

Show all your work if you want to receive credit.

(1) Write the following without trig functions

(a) $\sin\left(\arctan \frac{7}{x}\right)$

(b) $\sin\left(2 \arccos \frac{7}{x}\right)$

(2) Find all solutions to the following. Answers must be in exact radian form.

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

(b) $\sin 2x = \sin x$

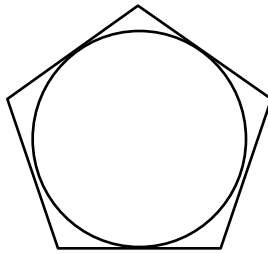
(c) $\sin x + \cos x = 1$

(d) $\sin\left(2x - \frac{\pi}{6}\right) = \frac{\sqrt{3}}{2}$

(3) Prove the following identities.

(a) $\frac{1 + \cos x}{\sin x} = \frac{\sin x}{1 - \cos x}$

(b) $\cos 3x = 4 \cos^3 x - 3 \cos x$

(4) Determine the values of C and D , in terms of A and B , that makes the following an identity. $A \cos x + B \sin x = C \cos(x - D)$ (5) Find the area of a pentagon circumscribed around a circle of radius a .(6) Determine all the exact solutions to the system $\begin{cases} x - y = 3 \\ y = x^2 - 2x - 8 \end{cases}$. Answers should be written in the form of points.(7) Determine all the exact solutions to $\begin{cases} 4x - 5y = 7 \\ 8x + 10y = -14 \end{cases}$. Answers should be written in as points.