

# LaSalle Institute

## Summer Math Work

For students who have completed

## Algebra 2 / Trigonometry

Directions:

- Answer Every Problem
- Work is to be shown in the packet.
- If you need more room attach loose leaf paper.
- Hand in completed assignment to your teacher on the first day of class.
- Your teacher will review the work.
- A review TEST will be given in the first two weeks of school, for a grade.

Thank you,

Michelle Moloney

Algebra 2/Trigonometry Teacher

## Assignment

Date \_\_\_\_\_ Period \_\_\_\_\_

State the quadrant in which the terminal side of each angle lies.

1)  $\frac{15\pi}{4}$

2)  $-465^\circ$

3)  $-299^\circ$

4)  $233^\circ$

5)  $\frac{10\pi}{3}$

6)  $310^\circ$

7)  $\frac{41\pi}{18}$

8)  $\frac{11\pi}{6}$

9)  $-\frac{53\pi}{18}$

10)  $570^\circ$

11)  $-\frac{2\pi}{3}$

12)  $-\frac{10\pi}{3}$

13)  $-\frac{23\pi}{6}$

14)  $\frac{8\pi}{3}$

15)  $-377^\circ$

16)  $-220^\circ$

17)  $-635^\circ$

18)  $-\frac{14\pi}{9}$

19)  $650^\circ$

20)  $-\frac{10\pi}{9}$

Trig Functions

1) In right triangle RST,  $\angle T$  is the right angle. If  $\sin R = \frac{\sqrt{5}}{3}$ , find:

a.)  $\cos R$

b.)  $\tan S$

c.)  $\csc R$

d.)  $\sec S$

e.)  $m\angle R$  to the nearest ten minutes

2) Which of the following angles is coterminal with  $825^\circ$  ?

A)  $625^\circ$

C)  $75^\circ$

B)  $105^\circ$

D)  $365^\circ$

3) Which of the following angles is coterminal with  $-820^\circ$  ?

A)  $100^\circ$

C)  $-260^\circ$

B)  $260^\circ$

D)  $180^\circ$

4) In which quadrant does the angle  $635^\circ$  lie?

5) In which quadrant does the angle  $-635^\circ$  lie?

## Exponents and Logs

1. If  $\log_2 9 = x$ , find  $x$  to the nearest tenth.

2. Find the value of  $x^{-1}(3x^{\frac{1}{3}} + x^0)$  if  $x = 8$ .

3. The expression  $2\log a - \log b$  is equivalent to:

1)  $\frac{2\log a}{\log b}$       2)  $\log\left(\frac{a}{b}\right)^2$       3)  $\log(a^2 - b)$       4)  $\log\frac{a^2}{b}$

4. The expression  $\log\sqrt{7^3}$  is equivalent to:

1)  $\frac{2}{3}\log 7$       2)  $\frac{3}{2}\log 7$       3)  $3\log\frac{7}{2}$       4)  $\frac{1}{2}\log 3 \cdot 7$

