Instructions: Show all work. Use exact answers unless specifically asked to round.

1. Find the remaining trigonometric functions if $\csc\theta = \dfrac{5}{1}$.

$\sin\theta = \dfrac{1}{5}$

$\cos\theta = \dfrac{2\sqrt{6}}{5}$

$\tan\theta = \dfrac{1}{2\sqrt{6}}$

$\cot\theta = 2\sqrt{6}$

$\sec\theta = \dfrac{5}{2\sqrt{6}}$

$\csc\theta = 5$

$5^2 - 1^2 = 24$

$\sqrt{24} = 2\sqrt{6}$

2. Use identities to find the value of the expressions below given that $\sec\theta = 3$.

a. $\tan^2\theta$

$\sec^2\theta = 1 + \tan^2\theta$

$\sec^2\theta - 1 = \tan^2\theta = 9 - 1 = \boxed{8}$

b. $\csc\left(\dfrac{\pi}{2} - \theta\right) = 3$ by cofunction identity
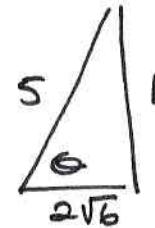
c. $\sin^2\theta$

$\sin^2\theta = 1 - \cos^2\theta = 1 - \left(\dfrac{1}{3}\right)^2 = 1 - \dfrac{1}{9} = \boxed{\dfrac{8}{9}}$

3. Use values of standard angles to give an exact value for the expression $1 + \cos\dfrac{\pi}{4} - \sin\dfrac{\pi}{3}$.

$1 + \dfrac{1}{\sqrt{2}} - \dfrac{\sqrt{3}}{2} = 1 + \dfrac{\sqrt{2}}{2} - \dfrac{\sqrt{3}}{2} = \dfrac{2 + \sqrt{2} - \sqrt{3}}{2}$

4. Find the value of the expression $\sec(1.5)$ in your calculator and round to 2 decimal places.

14.14