Name: _____ **Christmas Break**

1. Expressed as a function of a positive acute angle, $\cos(-305°)$ is equal to

(1) $-\cos 55°$
(2) $\cos 55°$
(3) $-\sin 55°$
(4) $\sin 55°$

2. What is the period of the function $f(\theta) = -2\cos 3\theta$?

(1) π
(2) $\frac{2\pi}{3}$
(3) $\frac{3\pi}{2}$
(4) 2π

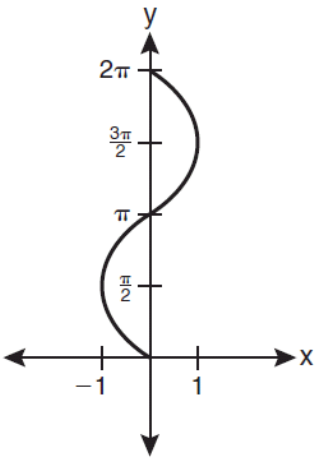
3. The value of $\tan 126°43'$ to the *nearest ten-thousandth* is

(1) -1.3407
(2) -1.3408
(3) -1.3548
(4) -1.3549

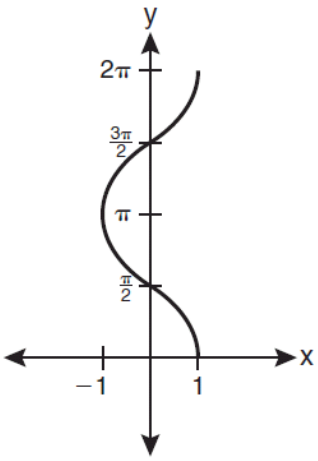
4. The expression $\frac{\sin^2\theta + \cos^2\theta}{1 - \sin^2\theta}$ is equivalent to

(1) $\cos^2\theta$
(2) $\sin^2\theta$
(3) $\sec^2\theta$
(4) $\csc^2\theta$

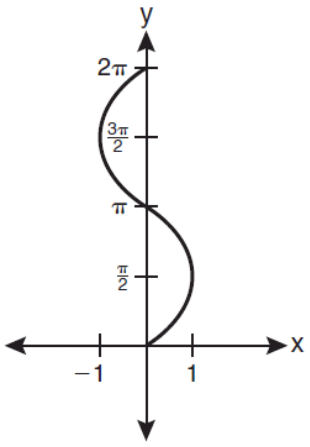
5. Which graph shows $y = \cos^{-1} x$?



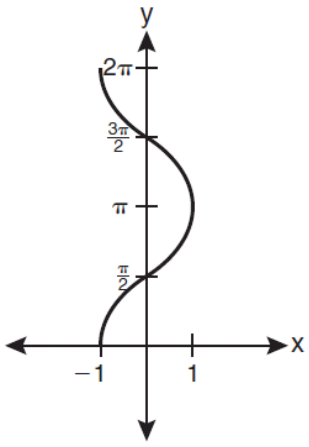
(1)



(3)



(2)



(4)

