$$V = \frac{1}{3}\pi r^2 h$$

$$\frac{dV}{dt} = \frac{1}{3}\pi(2r)\frac{dr}{dt}\cdot h + \frac{dh}{dt}\left(\frac{1}{3}\pi r^2\right)$$

$$\frac{dV}{dt} = \frac{2}{3}\pi rh\frac{dr}{dt} + \frac{1}{3}\pi r^2\frac{dh}{dt}$$

3. $\lim_{x \to 0} (2x-1)^3 = (2 \cdot 0 - 1)^3$

$(-1)^3 = -1$

5. $\lim_{x \to -1} \frac{x^2 - 5x - 6}{x+1} = -7$

$\frac{(x+1)(x-6)}{(x+1)}$

$x - 6$

$-1 \quad -7$

$(A-B)(A+B) = A^2 - B^2$

6. $\lim_{x \to 0} \frac{\sqrt{6+x} - \sqrt{6}}{x} \cdot \frac{\sqrt{6+x} + \sqrt{6}}{\sqrt{6+x} + \sqrt{6}}$

$\frac{6 + x - 6}{x(\sqrt{6+x} + \sqrt{6})}$

$\frac{1}{\sqrt{6+x} + \sqrt{6}}$

$\frac{1}{2\sqrt{6}} \quad \frac{\sqrt{6}}{\sqrt{6}} \quad \frac{\sqrt{6}}{12}$

7. $\lim_{x \to 0} \frac{\frac{1}{x+4} - \frac{1}{4}}{x} \cdot \frac{(x+4)4}{(x+4)4}$

$\frac{(x+4)4}{x+4} - \frac{(x+4)4}{4}$

$x(x+4)4$

$\frac{-1}{16}$

$\frac{x = -4}{x(x+4)4}$

$f(-1) = \text{undefined}$

$\lim_{x \to -1}$

28. $\lim_{\theta \to \frac{\pi}{2}} \cot^2\theta$

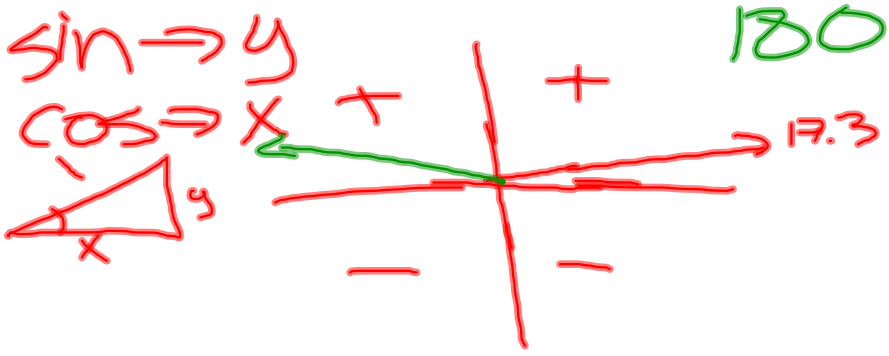
$$\frac{\cos^2\frac{\pi}{2}}{\sin^2\frac{\pi}{2}} = \frac{0^2}{1^2} = 0$$

30. $\frac{1}{\sin(\frac{5\pi}{4})} = -1.414 = -\sqrt{2}$

sin's + cos's usually end up as $\pm 1, \pm\frac{1}{2}, \pm\frac{\sqrt{2}}{2}, \pm\frac{\sqrt{3}}{2}, \pm\sqrt{2}, \pm\sqrt{3}$

$\sin^{-1}(\sin\theta) = 0.2975$ $\quad \sin^{-1}(\quad)$ $\quad 0° \le \theta \le 360°$

$\theta = 17.3°$



31. $\lim_{x\to 0} \frac{1-\cos^2 x}{x} = \frac{\sin^2 x}{x} = \frac{\sin x}{x}\cdot\sin x$

$1\cdot\sin(0)$

0

$\lim_{x\to 0} \frac{(1-\cos x)(1+\cos x)}{x}$

$0(1+\cos 0) = 0$

32. 2. $\lim_{x\to 0} \frac{(\sec x - 1)}{x\sec x}$

$\frac{\frac{1}{\cos x} - 1}{x\frac{1}{\cos x}}\cdot\frac{\cos x}{\cos x}$

$\frac{1-\cos x}{x} = 0$