5. Find  $x$  to the nearest hundredth:

$$x^{2.2} = 237$$

6. Solve for  $x$ :  $\log_8(x-6) + \log_8(x+6) = 2$

7. Given  $\log 4 = x$  and  $\log 5 = y$ .

Name: \_\_\_\_\_

Period: \_\_\_\_\_

1.  $2\sqrt{3x+4} = 10$

A. -7

B. 7

C. 21

D.  $\frac{25}{3}$

1. \_\_\_\_\_

2.  $\sqrt[3]{3x+1} = 4$

2. \_\_\_\_\_

3.  $\left(\frac{1}{3}\right)^x = 27^{x+2}$

3. \_\_\_\_\_

4.  $6^{2x-1} = 36^{-x}$

4. \_\_\_\_\_

5. Solve  $\log_{16}x = -\frac{1}{2}$

5. \_\_\_\_\_

6. Solve  $\log_2(x+1) + \log_2(x-5) = 4$

A. 5

B. 6

C. 7

D. 8

6. \_\_\_\_\_

7.  $\log_6 10 + \log_6 x = \log_6 40$

7. \_\_\_\_\_

8. Solve  $\ln 3x = 1$

A. 20.0855

B. 0.3333

C. 0.9.61

D. 8.1548

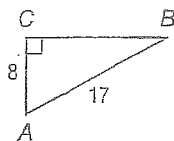
8. \_\_\_\_\_

9. What is the period for  $f(x) = 3\sin \frac{\theta}{2}$  \_\_\_\_\_  
 A.  $3\pi$       B.  $\frac{1}{2}\pi$       C.  $\pi$       D.  $2\pi$

10. What is the reference angle for  $150^\circ$ ? \_\_\_\_\_  
 F.  $150^\circ$       G.  $60^\circ$       H.  $-210^\circ$       J.  $30^\circ$

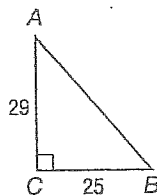
11. Find the exact value of  $\sin \theta$  if the terminal side of  $\theta$  in standard position \_\_\_\_\_ contains the point  $(-4, -3)$ .  
 F.  $-\frac{4}{5}$       G.  $-\frac{3}{5}$       H.  $\frac{3}{5}$       J.  $\frac{4}{5}$

12. Find the value of  $\csc A$ . \_\_\_\_\_  
 A.  $\frac{8}{17}$       C.  $\frac{17}{15}$   
 B.  $\frac{17}{8}$       D.  $\frac{15}{17}$

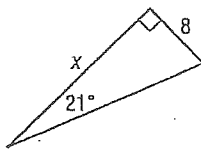


13. Rewrite  $\frac{2\pi}{9}$  radians in degree measure. \_\_\_\_\_  
 F.  $20^\circ$       G.  $80^\circ$       H.  $40^\circ$       J.  $\frac{40^\circ}{\pi}$

14. Find  $A$  to the nearest degree. \_\_\_\_\_  
 A.  $49^\circ$       C.  $37^\circ$   
 B.  $41^\circ$       D.  $53^\circ$



15. Which equation can be used to find  $x$ ? \_\_\_\_\_  
 F.  $\sin 21^\circ = \frac{8}{x}$       H.  $\tan 21^\circ = \frac{x}{8}$   
 G.  $\tan 21^\circ = \frac{8}{x}$       J.  $\sin 21^\circ = \frac{x}{8}$



Name \_\_\_\_\_  
Trig Functions

Period: \_\_\_\_\_  
Date: \_\_\_\_\_

Write your final answers on the lines provided. Show work where possible.

1. Find the number of degrees equal to  $\frac{4\pi}{9}$  radians. \_\_\_\_\_

2. If  $\sin A > 0$  and  $\sec A < 0$ , in which quadrant does  $\angle A$  terminate? \_\_\_\_\_

3. What is the exact value of  $\cos 300^\circ + \sin 240^\circ$  \_\_\_\_\_

4. What is the exact value of  $\tan 300^\circ$  \_\_\_\_\_

5. What is the exact value of  $\sec 150^\circ$  \_\_\_\_\_

6. Express  $\cos 300^\circ$  as a function of a positive acute angle less than  $45^\circ$ . \_\_\_\_\_

7. Find the exact value of  $2 \cos 45^\circ + 2 \sin 60^\circ - \sin 30^\circ$  \_\_\_\_\_

8. Find, to the nearest second, the angle of elevation of the sun when a 25 ft. pole casts a shadow 8 ft. long. \_\_\_\_\_