6. If $\sin A = \frac{2}{3}$ where $0° < A < 90°$, what is the value of $\sin 2A$?

(1) $\frac{2\sqrt{5}}{3}$

(2) $\frac{2\sqrt{5}}{9}$

(3) $\frac{4\sqrt{5}}{9}$

(4) $-\frac{4\sqrt{5}}{9}$

7. What is the radian measure of the smaller angle formed by the hands of a clock at 7 o'clock?

(1) $\frac{\pi}{2}$

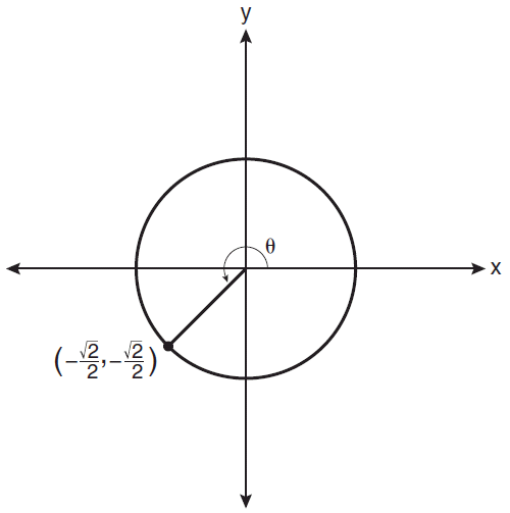
(2) $\frac{2\pi}{3}$

(3) $\frac{5\pi}{6}$

(4) $\frac{7\pi}{6}$

8. Express as a single fraction the exact value of $\sin 75°$.

9. In the diagram below of a unit circle, the ordered pair $\left(-\frac{\sqrt{2}}{2}, -\frac{\sqrt{2}}{2}\right)$ represents the point where the terminal side of θ intersects the unit circle.



What is $m\angle\theta$?

(1) 45

(2) 135

(3) 225

(4) 240

10. If $\sin^{-1}\left(\frac{5}{8}\right) = A$, then

(1) $\sin A = \frac{5}{8}$

(2) $\sin A = \frac{8}{5}$

(3) $\cos A = \frac{5}{8}$

(4) $\cos A = \frac{8}{5}$

11. How many distinct triangles can be formed if $m\angle A = 35$, $a = 10$, and $b = 13$?

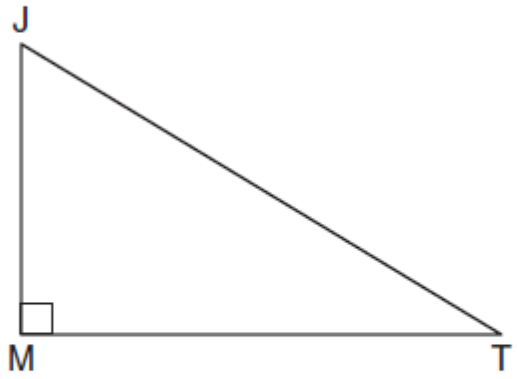
(1) 1

(2) 2

(3) 3

(4) 0

12. In the diagram below of right triangle JTM, $JT = 12$, $JM = 6$, and $m\angle JMT = 90$.



What is the value of $\cot J$?

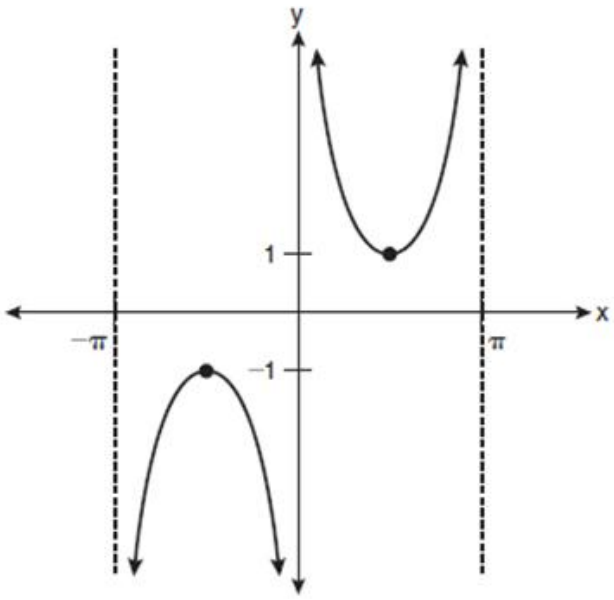
(1) $\frac{\sqrt{3}}{3}$

(2) 2

(3) $\sqrt{3}$

(4) $\frac{2\sqrt{3}}{3}$

13. Which equation is sketched in the diagram below?



(1) $y = \csc x$
(2) $y = \sec x$
(3) $y = \cot x$
(4) $y = \tan x$

14. Starting with $\sin^2 A + \cos^2 A = 1$, derive the formula $\tan^2 A + 1 = \sec^2 A$.

15. In $\triangle ABC$, $m\angle A = 32$, $a = 12$, and $b = 10$. Find the measures of the missing angles and side $\triangle ABC$. Round each measure to the *nearest tenth*.

