \sin \alpha \cos \alpha$   
 $= 2(\frac{4}{5})(-\frac{3}{5})$   
 $= -\frac{24}{25}$

B.  $\cos 2\alpha = \cos^2 \alpha - \sin^2 \alpha$   
 $= (\frac{-3}{5})^2 - (\frac{4}{5})^2$   
 $= \frac{-7}{25}$

C.  $\tan 2\alpha = \frac{2(\frac{4}{5})}{1 - (\frac{3}{5})^2} = \frac{-24}{7}$

Solve.

72.  $8 + \csc x = 10$ ,  $[0^\circ, 360^\circ)$   
 $x = 30^\circ, 150^\circ$

73.  $\tan \theta + \sqrt{3} = 0$ ,  $[0, 2\pi)$   
 $\theta = \frac{2\pi}{3}, \frac{5\pi}{3}$

74.  $4 \cos^2 x = 3$ ,  $[0^\circ, 360^\circ)$   
 $x = 30^\circ, 150^\circ, 210^\circ, 330^\circ$

75.  $\sin^2 x + \sin x = 0$ ,  $[0, 2\pi)$   
 $x = 0, \pi, \frac{3\pi}{2}$

76.  $\cos^2 x + 2 \cos x = 3$ ,  $[0^\circ, 360^\circ)$   
 $x = 0^\circ$

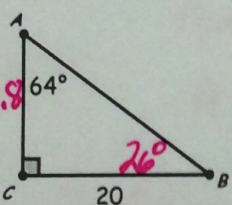
77.  $\cos^2 x - \sin x + 1 = 0$ ,  $[0, 2\pi)$   
 $x = \frac{\pi}{2}$

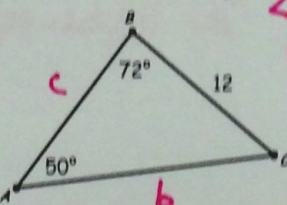
78.  $\sin 3x \cdot \cos x - \cos 3x \cdot \sin x = 1$   
 $[0^\circ, 360^\circ)$   
 $x = 45^\circ, 135^\circ$

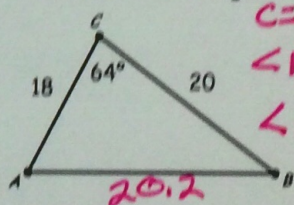
79.  $\sin(2x) - \cos x = 0$   
 all angles in degrees  
 $x = 90^\circ + 180^\circ N; 30^\circ + 360^\circ N;$   
 $150^\circ + 360^\circ N$

80.  $\sin^2 x + 4 \cos x - 4 = 0$   
 all angles in degrees  
 $0^\circ + 360^\circ N$

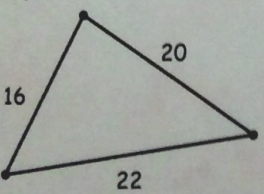
Triangles.

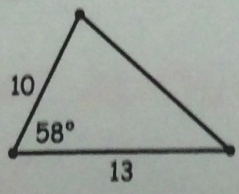
81. Solve the triangle.  
  
 $\angle B = 26^\circ$   
 $c = 22.3$   
 $b = 9.8$

82. Solve the triangle.  
  
 $\angle C = 58^\circ$   
 $c = 13.3$   
 $b = 14.9$

83. Solve the triangle.  
  
 $c = 20.2$   
 $\angle A = 62.8^\circ$   
 $\angle B = 53.2^\circ$

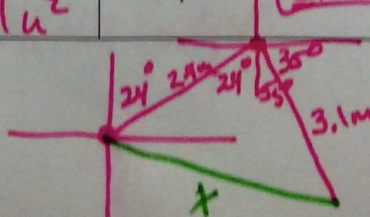
Find the area of the triangles.

84.  
  
 $A \approx 154.1 \text{ u}^2$

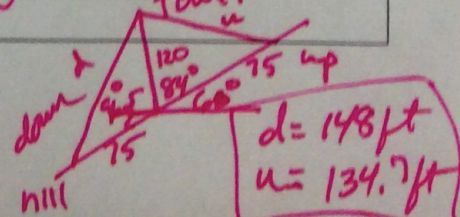
85.  
  