9. Simplify  $\cot \theta \sec \theta$ .

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

G  $\sin \theta$

H  $\csc \theta$

J  $\sec^2 \theta$

10. \_\_\_\_\_

10. Find the period of  $y = 2 \tan \frac{2}{3} \theta$ .

A  $540^\circ$

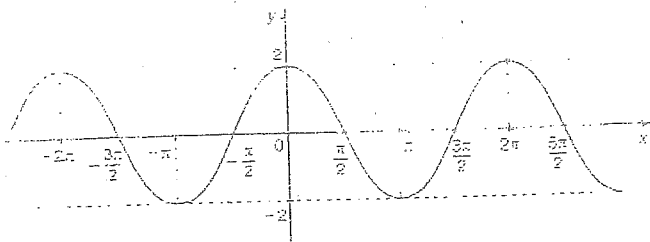
B  $270^\circ$

C  $240^\circ$

D  $120^\circ$

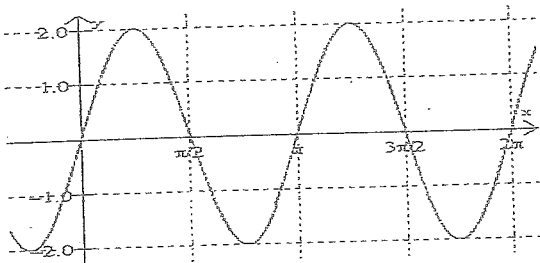
17. \_\_\_\_\_

11. State the name of the equations of the following graphs:



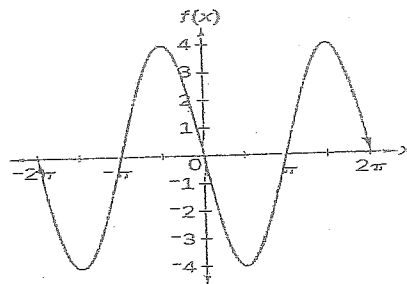
$f(x) =$  \_\_\_\_\_

12.



$f(x) =$  \_\_\_\_\_

13.



$f(x) =$  \_\_\_\_\_

Part B:

Write the letter for the correct answer in the blank at the right of each question.

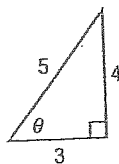
1. Find the value of  $\tan \theta$ .

A  $\frac{4}{3}$

C  $\frac{3}{4}$

B  $\frac{4}{5}$

D  $\frac{5}{3}$

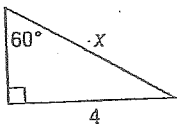


1. \_\_\_\_\_

2. Which equation can be used to find  $x$ ?

F  $\cos 60^\circ = \frac{4}{x}$       H  $\tan 60^\circ = \frac{x}{4}$

G  $\sin 60^\circ = \frac{4}{x}$       J  $\cot 60^\circ = \frac{4}{x}$



2. \_\_\_\_\_

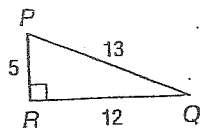
3. Find  $P$  to the nearest degree.

A  $21^\circ$

C  $23^\circ$

B  $67^\circ$

D  $69^\circ$



3. \_\_\_\_\_

4. Simplify  $\frac{1 - \cos^2 \theta}{\tan^2 \theta}$ .

F  $-\cos^2 \theta$

G  $\sec^2 \theta$

H  $\cos^2 \theta$

J  $\sin^2 \theta$

4. \_\_\_\_\_

5. Find the exact value of  $\cos\left(-\frac{\pi}{4}\right)$ .

F  $\frac{\sqrt{2}}{2}$

G  $-\frac{\sqrt{2}}{2}$

H  $\frac{\sqrt{3}}{2}$

J  $-\frac{\sqrt{3}}{2}$

5. \_\_\_\_\_



6.  $P\left(-\frac{4}{5}, -\frac{3}{5}\right)$  is located on the unit circle. Find  $\cos \theta$ .