16. What is the radian measure of an angle whose measure is $-420°$?

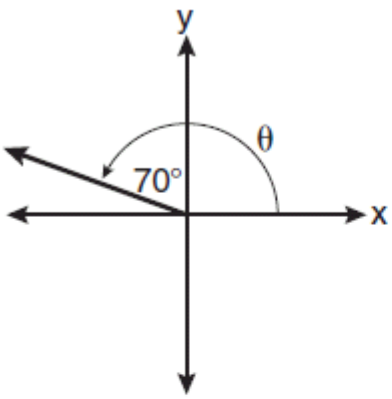
(1) $-\frac{7\pi}{3}$

(2) $-\frac{7\pi}{6}$

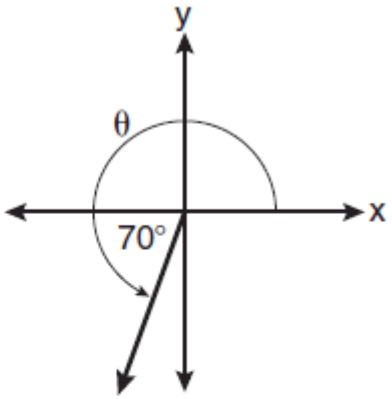
(3) $\frac{7\pi}{6}$

(4) $\frac{7\pi}{3}$

17. In which graph is θ coterminal with an angle of $-70°$?



(1)



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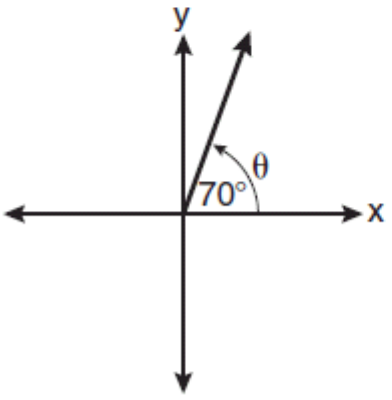

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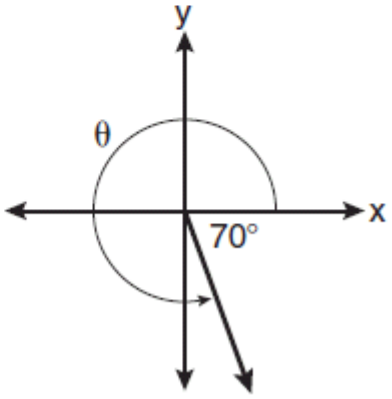


(4)

18. In $\triangle ABC$, $m\angle A = 74$, $a = 59.2$, and $c = 60.3$. What are the two possible values for $m\angle C$, to the *nearest tenth*?

