Trig
Equations

Day 1
Solving Trigonometric Equations

Dec 22-1:35 PM

First Degree Trigonometric Equations

A trigonometric equation is an equation with the variable expressed in terms of a trig. function value.

If you recall how to solve linear equations, you can solve first degree trig. equations in the same manner.

Solve for x: Solve for θ in the interval $0° \le θ \le 360°$:

$4x + 3 = 5$ $4\sin θ + 3 = 5$

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Now we have found that $\sin θ = \frac{1}{2}$. However, we were not asked to find $\sin θ$, we were asked to find θ.

$\sin θ = \frac{1}{2}$

reference angle =

****what quadrants is sin positive?

Quadrant   =

Quadrant   =

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$15 \overset{1}{-} 2$

1). Solve for θ in the interval 0°≤ θ ≤ 360°:

$$3\tan\theta - 4 = 5\tan\theta - 1$$

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2). Solve for θ in the interval 0°≤ θ ≤ 360°:

$$3(\sin\theta - 1) = -4$$

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3). Solve for θ in the interval 0°≤ θ ≤ 360°:

$$2\cos\theta - 4 = -4$$

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4). Solve for θ in the interval $0° \leq \theta \leq 360°$:

$$8\sec\theta - 2 = 10 + 2\sec\theta$$

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5). Solve for θ in the interval $0 \leq \theta \leq 2\pi$:

$$2\cos\theta + 3\sqrt{2} = 2\sqrt{2}$$

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$15-4$ ^3

Name: _____

Day 1 HW odd #s

1) Solve for *all* values of $2 \cos \theta - \sqrt{3} = 0$ when $0° \leq \theta \leq 360°$.

5) Find, to the nearest ten minutes or nearest tenth of a degree, the solution set of $3 \sin x = 1$ over the domain $0 \leq x \leq 360$.

2) What is the solution to $3 \sin \theta - 2 = 0$ when $0° \leq \theta \leq 90°$? [*Round to the nearest tenth of a degree.*]

6) Find, to the nearest degree, the solution set of $6 \tan x = 1$ over the domain $0 \leq x \leq 360$.

3) What is the solution to $7 \cos \theta - 5 = 0$ when $0° \leq \theta \leq 90°$? [*Round to the nearest tenth of a degree.*]

7) Solve for *all* values of $2 \sin \theta + \sqrt{3} = 0$ when $0° \leq \theta \leq 360°$.

8) Given $\cos x = \frac{1}{2}$, solve for x, to the nearest degree, in the interval $0 \leq x \leq 360$.

4) Given $2 \sin x - \sqrt{3} = 0$, solve for x, to the nearest degree, in the interval $0 \leq x \leq 360$.

15 - 5

9) Given $\sin x = -\frac{1}{2}$, solve for x, to the nearest degree, in the interval $0 \leq x \leq 360$.

12) Given $-2 \sin x = \sqrt{2}$, solve for x, to the nearest degree, in the interval $0 \leq x \leq 360$.

10) Given $2 \tan x + 2 = 0$, solve for x, to the nearest degree, in the interval $0 \leq x \leq 360$.

13) Given $2 \tan x + 2\sqrt{3} = 0$, solve for x, to the nearest degree, in the interval $0 \leq x \leq 360$.

11) Given $2 \cos x + \sqrt{3} = 0$, solve for x, to the nearest degree, in the interval $0 \leq x \leq 360$.

14) Find, to the nearest degree, the solution set of $5 \sin x + 1 = 0$ over the domain $0 \leq x \leq 360$.

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Factoring to Solve Trig. Equations
Day 3
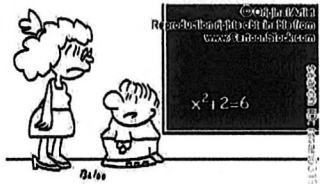
"If 'x' is unknown, why
should I rock the boat?"

Jan 8-8:54 AM

We know that the equation $x^2 + 5x - 14 = 0$ can be solved by factoring the left side and setting each factor equal to 0.

Try:

$X^2 - 121 = 0$

$3X^2 + 9X - 12 = 0$

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The equation $\tan^2 \theta + 5\tan \theta - 14 = 0$ can be solved for $\tan \theta$ in a similar way.

Jan 8-8:54 AM

1). Find all values of θ in the interval $0 \leq \theta \leq 2\pi$ for which $2\sin^2 \theta - \sin \theta - 3 = 0$.

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2). Find all values of θ in the interval $0° \leq \theta \leq 360°$ for which $4\cos^2 \theta - 1 = 0$.

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3). Find all values of θ in the interval $0° \leq \theta \leq 360°$ for which $2\sin\theta\cos\theta + \sin \theta = 0$.

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Name: _____

Day 3 HW odd #s

1) In the interval $0 \leq x < 2\pi$, the solutions of the equation $\sin^2 x = \sin x$ are

5) Find, to the nearest degree, the solution set of $2 \tan^2 x - 18 = 0$ in the interval between $0°$ and $360°$.

2) If θ is an angle in Quadrant I and $\tan^2 \theta - 4 = 0$, what is the value of θ to the nearest degree?

6) Given $\tan^2 x - \tan x = 0$, solve for x in the interval $0° \leq x < 360°$.

3) What is the solution set of the equation $2 \cos^2 \theta - \cos \theta = 0$ in the interval $0° \leq \theta < 360°$?

7) Given $3 \sin^2 x - \sin x = 0$, solve for x to the nearest degree over the domain $0° \leq x < 360°$.

4) Find, to the nearest degree, the solution set of $\tan^2 x - 3 = 0$ in the interval between $0°$ and $360°$.

8) Given $4(\sin^2 x - 1) = 3 \sin x - 4$, solve for x to the nearest degree over the domain $0° \leq x < 360°$.

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9) Find, to the nearest degree, the solution set of $\tan^2 x + \tan x - 2 = 0$ over the domain $0° \leq x \leq 90°$.

11) Find, to the nearest degree, the solution set of $\tan^2 x + 3 \tan x = 18$ over the domain $0° \leq x < 360°$.

10) Find, to the nearest degree, the solution set of $\tan^2 x - 5 \tan x + 6 = 0$ over the domain $0° \leq x \leq 90°$.

12) Find, to the nearest degree, the solution set of $\cos^2 B = 2 \cos B + 1$ over the domain $0° \leq x < 360°$.

13) Solve $2 \cos^2 \theta + \cos \theta - 1 = 0$ for a value of θ in the interval $0° \leq \theta \leq 90°$.

15 - 10

Name:_____   Day 5   Date:_____

1) Solve the following equation algebraically for all values of θ in the interval $0° \leq \theta < 360°$
    $2 \sin \theta - 1 = 0$

2) What value of x in the interval $0° \leq \theta < 360°$ satisfies the equation $\sqrt{3} \tan x + 1 = 0$?

3) What are the values of θ in the interval $0° \leq \theta < 360°$ that satisfy the equation $\tan \theta - \sqrt{3} = 0$?

4) What is the number of degrees in the value of θ that satisfies the equation $2 \cos \theta - 1 = 0$ in the interval $0° \leq \theta < 360°$?

5) Which values of x satisfy the equation $\sin^2 x + \sin x = 0$?

15-11

6) In the interval $0° \leq \theta \leq 360°$, what values of θ satisfy the equation $\tan^2 \theta - 3\tan \theta + 2 = 0$?
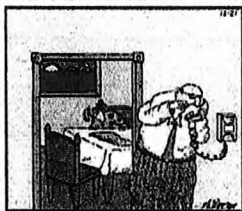
7) In the interval $0 \leq x \leq 2\pi$, the solutions of the equation $\sin^2 x = \sin x$ are

8) If θ is an angle and $\tan^2 \theta - 4 = 0$, what are the values of θ to the *nearest degree*?

9) In the interval $0° \leq \theta \leq 360°$, what values of θ satisfy the equation $3\sin^2 \theta + \sin \theta - 2 = 0$?

15-12

Solving Second Degree Equations
Using the Quadratic formula

Day 7

"Uh yeah, Homework Help Line? I need to have you explain the quadratic equation in roughly the amount of time it takes to get a cup of coffee."

Jan 8-1:29 PM

Not all quadratic equations can be solved by factoring. It is often useful, or necessary, to use the quadratic formula to solve second degree trigonometric equations.

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

Solve in *simplest radical form **and*** to the *nearest hundredths*:
$X^2-5X+5=0$

Jan 8-1:29 PM

Now try: To the nearest degree, solve for θ in the interval $0° \leq \theta \leq 360°$:

$$\tan^2 X - 5\tan X + 5 = 0$$

Jul 20-10:22 AM

1). To the nearest degree, solve for θ in the interval $0° \leq \theta \leq 360°$:

$3\sin^2\theta - 7\sin\theta + 2 = 0$

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2). To the nearest degree, solve for θ in the interval $0° \leq \theta \leq 360°$:

$2\cos^2\theta - 4\cos\theta + 1 = 0$

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3). To the nearest degree, solve for θ in the interval $0° \leq \theta \leq 360°$:

$3\cos^2\theta - 5\cos\theta - 4 = 0$

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15 -14

Name_____ Day 8 Date_____
Quadratic Trig practice

For 1-5 solve for θ in the interval $0° \le \theta \le 360°$.

1) $3 \tan^2 \theta - 2 = 1$

2) $5 \cos^2 \theta - 1 = 3(1 - \cos^2 \theta)$

3) $\tan \theta (\tan \theta + 1) = \tan \theta + 3$

4) $\cos \theta = \dfrac{1}{\cos \theta}$

5) $3 \tan^2 \theta - 5 \tan \theta = 2$

6) What is the total number of solutions for the equation $3 \sin^2 \theta + \sin \theta = 2$ in the interval $0° \le \theta \le 360°$?

(1) 1

(3) 3

(2) 2

(4) 4

15-15

Name:_____ Day 9 Date:_____
Review

1) Solve the following equation algebraically for all values of θ in the interval $0° \leq \theta < 360°$
   $2 \tan \theta - 3 = -5$

2) What values in the interval $0° \leq \theta < 360°$ satisfies the equation $2 \sin \theta + 3 = 3(\sin \theta + 1)$?

3) What are the values of θ in the interval $0° \leq \theta < 360°$ that satisfy the equation
   $6\cos \theta + \sqrt{3} = -4(\cos \theta + \sqrt{3})$?

4) Find the values of θ that satisfy the equation $-2(\tan \theta - 4) = 3(4 - \tan \theta)$ in the interval
   $0° \leq \theta < 360°$?

5) Which values of x satisfy the equation $\sin^2 x + \sin x = 0$?

15-16