5. Write the algebraic expression for each expression by sketching the appropriate right triangle.

a. $\sin(\arctan x)$

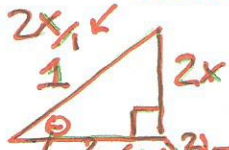
b. $\cos(\sin^{-1} 2x)$

$\cos\theta = \frac{\sqrt{1-4x^2}}{1}$

$\sin^{-1}(2x) = \theta$ make a ratio ↗ or just $\sqrt{1-4x^2}$

$\sin\theta = \frac{2x}{1}$ ↙

make Δ

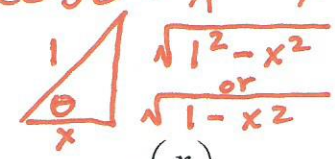


$(1^2-(2x)^2) = 1-4x^2) \Rightarrow \sqrt{1-4x^2}$

c. $\sin(\cos^{-1} x)$

$\cos^{-1} x = \theta$

$\cos\theta = \frac{x}{1}$ ↗



$\sqrt{1^2-x^2}$ or $\sqrt{1-x^2}$

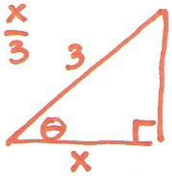
$\sin\theta = \frac{\sqrt{1-x^2}}{1}$ or just $\sqrt{1-x^2}$

d. $\cot\left(\tan^{-1}\left(\frac{1}{x}\right)\right)$

e. $\tan\left(\cos^{-1}\left(\frac{x}{3}\right)\right)$

$\cos^{-1}\frac{x}{3} = \theta$

$\cos\theta = \frac{x}{3}$ ↗



$3^2-x^2 = b^2$

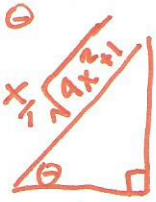
$\sqrt{9-x^2}$

$\tan\theta = \frac{\sqrt{9-x^2}}{x}$

f. $\sec(\arctan 3x)$

$\tan^{-1}(3x) = \theta$

$\tan\theta = \frac{3x}{1}$ ↗



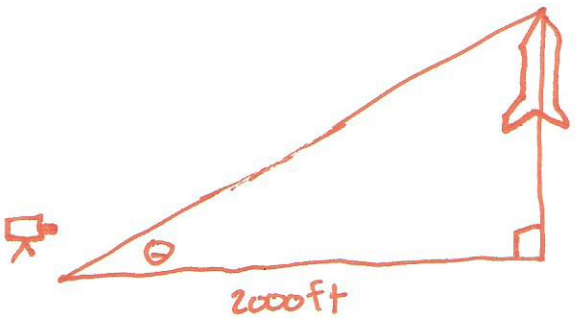
$(3x)^2+1^2 = c^2$

$9x^2+1 = c^2$

$\sqrt{9x^2+1}$

$\sec\theta = \frac{\sqrt{9x^2+1}}{1}$ or just $\sqrt{9x^2+1}$

6. A TV camera at ground level is filming the lift off of the space shuttle at a point *2000ft* from the launch pad. If θ is the angle of elevation to the shuttle and s is the height of the shuttle in *feet*. Find θ when $s = 1000ft$ and $2000ft$.



$\tan\theta = \frac{s}{2000}$

$\tan^{-1}\left(\frac{s}{2000}\right) = \theta$

a) $\tan^{-1}\left(\frac{1000}{2000}\right) = \theta = 26.565°$

b) $\tan^{-1}(\quad)$