4-2 Notes – Solving Trig Equations Name _____
Pre-Calculus

A. Review – NO CALCULATOR. Solve for θ when $0 \le \theta \le 360^\circ$.

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

2. $\sec\theta = 2$

B. Solving Equations Involving Trig

Solve just like normal equations then find values for x or θ that satisfy the equation. Use "u-substitution" when necessary. (Example #4 & #12) You will have multiple answers.

3. Solve for x when $0^\circ \le x \le 360^\circ$.

$$2\sin x + \sqrt{3} = 0$$

4. Solve for θ when $0 \le \theta \le 2\pi$. Use "u-substitution".

$$2\cos\theta + 4 = 5 \qquad \text{Let } \cos\theta = u$$
$$2u + 4 = 5$$
$$2u = 1$$
$$u = \frac{1}{2} \qquad \text{Plug } \cos\theta \text{ back in for } u.$$
$$\cos\theta = \frac{1}{2}$$

So, $\theta = {}^{\pi}/_{3}$ and $\theta = {}^{5\pi}/_{3}$

5. Solve for x when $0 \le x \le 2\pi$. Use "u-substitution". (There will be 4 answers.)

$$3sec^2x - 4 = 0$$

6. Solve for x when $0 \le x \le 2\pi$. Use "u-substitution".

$$|\sin x| = 1$$

7. Solve for x when $0^\circ \le x \le 360^\circ$.

$$\sqrt{4\sin x + 7} = 3$$

8. Solve for x when $0 \le x \le 2\pi$.

$$2\tan x - \sqrt{3} = \sqrt{3}$$

9. Solve for x when $0^\circ \le x \le 360^\circ$.

$$3tan^3 x = 3$$

10. Solve for x when $0 \le \theta \le \pi/2$.

$$4\cos\theta = 2\cos\theta + 1$$

11. Solve for x when $0^\circ \le \theta \le 360^\circ$.

$$8tan^2\theta - 2 = 1 - tan^2\theta$$

12. Solve for x when $0 \le x \le 2\pi$. (4 answers)

$sin^3 x - \sin x = 0$ Let $u = \sin x$

$$u^3 - u = 0$$
$$u(u^2 - 1) = 0$$
$$u(u+1)(u-1) = 0$$
$$u = 0 \quad u = -1 \quad u = 1$$
$$\sin x = 0 \quad \sin x = -1 \quad \sin x = 1$$
$$x = 0,\ x = \pi,\ x = {}^{3\pi}/_{2},\ x = {}^{\pi}/_{2}$$

13. Solve for x when $0 \le x \le 2\pi$. (3 answers)

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

14. Solve for x when $0^\circ \le x \le 360^\circ$. (use calculator)

$$\frac{4\tan x - 1}{6} = \frac{1 - \tan x}{3}$$

15. Solve for x when $0 \le x \le 2\pi$. Use Quadratic formula.

$$cos^2 x - 4\cos x = -2$$