Inverse Trig Wrap-Up:

1) $y = \tan^{-1}(2x^4)$

$y' = \frac{1}{1+(2x^4)^2} \cdot 8x^3$

$y' = \frac{8x^3}{1+4x^8}$

2) $y = (\sin^{-1}(5x^2))^3$

$y' = 3(\sin^{-1}(5x^2))^2 \cdot \frac{1}{\sqrt{1-(5x^2)^2}} \cdot 10x$

$y' = \frac{30x(\sin^{-1}(5x^2))^2}{\sqrt{1-25x^4}}$

3) $y = \cos^{-1}(-2x^3-3)^3$

$y' = \frac{-1}{\sqrt{1-((-2x^3-3)^3)^2}} \cdot 3(-2x^3-3)^2 \cdot -6x^2$

4) $\int \frac{1}{\sqrt{16-x^2}}dx$

$= \sin^{-1}\left(\frac{x}{4}\right) + c$

5) $\int \frac{1}{4+x^2}dx = \frac{1}{2}\tan^{-1}\left(\frac{x}{2}\right)+c$

6) $\int \frac{1}{x\sqrt{x^2-4}}dx = \frac{1}{2}\sec^{-1}\left|\frac{x}{2}\right| + c$

7) $\int \frac{8x}{\sqrt{9-16x^4}}dx$ $\quad u = 4x^2$, $du = 8x\,dx$ $\quad \int \frac{1}{\sqrt{3^2-u^2}}du = \arcsin\left(\frac{u}{3}\right)$

$\arcsin\left(\frac{4x^2}{3}\right) + c$

8) $\int \frac{3x^2}{x^3\sqrt{x^6-1}}dx$ $\quad u = x^3$, $du = 3x^2dx$ $\quad \int \frac{1}{u\sqrt{u^2-1}}du = \sec^{-1}\left|\frac{u}{1}\right| + c$

$= \sec^{-1}|x^3| + c$

9) $\int \frac{10x}{16+25x^4}dx$ $\quad u = 5x^2$, $du = 10x\,dx$ $\quad \int \frac{1}{4^2+u^2}du = \frac{1}{4}\tan^{-1}\left(\frac{u}{4}\right)+c$

$\frac{1}{4}\tan^{-1}\left(\frac{5x^2}{4}\right)+c$