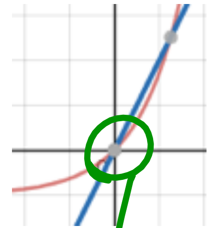
$$\lim_{x\to 0}\frac{e^x-1}{2x}$$

$y = e^x - 1$

$y = 2x$



$(e^x-1)' = e^x\big|_{x=0} = 1$

$y = x$

$\leadsto \lim_{x\to 0}\frac{x}{2x} = \frac{1}{2}$

$$\lim_{x\to a}\frac{f(x)}{g(x)} = \lim_{x\to a}\frac{f'(x)}{g'(x)}$$

① $\frac{0}{0}$

② $\frac{\infty}{\infty}$

②* $0\cdot\infty$

③ $\infty-\infty$

④ 1^{∞}

15. $\lim\limits_{x\to\infty} \dfrac{\overset{\to\infty}{\ln x}}{\underset{\to\infty}{\sqrt{x}}} = \lim\limits_{x\to\infty} \dfrac{\frac{1}{x}}{\frac{1}{2\sqrt{x}}}$

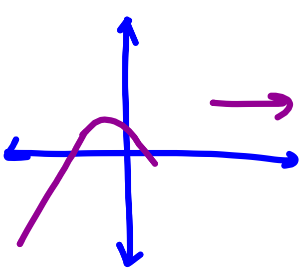
$= \lim\limits_{x\to\infty} \dfrac{1}{x}\cdot\dfrac{2\sqrt{x}}{1} = \lim\limits_{x\to\infty} \dfrac{2\cancel{\sqrt{x}}}{\cancel{x}\sqrt{x}}$

$= \lim\limits_{x\to\infty} \dfrac{2}{\sqrt{x}} = 0$

17. Show that the equation $\underbrace{1 + 2x + x^3 + 4x^5}_{y=} = 0$ has exactly one real root.

x-int

$y' = 2 + 3x^2 + 20x^4 >$ for all x.



what if there is no change in sign of y', there is only one root.

$\therefore$ there is only 1 real root.