

Show work for all problems except #5; use the back of the sheet if necessary. Final answers on all questions should not contain unsimplified trigonometric expressions.

1. **(3 points)** Determine the value of $\sin\left(\frac{\pi}{18}\right)\cos\left(\frac{\pi}{9}\right) + \sin\left(\frac{\pi}{9}\right)\cos\left(\frac{\pi}{18}\right)$.

2. **(3 points)** Determine the value of $\cos 75^\circ$.

3. **(4 points)** Given that $\sec x = 3$ and that x is in quadrant IV, calculate $\cos(2x)$.

4. **(3 points)** Determine the value of $\cos \frac{3\pi}{8}$.

5. **(3 points)** Determine the values of the following inverse trigonometric functions or assert that they do not exist:
 - $\sin^{-1} \frac{1}{2}$.

 - $\arccos(-1)$.

 - $\arctan(-\sqrt{3})$.

6. **(4 points)** Determine the value of $\cos(\tan^{-1}(5))$.