17.) $f(x) = \operatorname{arccot}\left(\frac{x}{5}\right)$ $\quad x = -5$

$$f'(x) = \frac{-\frac{1}{5}}{1 + \frac{x^2}{25}} \qquad \left(-5, \frac{3\pi}{4}\right) \qquad \frac{-u'}{1+u^2}$$

$$f'(-5) = \frac{-\frac{1}{5}}{1+1} = \frac{-\frac{1}{5}}{2} = \frac{-1}{10}$$

$$y - y_1 = m(x - x_1)$$

$$y - \frac{3\pi}{4} = \frac{-1}{10}(x+5)$$

15.) $f(x) = \operatorname{arcsec}\left(\frac{x}{2}\right)$

$$f'(x) = \frac{\frac{1}{\cancel{2}}}{\left|\frac{x}{\cancel{2}}\right|\sqrt{\frac{x^2}{4} - 1}}$$

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

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

3.) $f(x)=\ln(x-1)$

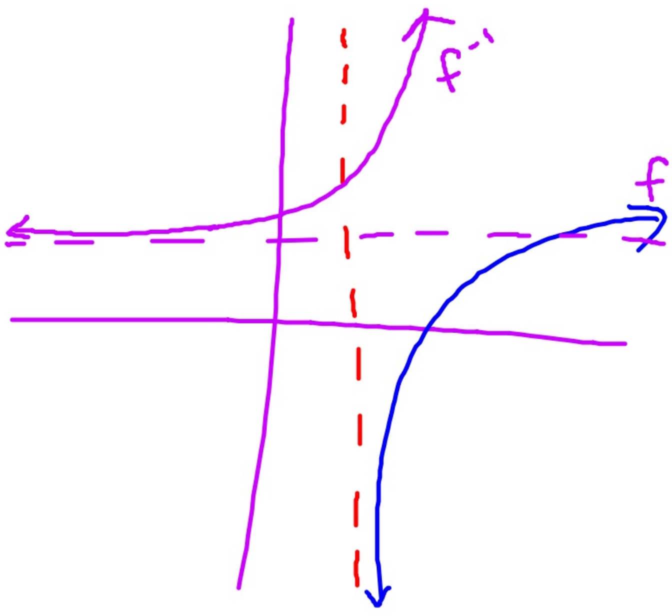
$x=\ln(y-1)$

$e \qquad e$

$e^{x}=y-1$

$e^{x}+1=y$

$f^{-1}(x)=e^{x}+1$



21) $\int \frac{4}{\sqrt{-x^2+8x}}dx = \int \frac{4}{\sqrt{16-(x-4)^2}}dx$

$-(x^2-8x+16)+16$

$-(x-4)^2+16$

$4\arcsin\frac{x-4}{4}+C$

24.) $\int_0^1 \frac{x+1}{\sqrt{4-x^2}}dx = \int_0^1 \frac{x}{\sqrt{4-x^2}}dx + \int_0^1 \frac{1}{\sqrt{4-x^2}}dx$

u-sub

$u = 4 - x^2$

$du = -2x\,dx$

$-\frac{1}{2}\int u^{-1/2}du$

$-\frac{1}{2} \cdot \frac{u^{1/2}}{1/2}$

$-\sqrt{4-x^2}\Big|_0^1$

$-\sqrt{3}+2$

arcsin

$\arcsin\frac{x}{2}\Big|_0^1$

$\frac{\pi}{6}$

$\boxed{-\sqrt{3}+2+\frac{\pi}{6}}$

$$\int \frac{dx}{x\sqrt{x^2-36}} = \frac{1}{6}\operatorname{arcsec}\frac{|x|}{6} + C$$

