

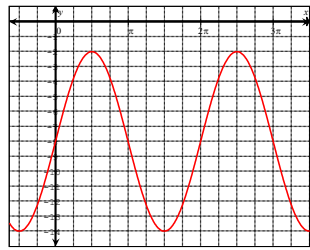
**SECTION 3.8 SOLVING
TRIGONOMETRIC EQUATIONS
AND HC**

D) REVIEW: SOLVING

- o "Solving" means finding a value for the variable, so that both sides of an equation will be equal
- o There are several ways to solve a Trigonometric equation:
 - o Algebraically: (Ch5.2)
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 -
 -
 - o Graphically:
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 -
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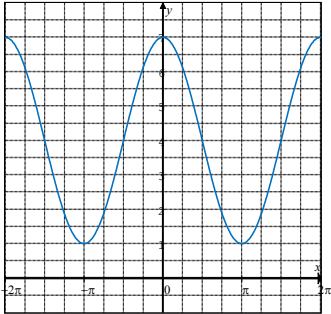
EX: SOLVE THE EQUATION FOR $0 \leq \theta \leq 3\pi$

$-5 = 6\sin\theta - 8$



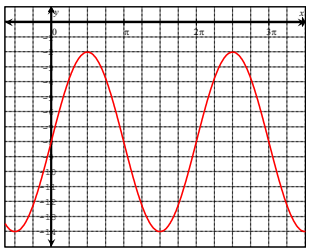
PRACTICE: SOLVE THE EQUATION FOR $0 \leq x \leq 2\pi$

$4 + 3\cos x = 1 - \cos x$



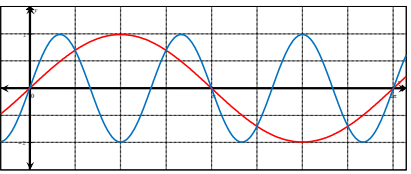
II) FINDING THE GENERAL SOLUTION:

- When finding the general solution,
- Other solutions can be
- Graphically, the horizontal distance



III) SOLVING TRIGONOMETRIC FUNCTIONS WITH HORIZONTAL COMPRESSIONS:

Ex: Find the value of θ , for $0 \leq \theta \leq 360^\circ$



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Ex: GIVEN THE FOLLOWING SYSTEM, HOW MANY SOLUTIONS WILL THERE BE BETWEEN $0 \leq \theta \leq 360^\circ$
 $\sin(B\theta) = 0.6$, WHERE "B" IS A CONSTANT

- i) 2
- ii) $2B$
- iii) $\frac{B}{2}$
- iv) $3B$

IV) SOLVING TRIGONOMETRIC EQUATIONS ALGEBRAICALLY

- o Isolate the variable using BEDMAS
- o Use inverse trig. functions to find the solution(s)
- o There are usually
- o Use the reference angles

- o When there is a horizontal compression,

$y = \sin x$	$y = \cos x$	$y = \tan x$
$y = \sin 3x$	$y = \cos 3x$	$y = \tan 3x$

V) SOLVING EQUATIONS WITH HORIZONTAL COMPRESSIONS

Ex: Solve for "x", $0 \leq x \leq 2\pi$ $3 \sin 3x = 2$

PRACTICE: SOLVE FOR "x", $0 \leq x \leq 2\pi$ $5 \cos 2x = 3$



VI) SOLVING TRIGONOMETRIC EQUATIONS USING ALGEBRA

Ex: Solve for "x", $0 \leq x \leq 2\pi$

i) $4 \cos^2 x - 2 = 0$

ii) $2 \sin x \cos x = \sin x$



Ex: Solve for "x", $0 \leq x \leq 2\pi$ $\sin x \sec x \cot x = \sin x \sec x$

$\sin x \sec x \cot x = \sin x \sec x$



VII) SOLVING TRIGONOMETRIC EQUATIONS INVOLVING SUBSTITUTION

Ex: Solve for "x", $0 \leq x \leq 2\pi$ $2\sin^2 x - 3\sin x + 1 = 0$

$$2(\sin x)^2 - 3(\sin x) + 1 = 0$$



Practice: Solve for "x", $0 \leq x \leq 2\pi$

- i) $4\sin^3 x - 11\sin^2 x + 6\sin x = 0$ ii) $3\cot^2 x + 2\cot x - 1 = 0$



VIII) USING DOUBLE ANGLE IDENTITIES TO SOLVE EQUATIONS

Ex: Solve the following equation for $0 \leq \theta \leq 360^\circ$

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



PRACTICE: SOLVE FOR $0 \leq \theta \leq 360^\circ$

$$2\cos^2 \theta + \cos 2\theta = 0$$



Challenge: Solve for "x", $0 \leq x \leq 2\pi$

$$\tan^8 2x - \tan^4 2x = 0$$



CHECK: $y_1 = \tan^8 2x - \tan^4 2x$ $y_2 = 0$

