

Name \_\_\_\_\_

Date \_\_\_\_\_

Trig Equations #3

Assignment #19 I have provided you with hints. Use them!

Solve each equation for  $0^\circ \leq x \leq 180$

This is the Domain over which you are solving

1)  $4\sin^2\theta - 3 = 0$

Hint: Isolate the trig function  
Square root of both sides

$4\sin^2\theta = 3$

$\sin^2\theta = \frac{3}{4}$

$\sin\theta = \frac{\sqrt{3}}{2}$

$\theta = 60^\circ$  or  $120^\circ$

2)  $2\sin^2\theta + \sin\theta = 0$

Hint: Factor like a quadratic  
Zero Product Property

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

$\sin\theta = 0$

$2\sin\theta + 1 = 0$

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

$180^\circ$

3)  $\sqrt{3}\tan\theta + 1 = 0$

Hint: Isolate the Trig Function

$\tan\theta = -\frac{1}{\sqrt{3}}$

$\frac{1}{\sqrt{3}} \rightarrow 30^\circ = \frac{\sqrt{3}}{3}$

$\theta = -\frac{\sqrt{3}}{3}$

$\theta = 150^\circ$

4)  $\sqrt{2}\cos\theta - 1 = 0$

Hint: Isolate the Trig Function

$\cos\theta = \frac{1}{\sqrt{2}}$

$\cos\theta = \frac{\sqrt{2}}{2}$

$\theta = 45^\circ$

5)  $\tan 2\theta = \cot\theta$

Hint: How can reciprocals ever be equal?

$\theta = 90^\circ$

\* Sometimes a table can help

Undefined Tangent Table

$\theta$	0	30	45	60	90
Value	0	$\frac{1}{\sqrt{3}}$	1	$\sqrt{3}$	Undefined

$\theta$	0	30	45	60	90	120	150	180
Value	0	$\frac{1}{\sqrt{3}}$	1	$\sqrt{3}$	Undefined	$-\sqrt{3}$	$-\frac{1}{\sqrt{3}}$	0

Value	$\frac{1}{\sqrt{3}}$	1	$\sqrt{3}$	Undefined	$-\sqrt{3}$	$-\frac{1}{\sqrt{3}}$	0
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6)  $2\cos^2\theta = \sin\theta + 1$

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

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

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

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

7)  $\sin 2\theta = \cos\theta$

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

$$\theta = 30^\circ$$

$$\theta = 270^\circ$$

This is a challenge problem.

Make a Pythagorean Substitution for  $\cos^2$ .

Get everything on one side

Factor

Use the zero product property

Hint: Think where is the only place possible for this to happen?

8)  $\sin^2\theta - 3\sin\theta + 2 = 0$

Just like  $x^2 - 3x + 2$

$$(x - 2)(x - 1)$$

$$\sin\theta = 2 \quad \sin\theta = 1$$

$$\theta = 90^\circ$$

Hint: Factor

Then use the Zero Product Property

Hint: the only way for this to happen is using the idea that  $1 + -1 = 0$ . Where does this happen?

9)  $\sin\theta + \cos\theta = 0$

10)  $\cos^2\theta - \frac{7}{2}\cos\theta - 2 = 0$

Hint: Factor with Fractions