A  $\frac{4}{5}$

B  $-\frac{4}{5}$

C  $-\frac{3}{5}$

D  $\frac{3}{4}$

6. \_\_\_\_\_

7. Which expression is equivalent to  $\frac{\sin^2 \theta + \cos^2 \theta}{\tan^2 \theta}$ ?

A  $\cot^2 \theta$

B  $\cos^2 \theta + \cot^2 \theta$

C  $\cos^2 \theta + \cos^4 \theta$

D  $\csc^2 \theta$

7. \_\_\_\_\_

8. Which angle is coterminal with a  $90^\circ$  angle in standard position?

F  $540^\circ$

G  $450^\circ$

H  $-90^\circ$

J  $270^\circ$

8. \_\_\_\_\_

6. \_\_\_\_\_

For Questions 9 and 10, find the exact value of each trigonometric function.

9.  $\cos \frac{2\pi}{3}$

9. \_\_\_\_\_

10.  $\sin -630^\circ$

10. \_\_\_\_\_

11. Simplify  $-5(\cot^2 \theta - \csc^2 \theta)$ .

A 5

B -5

C  $-5 \csc^2 \theta$

D  $5 \sec^2 \theta$

11. \_\_\_\_\_

12. Find the exact value of  $\cos \theta$  if  $\sin \theta = \frac{7}{9}$  and  $90^\circ < \theta < 180^\circ$ .

A  $\frac{2}{9}$

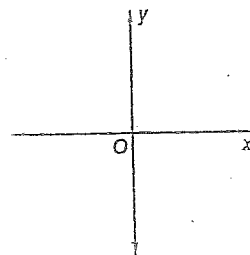
B  $-\frac{\sqrt{2}}{3}$

C  $\frac{4\sqrt{2}}{9}$

D  $\frac{4\sqrt{2}}{9}$

12. \_\_\_\_\_

13. Sketch the angle with measure  $-\frac{7\pi}{4}$  radians. Then find its reference angle.



SHOW ALL WORK

1. Verify that  $1 = \csc^2 \theta - \frac{\csc^2 \theta}{\sec^2}$  is an identity.

2. For  $\triangle XYZ$  with  $X = 24^\circ$ ,  $Z = 90^\circ$ ,  $y = 13.7$ , and  $z = 15$ , show three distinctly different ways to find the length  $x$  of the third side of the triangle. Round to the nearest tenth.

Name: \_\_\_\_\_

Period: \_\_\_\_\_

Date: \_\_\_\_\_

Simplify Completely:

Algebra 2

$$1. \frac{6x-18}{4x^2} \cdot \frac{x^3}{2x-6}$$

$$4. \frac{9x+18}{x^2-2x-8} \div \frac{6x}{3x-12}$$

$$2. \frac{2x+14}{x^2-1} \div \frac{x^2-49}{x^2-6x-7}$$

$$5. \frac{3}{x-1} - \frac{1}{x}$$

$$3. \frac{3x}{2x-6} + \frac{9}{4x-12}$$

$$6. \frac{x^2-2x-8}{x^2+5x+6} \cdot \frac{x^2+5x}{2x-8} \div \frac{x^2+2x-15}{x^2-9}$$

