

Show all your work for full credit. Unsupported answers = 0 points. Use extra paper when necessary.

1. Find an algebraic expression for:  $\sin(\cos^{-1}(\frac{x}{3}) - \tan^{-1}(x))$ .

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2. Find all the solutions on the interval  $[0, 2\pi)$  to the equation:  $2 \sin^2(x) + 2 = 1 - 3 \sin(x)$ .

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3. Find all the solutions to the equation:  $\cos^2(2x) = 3 - 3 \cos^2(2x)$ .

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4. Find all the solutions to the equation:  $\sqrt{2} \sin(x) + \sqrt{2} \cos(2x) \sin(x) - 1 - \cos(2x) = 0$ . Hint: factor by grouping.

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5. Find all the solutions on the interval  $[0, 2\pi)$  to the equation  $5 \cos^2(x) + \cos(x) = 6 - 7 \cos^2(x)$ . Round to 4 decimal places. Do not use the graphing solver feature of your calculator.

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