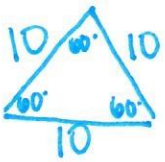
CBA #3 Review
PreCalculus

Name: _____

1. Find the perimeter and area of an equilateral triangle with sides of length 10 inches.



↑add all sides ↑All sides and angles equal

Perimeter = 10+10+10
30in

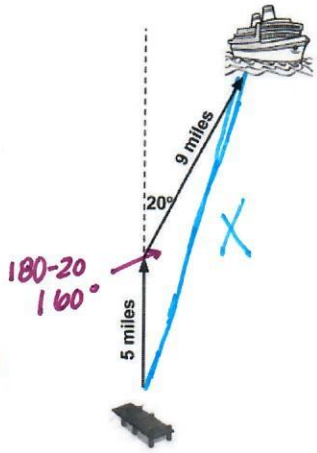
$A = \frac{1}{2}bh$ OR $\frac{1}{2}ab\sin C$

$\frac{1}{2}(10)(10)\sin 60° = 50\left(\frac{\sqrt{3}}{2}\right) = 25\sqrt{3}$

Area = $43.301 in^2$

~~could use~~ $A = \sqrt{s(s-a)(s-b)(s-c)}$ also!

2. A ship leaves a port traveling due north. After 5 miles, the ship turns 20° east of north and travels 9 more miles. At this point, how far is the ship from the port?



SAS → law of cosines

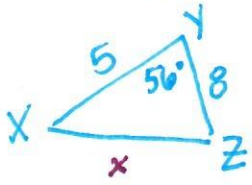
$x^2 = 9^2 + 5^2 - 2(9)(5)\cos 160°$

$\sqrt{x^2} = \sqrt{190.572}$

$x = 13.805$

13.805 mi

3. In triangle XYZ, XY=5mm, YZ=8mm, and m<Y=56°. Find the length of XZ to the nearest tenth of a millimeter.



SAS → law of cosines

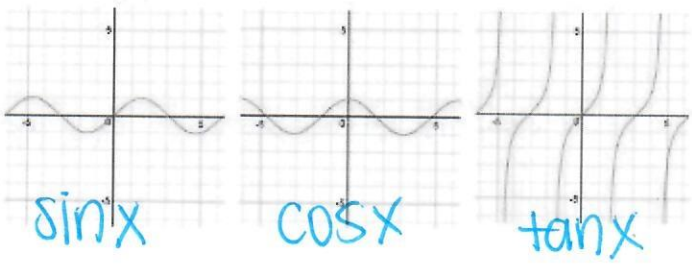
$x^2 = 5^2 + 8^2 - 2(5)(8)\cos 56°$

$\sqrt{x^2} = \sqrt{44.265}$

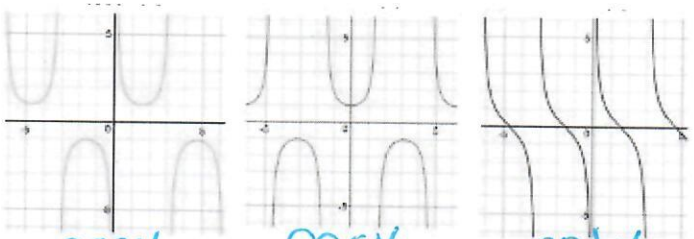
$x = 6.653$

6.7mm

4. Match the six trigonometric parent functions with their graph. (cosx, sinx, cscx, secx, tanx, cotx)



sinx cosx tanx



cscx secx cotx

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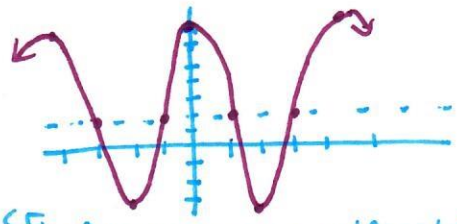
5. A trigonometric function is shown below.

$$f(x) = 5\cos x + 2$$

(starts @ top) no phaseshift or period change



Which key feature(s) are true for the function?

I. The graph has reflectional symmetry over the x-axis FALSE → symmetric over y-axis

II. The domain of the graph is all real numbers and the range is [-3,7] TRUE!

III. The function has zeros at kπ, where k is an odd integer.

FALSE → x-intercepts are not at pretty #s

6. A trigonometric function is shown below.

$$f(x) = 7\sin\left(x + \frac{\pi}{6}\right) - 4$$

$y = C + A\sin B(x - D)$

$-4 + 7\sin 1(x + \pi/6)$

List the transformations

- A • Amplitude: 7
- D • Phase shift: $-\pi/6$ (left)
- C • Vertical shift: down 4
- $2\pi/B$ • Period: 2π

7. An ice cream truck that plays loud music is circling Chuby's neighborhood. C(t) models the volume of the music (in dB) that Chuby hears, t minutes after the truck arrives in his neighborhood.

