NAME: _____ BLOCK: _____ DATE: _____

PMATH 12 - CHAPTER 7 - PRETEST signature

Multiple Choice - NON-CALCULATOR - 10 MINUTES (#1-4)
***CIRCLE** the choice that **best** completes the statement or answers the question.*

1. Assume x is an angle in standard position with $\tan x = -\frac{6}{7}$.
   In which quadrant could the terminal arm of angle x lie?

   A. Quadrant 2 or 4 **B.** Quadrant 3 or 4 **C.** Quadrant 1 or 3 **D.** Quadrant 2 or 3

2. Write the expression $\sec^2\theta \cot^2\theta$ as a single term.

   A. $\csc^2\theta$ **B.** $\tan^2\theta$ **C.** $\cos^2\theta$ **D.** $\sin^2\theta$

3. Write the expression $\frac{\csc\theta \cot\theta \sin\theta}{\cos\theta}$ as a single term.

   A. $\cot\theta$
   B. $\csc\theta$
   C. $\cos\theta$
   D. $\sec\theta$

4. Write the expression $\sin 5\theta\cos 2\theta + \cos 5\theta\sin 2\theta$ as a single term.

   A. $\sin 3\theta$ **B.** $\sin 7\theta$ **C.** $\cos 3\theta$ **D.** $\cos 7\theta$

MULTIPLE CHOICE - CALCULATOR may be used after 10 minutes

5. What are the solutions of the equation $\tan x = -\frac{1}{2}$ for $0 \le x \le 2\pi$, to the nearest hundredth?

   A. $x \doteq 1.11$ or $x \doteq 2.68$
   B. $x \doteq 153.43$
   C. $x \doteq 2.68$ or $x \doteq 5.82$
   D. $x \doteq -0.55$

6. What are the solutions of the equation $\cos 2x = -\frac{1}{4}$ for $0 \le x \le \pi$, to the nearest hundredth?

   A. $x \doteq 0.91$ or $x \doteq 2.23$
   B. $x \doteq 0.91$ or $x \doteq 2.48$
   C. $x \doteq 52.24$
   D. $x \doteq 1.82$ or $x \doteq 4.46$

7. Which of these values of x is NOT a solution of the equation $\sin x = -\frac{1}{2}$?

   A. $x = \frac{7\pi}{6}$ **B.** $x = \frac{11\pi}{6}$ **C.** $x = \frac{-5\pi}{6}$ **D.** $x = \frac{2\pi}{3}$

8. What are the roots of the equation $2\tan x + 1 = 0$ for $-180° \le x \le 180°$, to the nearest degree?

$\tan x = -\frac{1}{2}$ Q2 → 153

RA = 26.7 Q4 → -27

A. $x \doteq 3°$
C. $x \doteq -27°$ or $x \doteq 63°$
B. $x \doteq -27°$ or $x \doteq 153°$
D. $x \doteq -0°$

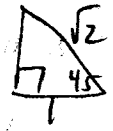
9. Write the expression $\sec\theta(\sin^2\theta - 1)$ as a single term.

$\frac{1}{\cos}(-\cos^2) = -\cos$

A. $\cos\theta$
B. $-\cos^2\theta$
C. $-\cos\theta$
D. $\sec^2\theta$

10. What is the exact value of the expression $\sin 40° \cos 95° + \cos 40° \sin 95°$?

$\sin 135 \rightarrow RA = 45$



A. -1
B. 1
C. $-\frac{1}{\sqrt{2}}$
D. $\frac{1}{\sqrt{2}}$

11. What is the solution of the equation $\sin 8x \cos 7x - \cos 8x \sin 7x = \frac{1}{\sqrt{2}}$ over the domain $0 \le x \le 2\pi$?

$\sin(8x - 7x) \Rightarrow \sin x = \frac{1}{\sqrt{2}}$

$1 \rightarrow \frac{\pi}{4}$

$2 \rightarrow \pi - \frac{\pi}{4} = \frac{3\pi}{4}$

A. $x = \frac{5\pi}{4}$ or $x = \frac{7\pi}{4}$
C. $x = \frac{\pi}{4}$ or $x = \frac{3\pi}{4}$
B. $x = \frac{\pi}{4}$ or $x = \frac{5\pi}{4}$
D. $x = \frac{3\pi}{4}$ or $x = \frac{9\pi}{4}$

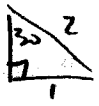
12. Write the expression $2\sin 4\theta \cos 4\theta$ as a single term.

