M1220

$\boxed{6.8 \ \#71}$

$$\int \frac{1}{x\sqrt{4x^2-9}}\,dx$$

$$=\frac{1}{3}\int \frac{1}{x\sqrt{\left(\frac{2}{3}x\right)^2-1}}\,dx$$

notice:

$$\int \frac{1}{x\sqrt{x^2-1}}\,dx = \operatorname{arcsec}|x|+C$$

$$4x^2-9 = 9\left(\tfrac{4}{9}x^2-1\right)$$
$$=9\left(\left(\tfrac{2}{3}x\right)^2-1\right)$$

$u = \frac{2}{3}x$

$du = \frac{2}{3}\,dx$

$\frac{3}{2}\,du = dx$

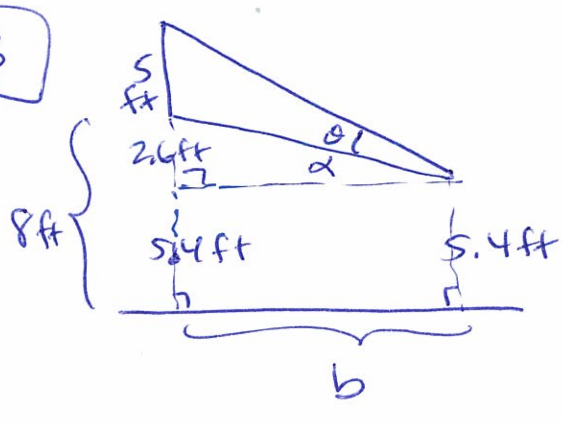
$\Rightarrow x = \frac{3}{2}u$

$$=\frac{1}{3}\left(\tfrac{3}{2}\right)\int \frac{1}{\frac{3}{2}u\sqrt{u^2-1}}\,du$$

$$=\frac{1}{3}\int \frac{1}{u\sqrt{u^2-1}}\,du = \frac{1}{3}\operatorname{arcsec}|u|+C$$

$$=\frac{1}{3}\operatorname{arcsec}\left|\tfrac{2}{3}x\right|+C$$

$\boxed{\#73}$



write θ in terms of b.

$$\tan(\theta+\alpha) = \frac{7.6}{b}$$

$$\theta+\alpha = \arctan\left(\frac{7.6}{b}\right)$$

$$\theta = \arctan\left(\frac{7.6}{b}\right) - \alpha$$

and $\quad \tan\alpha = \dfrac{2.6}{b}$

$\Rightarrow \alpha = \arctan\left(\dfrac{2.6}{b}\right)$

$$\Rightarrow \boxed{\theta = \arctan\left(\frac{7.6}{b}\right) - \arctan\left(\frac{2.6}{b}\right)}$$

if $b = 12.9$ ft

then $\theta = \arctan\left(\dfrac{7.6}{12.9}\right) - \arctan\left(\dfrac{2.6}{12.9}\right)$

$\approx \boxed{19.1^\circ}$