(1) 73.7 and 106.3

(2) 73.7 and 163.7

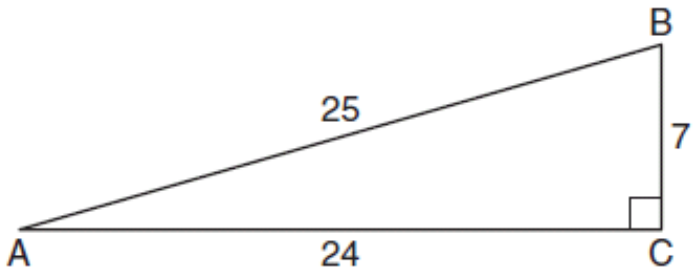
(3) 78.3 and 101.7

(4) 78.3 and 168.3

19. What is the principal value of $\cos^{-1}\left(-\frac{\sqrt{3}}{2}\right)$?

(1) $-30°$
(2) $60°$
(3) $150°$
(4) $240°$

20. Which ratio represents csc A in the diagram below?



(1) $\frac{25}{24}$
(2) $\frac{25}{7}$
(3) $\frac{24}{7}$
(4) $\frac{7}{24}$

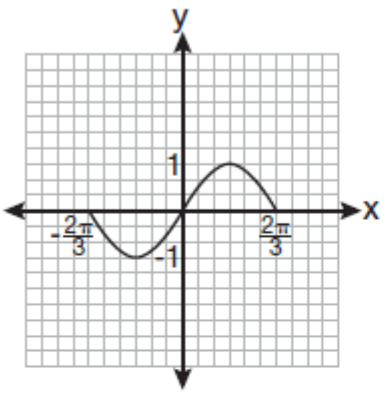
21. In $\triangle ABC$, $a = 3$, $b = 5$, and $c = 7$. What is $m\angle C$?

(1) 22
(2) 38
(3) 60
(4) 120

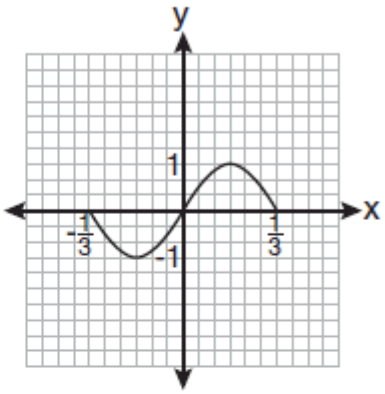
22. The sides of a parallelogram measure 10 cm and 18 cm. One angle of the parallelogram measures 46 degrees. What is the area of the parallelogram, to the *nearest square centimeter*?

(1) 65
(2) 125
(3) 129
(4) 162

23. Which graph represents one complete cycle of the equation $y = \sin 3\pi x$?



(1)



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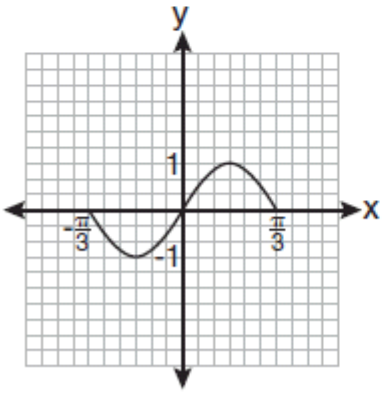
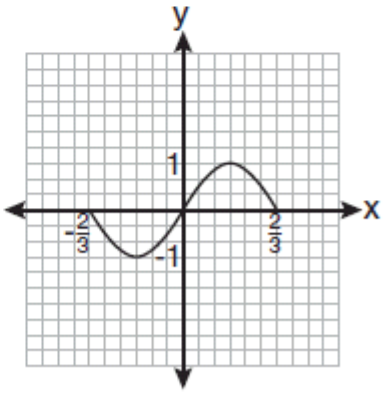


(2)



(4)

24. Solve the equation $2 \tan C - 3 = 3 \tan C - 4$ algebraically for all values of C in the interval $0° \leq C < 360°$.

25. If $\tan A = \frac{2}{3}$ and $\sin B = \frac{5}{\sqrt{41}}$ and angles A and B are in Quadrant I, find the value of $\tan (A + B)$.