$\sin 8\theta$

A. $\cos 8\theta$
B. $\sin 10\theta$
C. $\cos 10\theta$
D. $\sin 8\theta$

13. What is the exact value of the expression $2\sin 15° \cos 15°$?

$\sin 2(15) = \sin 30$



A. $-\frac{1}{2}$
B. $\frac{1}{2}$
C. $-\frac{1}{\sqrt{3}}$
D. $\frac{1}{\sqrt{3}}$

Short Answer

1. Write the general solution for the equation $\tan x = \frac{1}{2}$. Give the answers to the nearest hundredth.

RAD $x = 0.46$

$x = 0.46 + \pi k$

$k \in I$

period of tan is π

2. Write the general solution of the equation $5(-3+\tan x) = -2\tan x - 16$.
Give the answers to the nearest hundredth of a radian

$-15 + 5\tan x = -2\tan x - 16$

$7\tan x = -1$

$\tan x = -\frac{1}{7}$

S	A
T	C

$x = -0.14$

$RA = 0.14$

② $\pi - 0.14 = 3.0$

$x = 3.0 + \pi k$, $k \in I$

3. Solve the equation $2\sin^2 x = 1$ over the domain $-4\pi \le x \le -3\pi$. Give exact answers.

$\sin^2 x = \frac{1}{2}$

$\sin x = \pm\frac{1}{\sqrt{2}}$

$\sin x = \frac{1}{\sqrt{2}}$ ① $x = 45 = \frac{\pi}{4} - 2\pi = -\frac{7\pi}{4} - 2\pi = \frac{-15\pi}{4}$

② $\frac{3\pi}{4} - 2\pi - 2\pi = \frac{-13\pi}{4}$

$\sin x = -\frac{1}{\sqrt{2}}$ ④ $x = 45 = -\frac{\pi}{4} - 2\pi = -\frac{9\pi}{4} - 2\pi = -\frac{17\pi}{4}$

③ X

4. Determine the exact value of $\cos 195°$.

$\cos(90+105) = \cos 90\cos 105 - \sin 90 \sin 105$

$= 0 \quad (\cos 105) - 1\,(\sin 105)$

$= -\sin 105 = -\sin(45+60)$

$= -(\sin 45\cos 60 + \cos 45 \sin 60)$

$= -\left(\frac{1}{\sqrt{2}}\right)\left(\frac{1}{2}\right) + \left(\frac{1}{\sqrt{2}}\right)\left(\frac{\sqrt{3}}{2}\right)$

$= \frac{-1-\sqrt{3}}{2\sqrt{2}}$

Problem - show your work

1. a) Solve $-6\sin^2 x + \sin x = -3$ over the domain $0 \le x < 2\pi$. Give the roots to the nearest hundredth.

$a = \sin x \quad 0 = 6a^2 - a - 3$

Formula $a = \frac{1 \pm \sqrt{1+72}}{12}$ $\quad a = \frac{1 \pm \sqrt{73}}{12}$

$\sin x = \frac{1+\sqrt{73}}{12} = 0.795$ ① $x = 0.92$ ② $\pi - 0.92 = 2.22$

$\sin x = \frac{1-\sqrt{73}}{12} = -0.628$ ④ $x = -0.68 + 2\pi = 5.6$ ③ $\pi + 0.68 = 3.82$

b) Determine the general solution of the equation.

$x = 0.92 + 2\pi k$ or $x = 2.22 + 2\pi k$

or $x = 5.6 + 2\pi k$ or $x = 3.82 + 2\pi k$

$k \in I$

2. Use algebra to solve the equation $8\sin^2 x + 4\sin x = 6\sin x$ over the domain $0 \le x \le 2\pi$. Give the answers to the nearest hundredth of a radian.