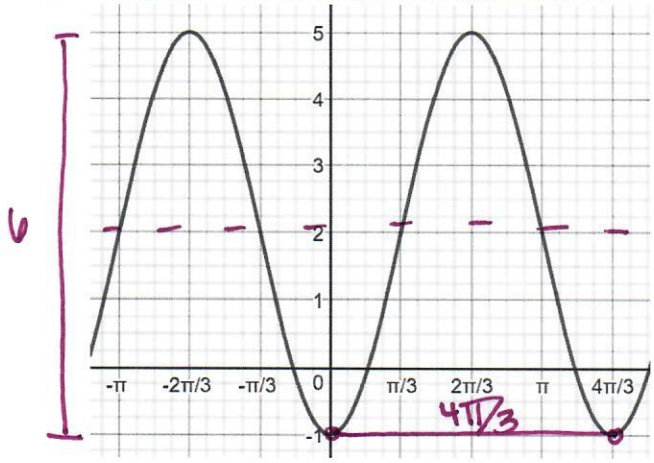
$$C(t) = -15\cos\left(\frac{2\pi}{15}t\right) + 65$$

$B = \frac{2\pi}{15}$

What is the period of this function?

period = $\frac{2\pi}{B}$ (time to complete one cycle) $= 2\pi \div \frac{2\pi}{15} \Rightarrow 2\pi \cdot \frac{15}{2\pi}$ **15 minutes**

8. The graph of a sinusoidal function is shown.



$A = 6/2 = 3$

$B = 2\pi \div \frac{4\pi}{3} \Rightarrow 2\pi \cdot \frac{3}{4\pi} = \frac{3}{2}$

$C = 2$

D = FOR SINE $\pi/3$ OR $-\pi$ (middle pt going up)

FOR COSINE $-2\pi/3$ OR $2\pi/3$ (high point)

Write a sine function and a cosine function to represent the graph.

$y = 3\sin\frac{3}{2}(x - \frac{\pi}{3}) + 2$ (etc)

$y = 3\cos\frac{3}{2}(x + 2\pi/3) + 2$ (etc)

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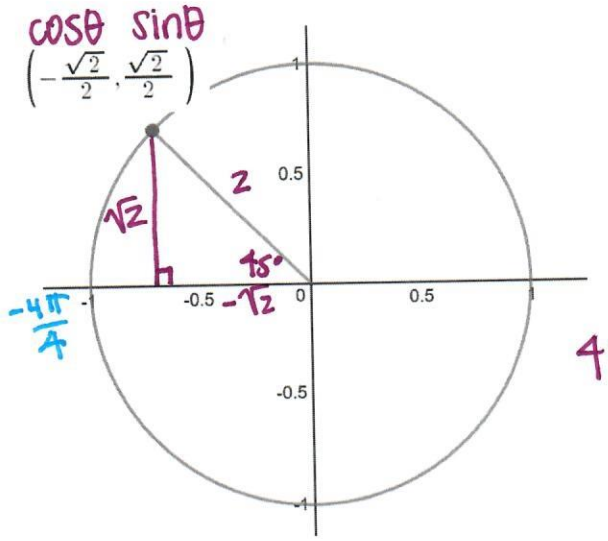
9. The terminal side of an angle is modeled in the diagram below. Which angle rotation(s) could be represented by the terminal side in the diagram?



I. 45°
II. $\frac{3\pi}{4}$
III. 135°
IV. $-\frac{5\pi}{4}$

coterminal angles: ±2π OR ±360

45° OR π/4 reference angle in QII

10. A trigonometric expression is shown below. use formula chart!

$$\frac{\sin^2\theta - 1}{\cos\theta}$$

$\cos^2\theta + \sin^2\theta = 1$

$\frac{\sin^2\theta - (\cos^2\theta + \sin^2\theta)}{\cos\theta}$

$\frac{\sin^2\theta - \cos^2\theta - \sin^2\theta}{\cos\theta}$

$\frac{-\cos^2\theta}{\cos\theta}$

Which expression represents the given trigonometric expression in simplified form?

A. $\cos\theta$ B. $-\cos\theta$ C. $-\cos^2\theta$ D. $\tan\theta$

11. A trigonometric equation is shown below.

$$4\sin\theta + \frac{3\sqrt{3}}{2} = \sin\theta \text{, where } 0 < \theta < 2\pi$$

What is the solution to the trigonometric equation over the given interval? (on unit circle)

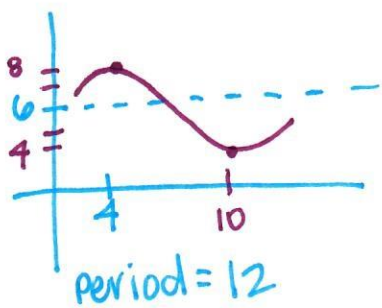
$4\sin\theta + \frac{3\sqrt{3}}{2} = \sin\theta$
$-4\sin\theta \quad -4\sin\theta$
$\frac{3\sqrt{3}}{2} = -3\sin\theta$
$\frac{3\sqrt{3}}{2} \div -3 = \frac{-3\sin\theta}{-3}$
$\sin^{-1}\left(-\frac{\sqrt{3}}{2}\right) = \theta$
SIA

$\sin^{-1}\left(-\frac{\sqrt{3}}{2} = \sin\theta\right)$

60° OR π/3 reference angle

$\frac{4\pi}{3}$ & $\frac{5\pi}{3}$

12. The average depth of water at the end of a dock is 6 feet. This varies 2 feet in both directions with the tide. Suppose there is a high tide at 4 AM. If the tide goes from low to high every 6 hours, write a cosine function d(t) describing the depth of the water as a function of time with t = 4 corresponding to 4 AM.



A: 2
B: $2\pi/12 = \pi/6$
C: 6
D: cosine

$d(t) = 6 + 2\cos\frac{\pi}{6}(x-4)$