26. What is the number of degrees in an angle whose radian measure is $\frac{11\pi}{12}$?

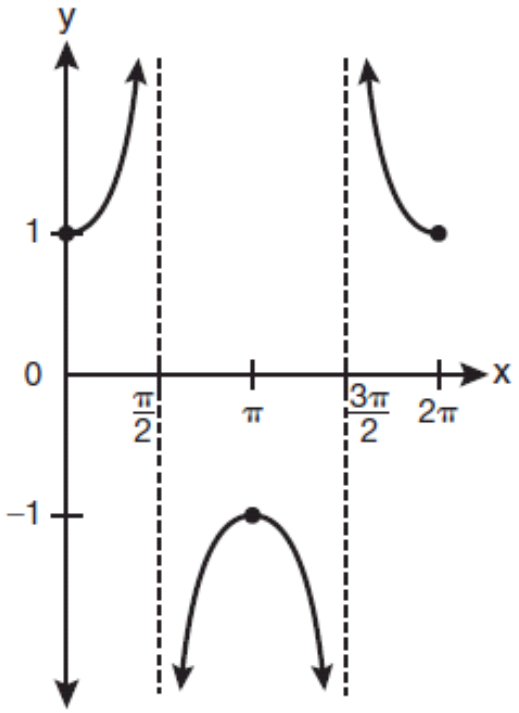
(1) 150

(2) 165

(3) 330

(4) 518

27. Which equation is represented by the graph below?



(1) $y = \cot x$

(2) $y = \csc x$

(3) $y = \sec x$

(4) $y = \tan x$

28. The expression $\cos^2 \theta - \cos 2\theta$ is equivalent to

(1) $\sin^2 \theta$

(2) $-\sin^2 \theta$

(3) $\cos^2 \theta + 1$

(4) $-\cos^2 \theta - 1$

29. What is the period of the function $y = \frac{1}{2}\sin\left(\frac{x}{3} - \pi\right)$?

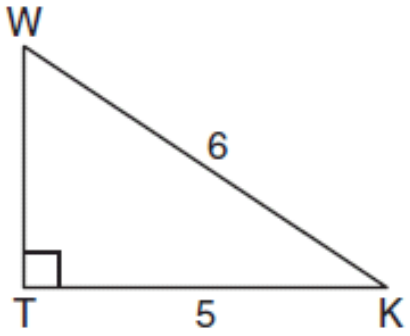
(1) $\frac{1}{2}$

(2) $\frac{1}{3}$

(3) $\frac{2}{3}\pi$

(4) 6π

30. In the diagram below of right triangle KTW, $KW = 6$, $KT = 5$, and $m\angle KTW = 90$.



What is the measure of $\angle K$, to the *nearest minute*?

(1) 33°33'
(2) 33°34'
(3) 33°55'
(4) 33°56'

31. Two sides of a parallelogram are 24 feet and 30 feet. The measure of the angle between these sides is 57°. Find the area of the parallelogram, to the *nearest square foot*.

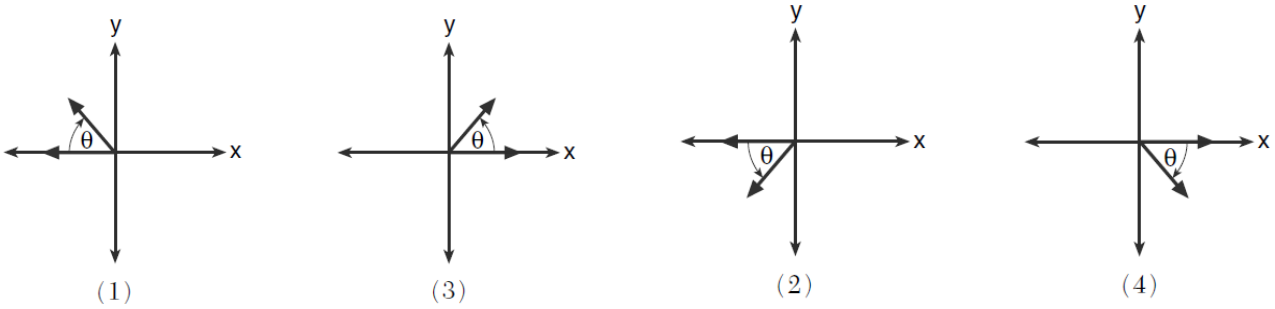
32. Find all values of θ in the interval $0° \leq \theta < 360°$ that satisfy the equation $\sin 2\theta = \sin \theta$.