 $A \approx 55.1 \text{ u}^2$

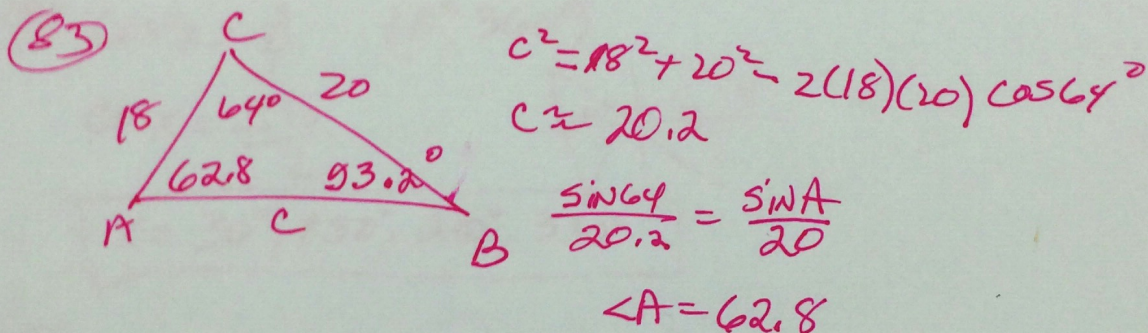
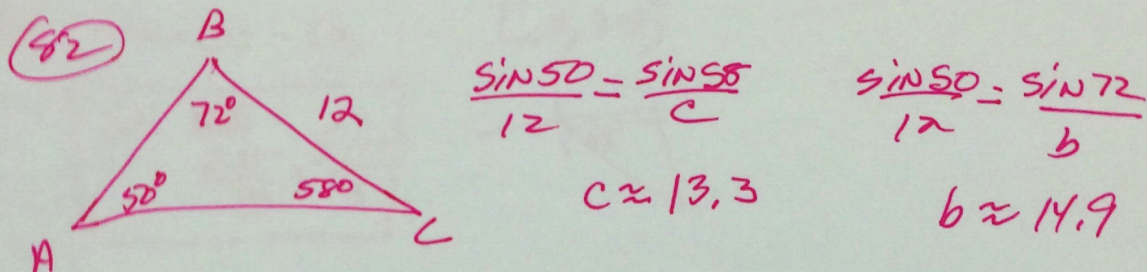
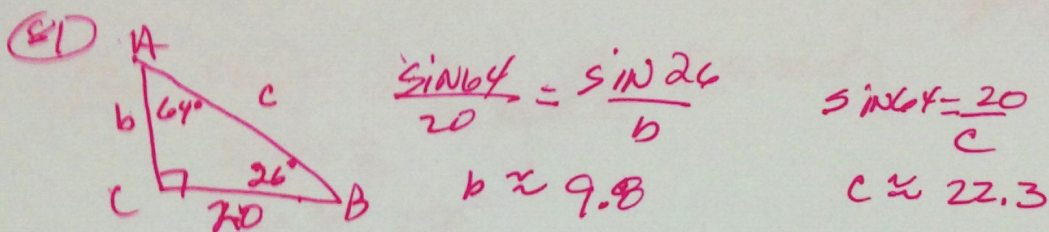
Solve each:

86. A rower leaves port on a bearing of  $24^\circ$  for 2.4 miles then takes a bearing of  $125^\circ$  for 3.1 miles. How far is the rower from port?  
 $3.5 \text{ miles}$



87. A 120 foot vertical tower is to be placed on the side of a hill that makes a  $6^\circ$  angle with the horizontal. Find the length of each of the guy wires that will be anchored 75 feet up hill and downhill.  
 $d = 148 \text{ ft}$   
 $w = 134.7 \text{ ft}$





(84)  $s = 29$

$$A = \sqrt{29(29-16)(29-20)(29-22)}$$

$A \approx 154.1$

(85)  $A = \frac{1}{2}(10)(13)\sin 58^\circ$

(86)  $x^2 = 2.4^2 + 3.1^2 - 2(2.4)(3.1)\cos 79$

$x \approx 3.5$

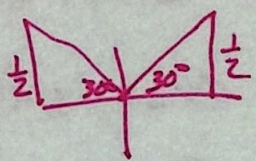
(87)  $d^2 = 75^2 + 120^2 - 2(75)(120)\cos 96^\circ$

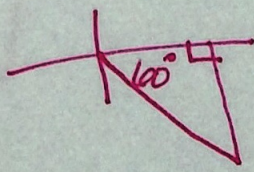
$d \approx 148.0$

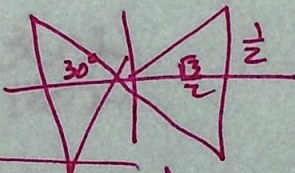
$u^2 = 75^2 + 120^2 - 2(75)(120)\cos 84^\circ$

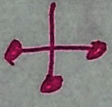
$u \approx 131.7$

3rd 6 weeks

(72)  $\csc x = 2$    $[0, 360^\circ)$   
 $\sin x = \frac{1}{2}$   
 $x = 30^\circ, 150^\circ$

(73)  $\tan \theta = -\sqrt{3}$   $[0, 2\pi)$   
  
 $\theta = \frac{2\pi}{3}, \frac{5\pi}{3}$

(74)  $\cos^2 x = \frac{3}{4}$   $(0^\circ, 360^\circ)$   
 $\cos x = \pm \frac{\sqrt{3}}{2}$    
 $x = 30^\circ, 150^\circ, 210^\circ, 330^\circ$

(75)  $\sin^2 x + \sin x = 0$   $[0, 2\pi)$   
 $\sin x (\sin x + 1) = 0$   
 $\sin x = 0$      $\sin x = -1$   
  
 $x = 0, \pi, \frac{3\pi}{2}$

(76)  $\cos^2 x + 2\cos x - 3 = 0$   $[0^\circ, 360^\circ)$   
 $(\cos x + 3)(\cos x - 1) = 0$   
 $\cos x = -3$      $\cos x = 1$   
 DNE  
 $x = 0^\circ$

$\frac{-3}{3-1}$