## Review of Amplitude, Frequency, and Period

### General Form of the Equation for Sine and Cosine Functions:

$$y = a \sin bx$$

$a = \text{amplitude}$

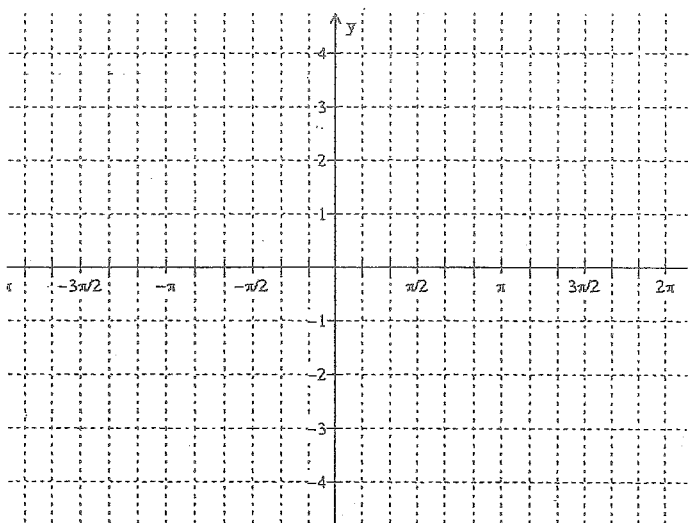
$$y = a \cos bx$$

$b = \text{frequency}$

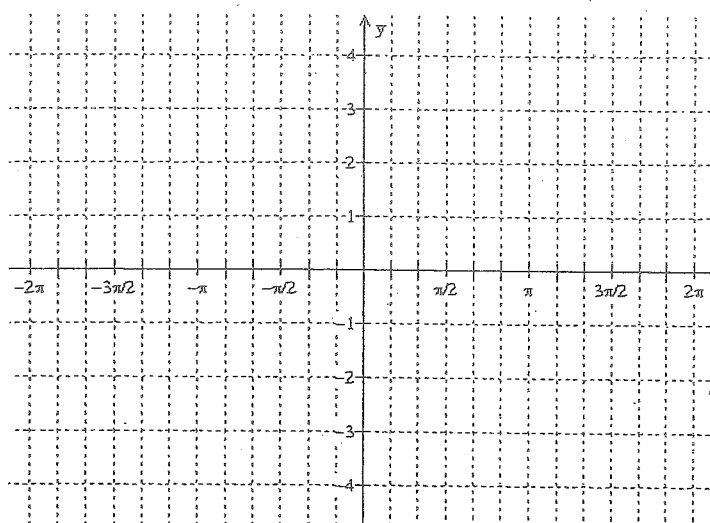
$$\text{Period} \rightarrow P = \frac{2\pi}{b}$$

**Directions:** Graph the following over the interval  $0 \leq x \leq 2\pi$ . List the amplitude, period, and frequency for each graph.

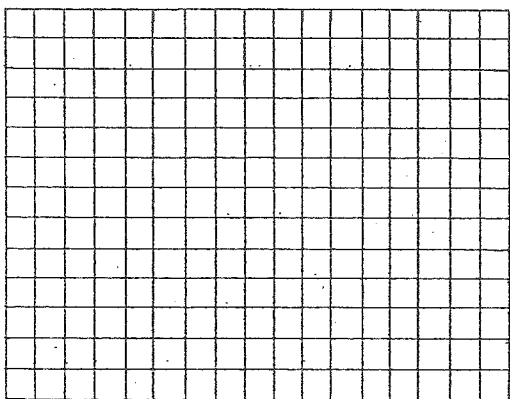
1.  $y = 3 \sin x$



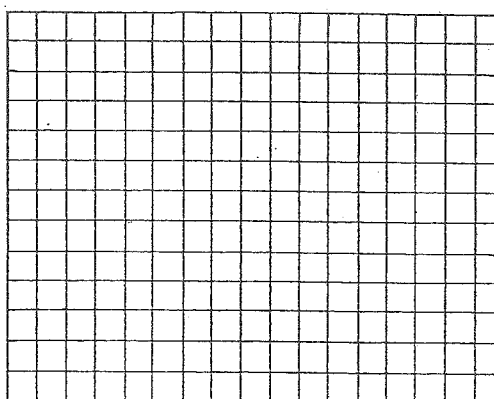
3.  $y = -4 \cos x$



2.  $y = 2 \sin 2x$



4.  $y = 3 \cos \frac{1}{2}x$



Log Applications - Classwork - Day 4  
Solving Exponential Equations

Solve and check. Round to the nearest tenth.

1.  $7^x = 7^4$

2.  $5^{3x} = 25$

3.  $\log_4 x = 1/2$

4.  $\log x = 3$

5.  $5 = \log_x \frac{1}{32}$

6.  $9^x = 6$

7.  $10^x + 4 = 32$

8.  $\log_3(2x + 1) = 2$

Sketch

7)  $-510^\circ$

8)  $-\frac{19\pi}{18}$

9)  $-\frac{13\pi}{12}$

10)  $-250^\circ$

State if the given angles are coterminal.