33. In a triangle, two sides that measure 6 cm and 10 cm form an angle that measures 80°. Find, to the *nearest degree*, the measure of the smallest angle in the triangle.

34. What is the solution set for $2\cos\theta - 1 = 0$ in the interval $0° \leq \theta < 360°$?

(1) $\{30°, 150°\}$
(2) $\{60°, 120°\}$
(3) $\{30°, 330°\}$
(4) $\{60°, 300°\}$

35. If $m\angle\theta = -50$, which diagram represents θ drawn in standard position?



(1) (3) (2) (4)

36. A circle is drawn to represent a pizza with a 12 inch diameter. The circle is cut into eight congruent pieces. What is the length of the outer edge of any one piece of this circle?

(1) $\frac{3\pi}{4}$
(2) π
(3) $\frac{3\pi}{2}$
(4) 3π

37. The value of csc 138°23′ rounded to four decimal places is

(1) −1.3376
(2) −1.3408
(3) 1.5012
(4) 1.5057

38. What is a positive value of $\tan \frac{1}{2}x$, when $\sin x = 0.8$?

(1) 0.5
(2) 0.4
(3) 0.33
(4) 0.25

39. In $\triangle MNP$, $m = 6$ and $n = 10$. Two distinct triangles can be constructed if the measure of angle M is

(1) 35
(2) 40
(3) 45
(4) 50

40. The formula for continuously compounded interest is $A = Pe^{rt}$, where A is the amount of money in the account, P is the initial investment, r is the interest rate, and t is the time in years.

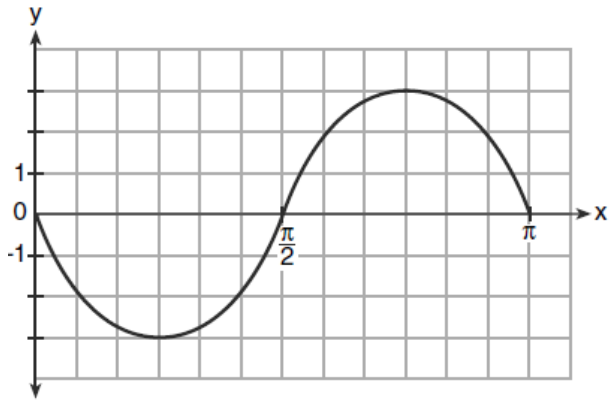
Using the formula, determine, to the *nearest dollar*, the amount in the account after 8 years if \$750 is invested at an annual rate of 3%.

41. Express $\cos \theta (\sec \theta - \cos \theta)$, in terms of $\sin \theta$.

42. Find, to the *nearest tenth*, the radian measure of 216°.

43. The two sides and included angle of a parallelogram are 18, 22, and 60°. Find its exact area in simplest form.

44. Write an equation for the graph of the trigonometric function shown below.



45. The measures of the angles between the resultant and two applied forces are 60° and 45°, and the magnitude of the resultant is 27 pounds. Find, to the *nearest pound*, the magnitude of each applied force.

Area of a Triangle

$$K = \frac{1}{2} ab \sin C$$

Functions of the Sum of Two Angles

$$\sin (A + B) = \sin A \cos B + \cos A \sin B$$
$$\cos (A + B) = \cos A \cos B - \sin A \sin B$$
$$\tan (A + B) = \frac{\tan A + \tan B}{1 - \tan A \tan B}$$

Functions of the Difference of Two Angles

$$\sin (A - B) = \sin A \cos B - \cos A \sin B$$
$$\cos (A - B) = \cos A \cos B + \sin A \sin B$$
$$\tan (A - B) = \frac{\tan A - \tan B}{1 + \tan A \tan B}$$

