MA 12 LG 11 Review Sheet (Exponents & Equations1)

1. Find $\angle A$ exactly in radians if A is in the first quadrant and:

a. $\text{Sin}A = \frac{1}{2}$ b. $\text{Tan}A = \frac{1}{\sqrt{3}}$

c. $\text{Cos}A = \frac{1}{2}$ d. $\text{Tan}A = 1$

2. Give the exact value of expression:

a. $\text{Sin}30° + \text{Cos-}90°$

b. $\text{Cos-}2\pi - \text{Sin}\frac{\pi}{2}$

3. a. Explain how you would use the graphs of $y = \text{Cos}x$ and $y = \frac{1}{2}$, plotted on the same axes to solve the equation $\text{Cos}x = \frac{1}{2}$.

b. Explain how you would use the graph of $y = \text{Cos}x - \frac{1}{2}$ to solve $\text{Cos}x = \frac{1}{2}$.

c. Explain how you would use the graphs in (a) and (b) to solve the equation $4\text{Cos}x = 2$.

4. Solve for x if $0 \le x < 360°$.

a. $3\text{Sin}2x = 3$ b. $2\text{Cos}2x + 1 = 0$

c. $2\text{Sin}\frac{1}{2}x = \sqrt{3}$

5. Solve algebraically for A if $0 \le A < 2\pi$.

a. $(\text{Sin}A - \frac{1}{2})(\text{Tan}A + 1) = 0$

b. $\text{Sin}^2 2A + \text{Sin}2A = 0$

c. $4\text{Cos}^2 A + 2\text{Cos}A - 2 = 0$

6. Find the general solution (solve over the real numbers) for each equation:

a. $\text{Sin}^2 A - \frac{3}{4} = 0$

b. $\text{Cos}^2 3A + \text{Cos}3A = 0$

c. $4\text{Cos}^2 A + 2\text{Cos}A - 2 = 0$

7. Solve for x if $0 \le x < 2\pi$. (2 dec. places)

a. $4\text{Sin}^2 x - 3\text{Sin}x - 1 = 0$

b. $2\text{Tan}^2 x - 3\text{Tan}x - 5 = 0$

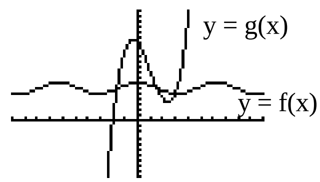
c. $12\text{Cos}^2 x - \text{Cos}x = 6$

d. $\text{Tan}^2 x - 2\text{Tan}x = 15$

8. a. Solve $\text{Sin}x - \frac{1}{3}x = 0$ graphically giving your answer to 3 decimal places.

b. How can you use the graph in part (a) to determine the number of roots the equation $\frac{1}{3}x - \text{Sin}x - 1 = 0$ has?

9. The graph below shows the graphs of two functions y = f(x) and y = g(x).



a. Based on the graph, how many solutions do you expect for the equation f(x) = g(x)? For the equation f(x) – g(x) = 0?

b. What single function can you graph, and then solve to help find the solutions of the equation f(x) = g(x)?

10. Ecologists have determined an equation that gives the number of owls, n(t) in a provincial park as a function of time in years is:

$n(t) = 10\text{Cos}(2t - \frac{\pi}{4}) + 50$

Determine the years when there are likely to be 55 owls.

11. The equation $x + \text{Sin}x - 3\text{Cos}x = 0$ has how many solutions?

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Answer Key

1. a. $\frac{\pi}{6}$ b. $\frac{\pi}{6}$ c. $\frac{\pi}{3}$ d. $\frac{\pi}{4}$

2. a. $\frac{1}{2}$ b. 0

3. a. Find points of intersection
   b. Find zeroes
   c. Equation same as $\text{Cos}x - \frac{1}{2} = 0$

4. a. 45˚, 225˚
   b. 60, 120˚, 240˚, 300˚
   c. 120˚, 240˚

5. a. $\frac{\pi}{6}, \frac{5\pi}{6}, \frac{3\pi}{4}, \frac{7\pi}{4}$
   b. $0, \frac{\pi}{2}, \pi, \frac{3\pi}{2}, \frac{3\pi}{4}, \frac{7\pi}{4}$
   c. $\frac{\pi}{3}, \frac{5\pi}{3}, \pi$

6. a. $\frac{\pi}{3} + 2n\pi$, $\frac{2\pi}{3} + 2n\pi$, $\frac{4\pi}{3} + 2n\pi$, $\frac{5\pi}{3} + 2n\pi$
   b. $\frac{\pi}{6} + \frac{2n\pi}{3}, \frac{\pi}{2} + \frac{2n\pi}{3}, \frac{\pi}{3} + \frac{2n\pi}{3}$
   c. $\frac{\pi}{3} + 2n\pi$, $\frac{5\pi}{3} + 2n\pi$, $\pi + 2n\pi$

7. a. 1.57, 3.39, 6.03
   b. 1.19, 2.36, 4.33, 5.50
   c. 0.72, 2.30, 3.98, 5.56
   d. 1.37, 1.89, 4.51, 5.03

8. a. -2.28, 0, 2.280
   b. $\text{Sin}x - \frac{1}{3} = 1$
   (graph both $y = \text{Sin}x - \frac{1}{3}$ & $y = 1$ and find points of intersection)

Answer Key

9. a. 3
   b. y = f(x) – g(x) or y = g(x) – f(x)

10. $0.92 + n\pi$, $3.01 + n\pi$

11. 1