

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

Instructor: Joe Batters  
Course: Pre-Calculus Pre AP (Master Course)      Assignment: 7.3 Classwork

1. Solve the equation.

$$2 + 2 \sin \theta = 4 \cos^2 \theta$$

What is the solution in the interval  $0 \leq \theta < 2\pi$ ? Select the correct choice and fill in any answer boxes in your choice below.

- A. The solution set is { \_\_\_\_\_ }.  
(Simplify your answer. Type an exact answer, using  $\pi$  as needed. Type your answer in radians. Use integers or fractions for any numbers in the expression. Use a comma to separate answers as needed.)
- B. There is no solution.

2. What are the zeros of  $f(x) = 8 \sin^2 x - 4$  on the interval  $[0, 2\pi]$ ?

The zeros are \_\_\_\_\_.  
(Type an exact answer in terms of  $\pi$ . Use a comma to separate answers as needed.)

3. The horizontal distance that a projectile will travel in the air is given by the equation  $R = \frac{(v_0)^2 \sin(2\theta)}{g}$  where  $v_0$  is the initial velocity of the projectile,  $\theta$  is the angle of elevation, and  $g$  is the acceleration due to gravity (9.8 meters per seconds squared).

Use the information to answer the following questions.

- (a) If you can throw a baseball with an initial speed of 33.5 meters per second, at what angle should you direct the throw so that the ball travels a distance of 107 meters before striking the ground?

The solution set is { \_\_\_\_\_ } degrees.  
(Type your answer in degrees. Use a comma to separate answers as needed. Do not round until the final answer. Then round to two decimal places as needed.)

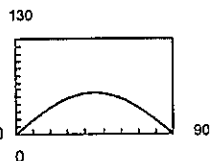
- (b) Determine the maximum distance that you can throw the ball.

\_\_\_\_\_ meters  
(Do not round until the final answer. Then round to one decimal place as needed.)

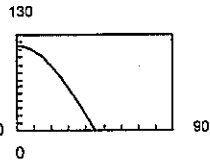
- (c) Graph  $R$  using a graphing utility, with  $v_0 = 33.5$  meters per second.

Which of the following graphs is the graph of  $R = \frac{(33.5)^2 \sin(2\theta)}{9.8}$ ?

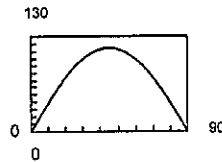
- A.



- B.



- C.



1. A. The solution set is  $\left\{ \frac{\pi}{6}, \frac{5\pi}{6}, \frac{3\pi}{2} \right\}$ .

(Simplify your answer. Type an exact answer, using  $\pi$  as needed. Type your answer in radians. Use integers or fractions for any numbers in the expression. Use a comma to separate answers as needed.)

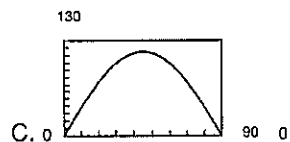
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2.  $\frac{\pi}{4}, \frac{3\pi}{4}, \frac{5\pi}{4}, \frac{7\pi}{4}$

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3. 34.56, 55.44

114.5



## 7.3 classwork day 1

$$\textcircled{1} \quad 2 + 2\sin\theta = 4\cos^2\theta$$

$$2 + 2\sin\theta = 4(1 - \sin^2\theta)$$

$$2 + 2\sin\theta = 4 - 4\sin^2\theta$$

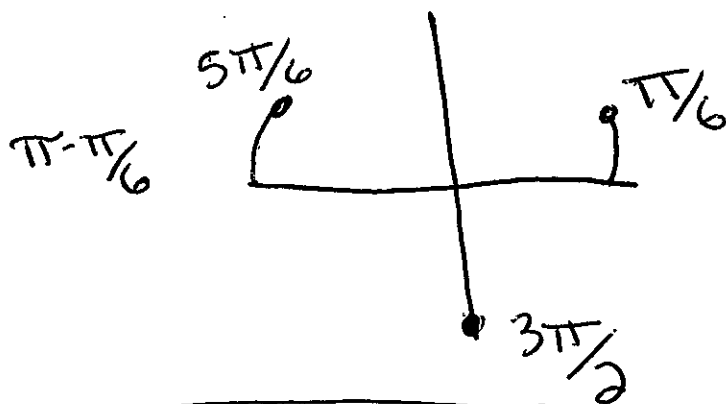
$$4\sin^2\theta + 2\sin\theta - 2 = 0$$

$$2\sin^2\theta + \sin\theta - 1 = 0$$

$$(2\sin\theta - 1)(\sin\theta + 1) = 0$$

$$\sin\theta = \frac{1}{2} \quad \sin\theta = -1$$

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



$$\left\{ \frac{\pi}{6}, \frac{5\pi}{6}, \frac{3\pi}{2} \right\}$$

# 7.3 classwork day 1 continued

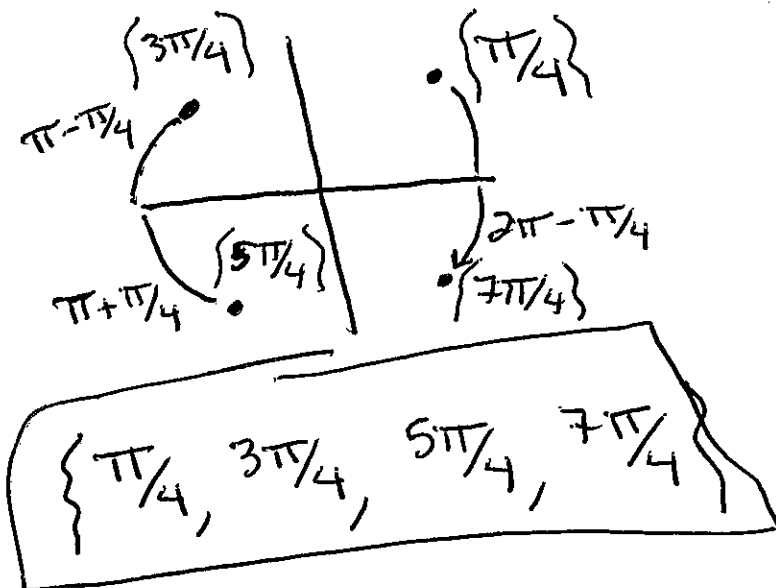
$$\textcircled{2} \quad 8 \sin^2 x - 4 = 0$$

$$8 \sin^2 x = 4$$

$$\sin^2 x = \frac{1}{2}$$

$$\sin x = \pm \sqrt{\frac{1}{2}}$$

$$\sin x = \pm \frac{\sqrt{2}}{2}$$



# 7.3 classwork day 1 continued

$$\textcircled{3} R = \frac{(V_0)^2 \sin 2\theta}{g}$$

$V_0$  = initial velocity

$\theta$  = angle

$g = 9.8 \text{ m/s}^2$

$R$  = distance

$$\text{a) } 107 = \frac{(33.5)^2 \sin 2\theta}{9.8}$$

$$\sin 2\theta = .93437$$

$$2\theta = \sin^{-1}(.93437)$$

$$2\theta = 69.127$$

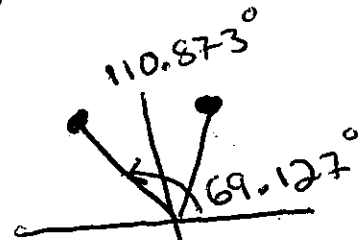
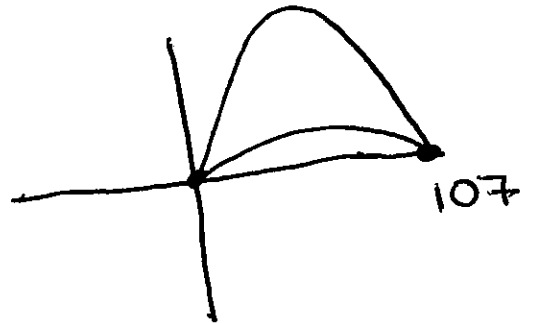
$$\theta = 34.56^\circ$$

$$180 - 69.127 = 110.873$$

$$2\theta = 110.873$$

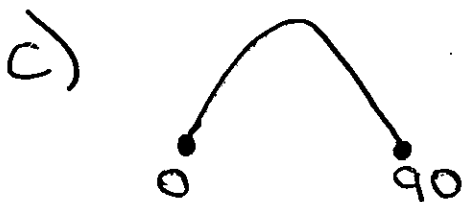
$$\theta = 55.44^\circ$$

\* degrees



b)  $45^\circ$  gives max (Q1 from 0 to  $90^\circ$ )

$$R = \frac{(33.5)^2 \sin 2(45)}{9.8} = 114.5 \text{ meters}$$



Graph C