Law of Sines

$$\frac{a}{\sin A} = \frac{b}{\sin B} = \frac{c}{\sin C}$$

Sum of a Finite Arithmetic Series

CoFunctions: examples

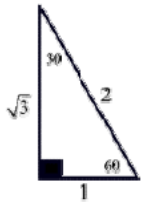
$\sin\theta = \cos(90° - \theta)$; $\tan\theta = \cot(90° - \theta)$

Inverse notation:

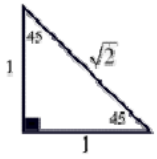
$\arcsin(x) = \sin^{-1}(x)$
$\arccos(x) = \cos^{-1}(x)$
$\arctan(x) = \tan^{-1}(x)$

Arc Length of a Circle $= \theta r$ (in radians)

Special Right Triangles



30°-60°-90° triangle
side opposite 30° = ½ hypotenuse
side opposite 60° = ½ hypotenuse $\sqrt{3}$



45°-45°-90° triangle
hypotenuse = leg $\sqrt{2}$
leg = ½ hypotenuse $\sqrt{2}$

Area of triangle: $A = \frac{1}{2} ab \sin C$
Area of parallelogram: $A = ab \sin C$

Pythagorean Identities:

$\sin^2\theta + \cos^2\theta = 1$ $\quad \tan^2\theta + 1 = \sec^2\theta$
$1 + \cot^2\theta = \csc^2\theta$

Law of Cosines

$$a^2 = b^2 + c^2 - 2bc \cos A$$

Functions of the Double Angle

$$\sin 2A = 2 \sin A \cos A$$
$$\cos 2A = \cos^2 A - \sin^2 A$$
$$\cos 2A = 2 \cos^2 A - 1$$
$$\cos 2A = 1 - 2 \sin^2 A$$
$$\tan 2A = \frac{2 \tan A}{1 - \tan^2 A}$$

Functions of the Half Angle

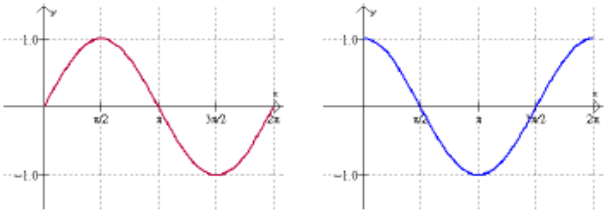
$$\sin \frac{1}{2} A = \pm \sqrt{\frac{1 - \cos A}{2}}$$
$$\cos \frac{1}{2} A = \pm \sqrt{\frac{1 + \cos A}{2}}$$
$$\tan \frac{1}{2} A = \pm \sqrt{\frac{1 - \cos A}{1 + \cos A}}$$

Trig Functions

$$\sin\theta = \frac{o}{h}; \quad \cos\theta = \frac{a}{h}; \quad \tan\theta = \frac{o}{a}$$
$$\csc\theta = \frac{h}{o}; \quad \sec\theta = \frac{h}{a}; \quad \cot\theta = \frac{a}{o}$$

Trig Graphs

$\sin x$ $\qquad$ $\cos x$



sinusoidal curve = any curve expressed as
$y = A \sin(B(x - C)) + D$

amplitude (A) = ½ | max − min| *(think height)*

period = horizontal length of 1 complete cycle

frequency (B) = number of cycles in 2π (period)

horizontal shift (C) – movement left/right

vertical shift (D) – movement up/down

Name: _____ **Date:** _____

Trigonometry Answer Sheet

1._____	16. _____	31. _____
2._____	17. _____	32. _____
3._____	18. _____	33. _____
4._____	19. _____	34. _____
5._____	20. _____	35. _____
6._____	21. _____	36. _____
7._____	22. _____	37. _____
8._____	23. _____	38. _____
9._____	24. _____	39. _____
10._____	25. _____	40. _____
11._____	26. _____	41. _____
12._____	27. _____	42. _____
13._____	28. _____	43. _____
14._____	29. _____	44. _____
15._____	30. _____	45. _____