$u = x$

$du = 1\,dx$

$a = 6$

5.) $f(x) = \sqrt{x^3 + x^2 + x + 1}$ $\quad (f^{-1})'(2) = \frac{2}{3}$

$2 = \sqrt{x^3 + x^2 + x + 1}$

$x = 1$

$f^{-1} : (2, 1)$

$f : (1, 2)$

$f'(x) = \frac{1}{2}(x^3 + x^2 + x + 1)^{-1/2}(3x^2 + 2x + 1)$

$f'(1) = \frac{1}{2}(4)^{-1/2}(6)$

$= \frac{6}{4} = \frac{3}{2}$

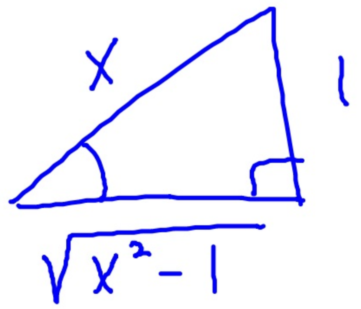
19.) $$5\int_{1/2}^{\sqrt{3}/2} \frac{dx}{\sqrt{1-x^2}}$$

$$5\arcsin x \Big|_{1/2}^{\sqrt{3}/2}$$

$$5\left(\frac{\pi}{3}-\frac{\pi}{6}\right)$$

$$5\left(\frac{\pi}{6}\right)$$

13) $\cot(\operatorname{arccsc} x) = \sqrt{x^2-1}$



27.) $\displaystyle\int_0^4 \frac{x}{1+x^2}\,dx = \frac{1}{2}\int \frac{1}{u}\,du$

$u = 1+x^2$

$du = 2x\,dx$

$\frac{du}{2x} = dx$

$= \frac{1}{2}\ln|u|$

$= \frac{1}{2}\ln|1+x^2|\Big|_0^4$

$\frac{1}{2}\ln 17 = \ln\sqrt{17}$

$$\int \frac{dx}{x\sqrt{x^2-25}} = \frac{1}{5}\operatorname{arcsec}\frac{|x|}{5} + C$$

$u = x$

$du = 1dx$

$a = 5$

4.) $f(x) = x^7 + 2x + 9$

$6 = x^7 + 2x + 9$

$-1 = x$

$f'(x) = 7x^6 + 2$

$f'(-1) = 9$

$\boxed{g'(6) = \frac{1}{9}}$

$f: (-1, 6)$

$g: (6, -1)$

$$f(x) = \arcsin u$$

$$f'(x) = \frac{u'}{\sqrt{1-u^2}}$$

$$f(x) = \arctan u$$

$$f'(x) = \frac{u'}{1+u^2}$$

$$f(x) = \operatorname{arcsec} u$$

$$f'(x) = \frac{u'}{|u|\sqrt{u^2-1}}$$

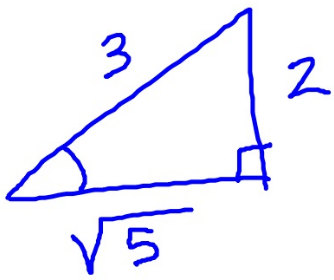
$$y = \arcsin \frac{x^2}{4}$$

$$y' = \frac{\frac{1}{2}x}{\sqrt{1-\frac{x^4}{16}}}$$

$$= \frac{\frac{x}{2}}{\sqrt{\frac{16-x^4}{16}}} = \frac{\frac{x}{2}}{\frac{\sqrt{16-x^4}}{4}}$$

$$\frac{x}{2} \cdot \frac{4}{\sqrt{16-x^4}} = \frac{2x}{\sqrt{16-x^4}}$$

$$\tan\left(\arcsin\frac{2}{3}\right) = \frac{2}{\sqrt{5}}$$



23.) $\int_0^1 \frac{x+1}{x^2+1}\,dx = \int_0^1 \frac{x}{x^2+1}\,dx + \int_0^1 \frac{1}{x^2+1}\,dx$

u-sub arctan

$$\left. \frac{1}{2}\ln|x^2+1| + \arctan x \right|_0^1$$

$$\frac{1}{2}\ln 2 + \frac{\pi}{4}$$

$$20.)\ \frac{7}{2}\int \frac{\cancel{2}x}{x^4+25}\,dx = \frac{7}{2}\cdot\frac{1}{5}\arctan\frac{x^2}{5}+C$$

$$\frac{7}{10}\arctan\frac{x^2}{5}+C$$

$u = x^2$

$\rightarrow du = 2x\,dx$

$a = 5$