Name:_____

PC: Solving Quadratic Trig Equations

Examples:

1. For $0° \leq \theta \leq 360°$, solve: $\cos^2 \theta = \cos \theta$

2. For $0° \leq \theta \leq 360°$, solve: $2\cos^2 \theta + 7\cos \theta - 4 = 0$

3. For $0° \leq \theta \leq 360°$, solve: $\sin^2 \theta - 1 = 0$

4. For $0 \le x \le 2\pi$, solve: $\csc^2 x - \csc x + 3 = 5$

5. To the nearest degree, solve for θ in the interval $0° \le \theta \le 360°$:
$$\sin^2 \theta - 4\sin \theta + 2 = 0$$

6. To the nearest degree, solve for x in the interval $0° < x < 360°$:
$$\sin x - 3 = \frac{-1}{\sin x} \quad \text{(Note: } \sin x \ne 0\text{)}.$$

Exercises 1–5: Solve for *exact* values of 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 $\sin^2 \theta - 2\sin \theta = 3$

4 $\csc^2 \theta - 1 = 3$

5 $2\cos^2 \theta = \cos \theta$

Exercises 6–10: Solve for *exact* values of θ in the interval $0 \le \theta \le 2\pi$.

6 $2\cos^2 \theta = \cos \theta + 1$

7 $\tan \theta(\tan \theta + 1) = \tan \theta + 3$

8 $2\sec^2 \theta = 3\sec \theta + 2$

9 $\cos \theta = \dfrac{1}{\cos \theta}, (\cos \theta \ne 0)$

10 $\sin \theta = \sqrt{\sin \theta}$

Exercises 11–16: Solve for β to the *nearest tenth of a degree* in the interval $0° \le \beta \le 360°$.

11 $5\tan^2 \beta + 3\tan \beta = 2$

12 $\sec^2 \beta = 6\sec \beta + 7$

13 $3\sin^2 \beta + \sin \beta + 5 = 4(1 - \sin \beta)$

14 $6\cos^2 \beta + 6\cos \beta + 2 = 1 + \cos \beta$

15 $3(1 - \sin^2 \beta) = \sin \beta$

16 $3\tan^2 \beta - 5\tan \beta = 2$

17 Find $m\angle B$ in the interval $180° \le B \le 270°$ that satisfies the equation $2\sin^2 B = 6\sin B$.

18 In the interval $90° \le x \le 180°$, find the value of x that satisfies the equation $2\cos^2 x = 1$.

19 If $\dfrac{3\pi}{2} \le \theta \le 2\pi$, solve for θ: $3\tan^2 \theta + 2 = 3$

Exercises 20–27: Select the numeral preceding the choice that best completes the statement or answers the question.

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

(1) 1
(2) 2
(3) 3
(4) 4

21 The number of degrees in the smallest positive angle that satisfies the equation $2\cos^2 x - 3\cos x = 2$ is

(1) 30
(2) 60
(3) 120
(4) 210

22 Which of the following is *not* a solution of the equation $\tan^2 \beta = 3$?

(1) $-\dfrac{\pi}{3}$

(2) $\dfrac{2\pi}{3}$

(3) $\dfrac{5\pi}{6}$

(4) $120°$

23 Which equation has roots of 0 and π?

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

24 Which third-quadrant angle satisfies the equation $2\cos^2 x - \cos x = 1$?

(1) 0

(2) $\dfrac{2\pi}{3}$

(3) $\dfrac{7\pi}{6}$

(4) $\dfrac{4\pi}{3}$

25 How many solutions does the equation $5\sin^2 x = 1 - 9\sin x$ have in the interval $0 \le x \le 2\pi$?

(1) 1
(2) 2
(3) 3
(4) 4

26 How many values of A in the interval $0° \le A < 360°$ satisfy the equation $2\sin^2 A + 3\sin A + 1 = 0$?

(1) 1
(2) 0
(3) 3
(4) 4

27 In the interval $0° \le A < 180°$, which value of x satisfies the equation $2\cos^2 x - 1 = 1$?

(1) 1   (3) 120°
(2) 2   (4) 180°