3-0235 — 50 SHEETS — 5 SQUARES
3-0236 — 100 SHEETS — 5 SQUARES
3-0237 — 200 SHEETS — 5 SQUARES
3-0137 — 200 SHEETS — FILLER
COMET

Simplify $\cos(\tan^{-1}x)$

method 1: As we saw in class today, $\tan^{-1}x$ is an angle. Specifically, it is the angle whose tangent is x.

let $\tan^{-1}x = \theta$, now we want to find $\cos(\theta)$

since $\tan^{-1}x = \theta$, it must be that $\tan\theta = x$

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

$$\sec^2\theta = 1 + x^2 \quad (\text{because } \tan\theta = x)$$

$$\sec\theta = \sqrt{1+x^2}$$

By definition $\sec\theta = \dfrac{1}{\cos\theta}$

If we solve for $\cos\theta$, we get

$$\cos\theta = \frac{1}{\sec\theta}$$

We already found that $\sec\theta = \sqrt{1+x^2}$

so $\cos\theta = \dfrac{1}{\sqrt{1+x^2}}$

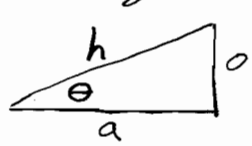
substituting $\tan^{-1}x$ back in for θ, we get

$$\cos(\tan^{-1}x) = \frac{1}{\sqrt{1+x^2}}$$

Method 2:

Since $\tan^{-1}x = \theta$, we know $\tan\theta = x$

given a right triangle, $\tan\theta = \dfrac{o}{a}$



since we want $\tan\theta = x$, we want $x = \dfrac{o}{a}$

let $a = 1$ and $o = x$, and we get this triangle

now, $\cos\theta = a/h$

so $\cos\theta = \dfrac{1}{\sqrt{1+x^2}}$ and $\theta = \tan^{-1}x$

$$\cos(\tan^{-1}x) = \frac{1}{\sqrt{1+x^2}}$$