11)  $185^\circ, -545^\circ$

12)  $\frac{17\pi}{36}, \frac{161\pi}{36}$

Find a coterminal angle between  $0^\circ$  and  $360^\circ$ .

13)  $-330^\circ$

14)  $-435^\circ$

15)  $640^\circ$

16)  $-442^\circ$

Find a coterminal angle between 0 and  $2\pi$  for each given angle.

17)  $\frac{11\pi}{3}$

18)  $-\frac{35\pi}{18}$

19)  $\frac{15\pi}{4}$

20)  $-\frac{19\pi}{12}$

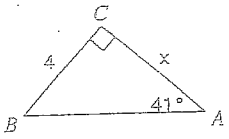
Find a positive and a negative coterminal angle for each given angle.

21)  $\frac{5\pi}{4}$

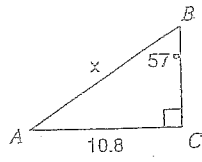
22)  $\frac{25\pi}{36}$

Solve for  $x$

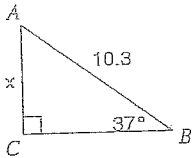
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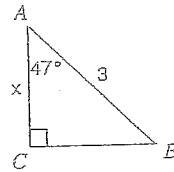
14)



5)

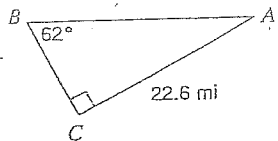


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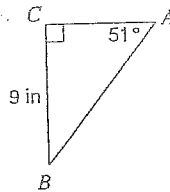


Solve each triangle. Round answers to the nearest tenth.

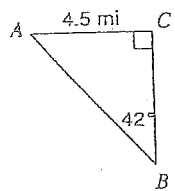
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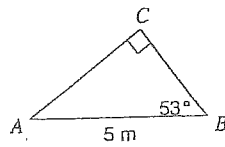
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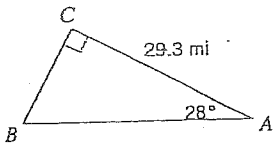
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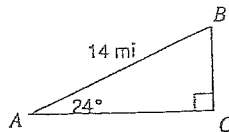
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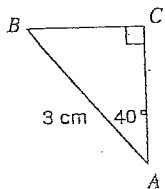
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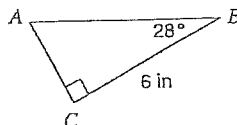
22)



23)

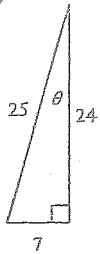


24)

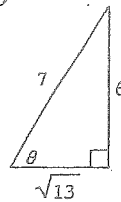


solve for  $\theta$

13)  $\tan \theta$



14)  $\sin \theta$



Find the value of each. Round your answers to the nearest ten-thousandth.

15)  $\cos 10^\circ$

16)  $\sin 60^\circ$

17)  $\csc 21^\circ$

18)  $\cos 60^\circ$

19)  $\tan 40^\circ$

20)  $\csc 59^\circ$

21)  $\csc 56^\circ$

22)  $\cot 65^\circ$

23)  $\tan 10^\circ$

24)  $\tan 25^\circ$

Find the value of the trig function indicated.

25) Find  $\csc \theta$  if  $\tan \theta = \frac{3}{4}$

26) Find  $\cot \theta$  if  $\sec \theta = 2$

27) Find  $\tan \theta$  if  $\sin \theta = \frac{4}{5}$

28) Find  $\cot \theta$  if  $\sec \theta = \frac{5}{4}$

29) Find  $\sec \theta$  if  $\sin \theta = \frac{3\sqrt{13}}{13}$

30) Find  $\cot \theta$  if  $\sin \theta = \frac{12}{13}$

Critical think questions:

31) Draw a right triangle that has an angle with a tangent of 1.

32) What is the slope of the hypotenuse for #9? How does that compare to  $\tan \theta$ ? Why?