S | A
T | C

$8\sin^2 x - 2\sin x = 0$

GCF $2\sin x(4\sin x - 1) = 0$

$2\sin x = 0$

$\sin x = 0$

$x = 0$

$0, \pi, 2\pi$

$0, 3.14, 6.28$

$4\sin x - 1 = 0$

$\sin x = \frac{1}{4}$

$x = 0.25$

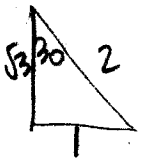
$x = \pi - 0.25$

$= 2.89$

3. For the identity $\frac{\csc\theta\tan\theta}{\sec\theta} = 1$:

a) Verify the identity for $\theta = \frac{\pi}{6}$.

L.S. $\dfrac{\csc\frac{\pi}{6}\tan\frac{\pi}{6}}{\sec\frac{\pi}{6}}$



$= \dfrac{\left(\frac{2}{1}\right)\left(\frac{1}{\sqrt{3}}\right)}{\left(\frac{2}{\sqrt{3}}\right)}$

$= \frac{2}{\sqrt{3}} \div \frac{2}{\sqrt{3}}$

$= 1 = R.S.$

b) Prove the identity.

L.S. $\frac{1}{\sin} \cdot \frac{\sin}{\cos} \div \frac{1}{\cos}$

$\frac{1}{\cos} \times \frac{\cos}{1}$

$= 1 = R.S.$

4. Prove the identity $\sec^2\theta = \sin\theta\csc\theta + \tan^2\theta$.

RS $\sin\frac{1}{\sin} + \frac{\sin^2}{\cos^2}$

$1 + \frac{\sin^2}{\cos^2}$ ⟶ OR $1+\tan^2 = \sec^2 = L.S.$

$\frac{\cos^2}{\cos^2} + \frac{\sin^2}{\cos^2}$

$\frac{\cos^2+\sin^2}{\cos^2}$

$= \frac{1}{\cos^2}$

$= \sec^2\theta = L.S$

5. Prove the identity $(\sec\theta - \cos\theta)(\csc\theta - \sin\theta) = \frac{\tan\theta}{1+\tan^2\theta}$.

LS.

$\left(\frac{1}{\cos} - \cos\right)\left(\frac{1}{\sin} - \sin\right)$

$\left(\frac{1-\cos^2}{\cos}\right)\left(\frac{1-\sin^2}{\sin}\right)$

$\left(\frac{\sin^2}{\cos}\right)\left(\frac{\cos^2}{\sin}\right)$

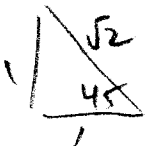
$= \sin\theta\cos\theta$

RS $\frac{\tan}{\sec^2}$

$= \frac{\sin}{\cos} \div \frac{1}{\cos^2}$

$= \frac{\sin}{\cos} \times \frac{\cos^2}{1}$

$= \sin\theta\cos\theta = L.S.$



6. Prove the identity $\sin\left(\frac{\pi}{4}-\theta\right)=\cos\left(\frac{\pi}{4}+\theta\right)$.

LS.

$\sin\frac{\pi}{4}\cos\theta - \cos\frac{\pi}{4}\sin\theta$

$\frac{1}{\sqrt{2}}\cos\theta - \frac{1}{\sqrt{2}}\sin\theta$

$\frac{\cos\theta-\sin\theta}{\sqrt{2}}$

RS. $\cos\frac{\pi}{4}\cos\theta - \sin\frac{\pi}{4}\sin\theta$

$\frac{1}{\sqrt{2}}\cos\theta - \frac{1}{\sqrt{2}}\sin\theta$

$\frac{\cos\theta-\sin\theta}{\sqrt{2}}$

L.S. = R.S.

7. Use algebra to solve the equation $\cos 2x+\sin^2 x=\frac{3}{4}$ over the domain $0\le x\le\pi$. Give exact answers.

S	A
T	C

$1-2\sin^2x+\sin^2x=\frac{3}{4}$

$1-\sin^2x=\frac{3}{4}$

$\frac{1}{4}=\sin^2x$

$\pm\frac{1}{2}=\sin x$

$\frac{1}{2}$ $x=30=\frac{\pi}{6}$ (1)

$-\frac{1}{2}$ $x=-30=-\frac{\pi}{6}$ (4)

(1) $\frac{\pi}{6}$

(2) $\pi-\frac{\pi}{6}=\frac{5\pi}{6}$