NAME _____

MATH 114: FALL 2021	TEST 2

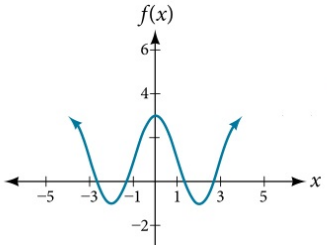
You may use the provided unit-circle and formula sheet. You are also allowed a 3x5 inch card of notes.

Problem 1: (12pts) Match each graph with the appropriate formula by filling in the blank below each graph with the letter corresponding the formula:

(A.) $y = 2\cos\left(\frac{\pi x}{2}\right) + 1$,

(B.) $y = 2.5\sec(0.4x)$,

(C.) $y = -3\csc(4x)$.



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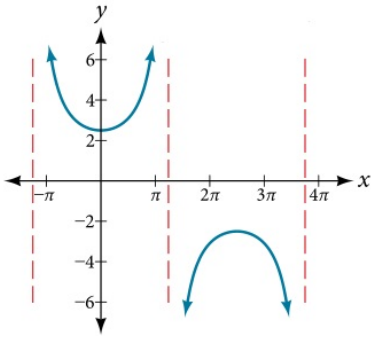

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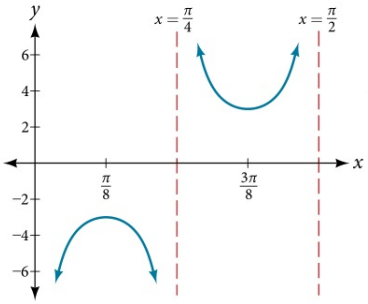

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Problem 2: (8pts) Given $\sin\theta = -1/2$ and $\cos\theta = \sqrt{3}/2$ find $\csc\theta$.

Problem 3: (15pts) Use an appropriate identity to rewrite each of the following expressions:

(A.) $\cos 3x \sin 5x + \sin 3x \sin 5x =$

(B.) $\sin 3x + \sin 7x =$

(C.) $\cos 6x \cos 10x =$

Problem 4: (5pts) Suppose $\sin A = 0$ where $0 \leq A \leq \pi/2$ and $\cos B = 2/7$. Calculate $\cos(A + B)$.

Problem 5: (6pts) Use trigonometric identities to rewrite the following expression in terms of $\cos\theta$:

$$1 - \frac{\tan^2\theta}{\sec^2\theta}$$

Problem 6: (6pts) Use trigonometric identities to simplify the following expression:

$$2\sin^2\theta + \cos(2\theta)$$

Problem 7: (6pts) If α, β and γ are angles in the same triangle, then prove that $\cos(\alpha+\beta)+\cos\gamma = 0$.

Problem 8: (6pts) The line $y = -x\sqrt{3}$ passes through the origin in the x, y-plane. What is the measure of the angle that the line makes with the negative x-axis ?

Problem 9: (9pts) Find the exact value of $\tan\left(\sin^{-1}\left(\frac{1}{x}\right)\right)$ in terms of x with the help of a reference triangle.

Problem 10: (6pts) Write the range of each inverse function in interval notation on the blanks provided:

(A.) $range(\sin^{-1}) =$ _____

(B.) $range(\cos^{-1}) =$ _____

Problem 11: (15pts) Find a solution or state no solution exists.

(A.) $\sin x = 0.3$

(B.) $\tan x = -1$

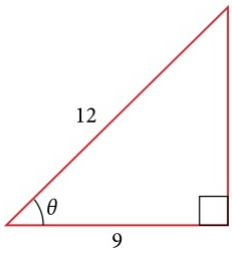
(C.) $\cos x = 2$

Problem 12: (10pts) Find all solutions of $\tan x = 1$ for $0 \leq x \leq 2\pi$.

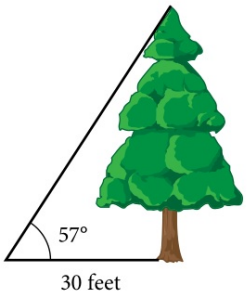
Problem 13: (10pts) Find all solutions of $\cos(3x) = 0$ for $0 \leq x \leq 2\pi$.

Problem 14: (10pts) Find all solutions of $2\sin^2 x + \sin x + 1 = 0$ for $x \in [0, 2\pi]$.

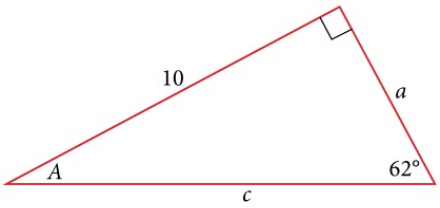
Problem 15: (6pts) Find the **length** of the side opposite θ **and** find θ:



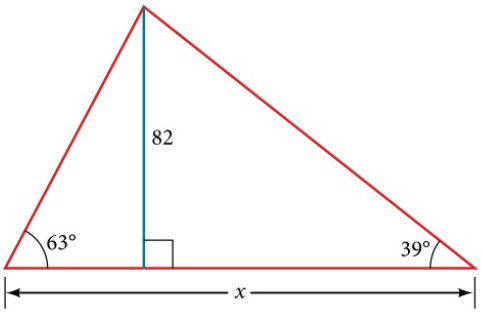
Problem 16: (5pts) Find the height of the tree.



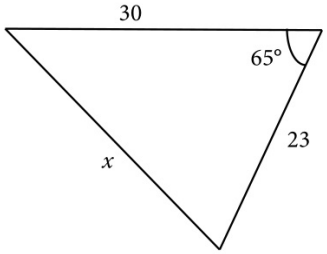
Problem 17: (10pts) Find the lengths a and c and find the measure of angle A of the triangle pictured below:



Problem 18: (10pts) Find x.



Problem 19: (5pts) Find x.



Problem 20: (5pts) Find the missing length of the triangle below: