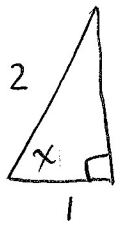
+4 1. Find the exact value of $\arccos\left(\frac{1}{2}\right)$.

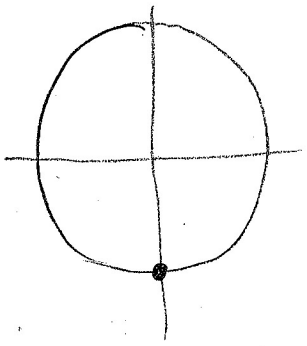
$x = \arccos\left(\frac{1}{2}\right)$



$30°-60°-90°$ triangle

$x = 60° = \frac{\pi}{3}$

+4 2. Find the exact value of $\arcsin(-1)$.



Range of arcsin: $\left[-\frac{\pi}{2}, \frac{\pi}{2}\right]$

$\arcsin(-1) = -\frac{\pi}{2}$

+4 3. Differentiate $y = \sqrt{\arctan(x)}$.

$y = (\arctan(x))^{\frac{1}{2}}$

$f(x) = x^{\frac{1}{2}}$ $\quad g(x) = \arctan(x)$

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

$= \frac{1}{2\sqrt{x}}$

$y' = f'(g(x))\, g'(x)$

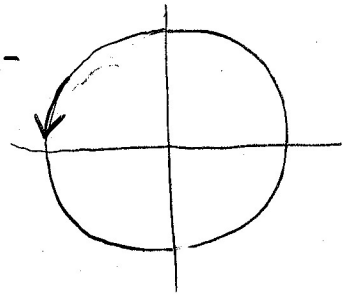
$= \frac{1}{2\sqrt{\arctan(x)}} \cdot \frac{1}{1+x^2}$

$= \frac{1}{2(1+x^2)\sqrt{\arctan(x)}}$

4. Find $\lim_{x\to\pi^-} \frac{\sin(x)}{1+\cos(x)}$. $\frac{0}{1+(-1)} = \frac{0}{0}$ use LR

+4

$\overset{LR}{=} \lim_{x\to\pi^-} \frac{\cos(x)}{-\sin(x)}$ $\frac{-1}{0}$ So the limit DNE



$\frac{-}{-(+)} = +$, so the limit is DNE$(+\infty)$

5. Find $\lim_{x\to 0} \frac{1+x^2}{x}$. $\frac{1}{0}$

+4

So, the limit DNE.

6. Find $\lim_{x\to 0} \frac{e^{2x}-1-2x}{2x^2}$. $\frac{e^0-1-0}{0} = \frac{0}{0}$ use LR

+4

$\overset{LR}{=} \lim_{x\to 0} \frac{2e^{2x}-2}{4x} = \lim_{x\to 0} \frac{2(e^{2x}-1)}{4x} = \lim_{x\to 0} \frac{e^{2x}-1}{2x}$ $\frac{1-1}{0} = \frac{0}{0}$ use LR

$\overset{LR}{=} \lim_{x\to 0} \frac{2e^{2x}}{2} = \lim_{x\to 0} e^{2x} = 1$