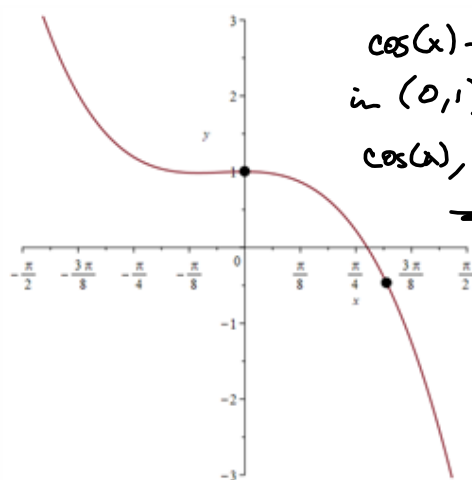


Chapter 2 Homework? Practice Test 1?!

Questions?

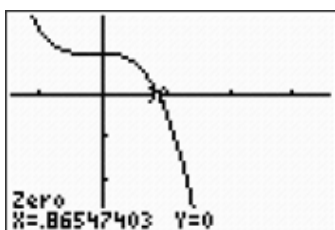
S 1.8 #16 - CONTINUITY!!!!



$\cos(x) - x^3$ has at least one root
in $(0,1)$ b/c $f(0) = 1 > 0 > f(1) \approx -.46$;
 $\cos(x), x^3$ are cont^s $\Rightarrow \cos(x) - x^3$ is cont^s
 $\Rightarrow \exists c \in (0,1) \ni f(c) = 0$,
by IVT.

Intermediate Value Theorem.

If a chicken crosses the road, it crosses the center line.



$$x \approx .86547403$$

$$.86 < x < .87$$

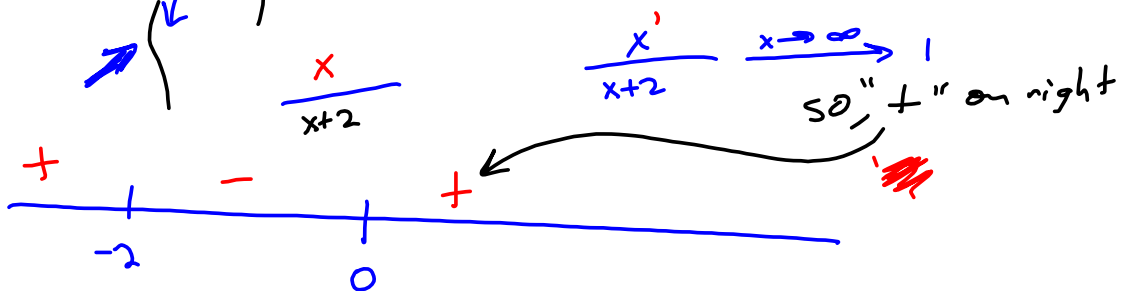
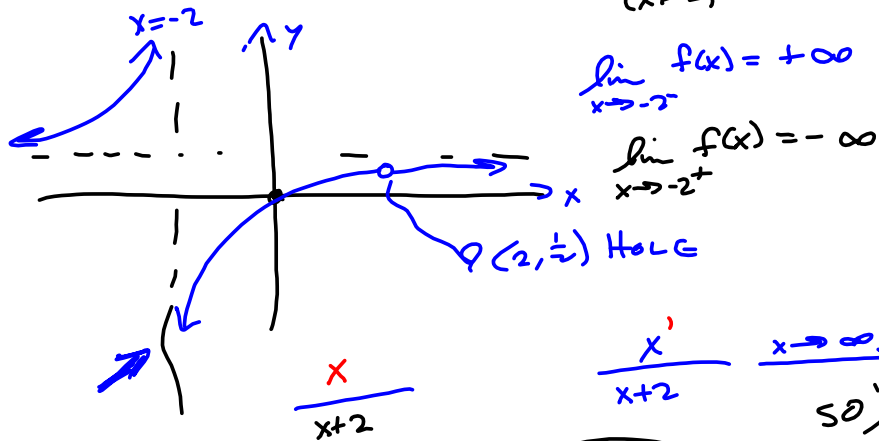
$$.87 - .86 = .01$$

Jocebyn always
pickin' on me



Thanks!

$$\frac{x^2 - 2x}{x^2 - 4} = \frac{x(x-2)}{(x-2)(x+2)} = \frac{x}{x+2} \quad \begin{matrix} x \rightarrow 2 \\ (x \neq 2) \end{matrix} \rightarrow \frac{2}{2+2} = \frac{1}{2}$$



For Practical Purposes, intervals of continuity are domain questions.

$$\frac{x^2-2x}{x^2-4} \text{ is cont}^e \text{ on } (-\infty, -2) \cup (-2, 2) \cup (2, \infty)$$

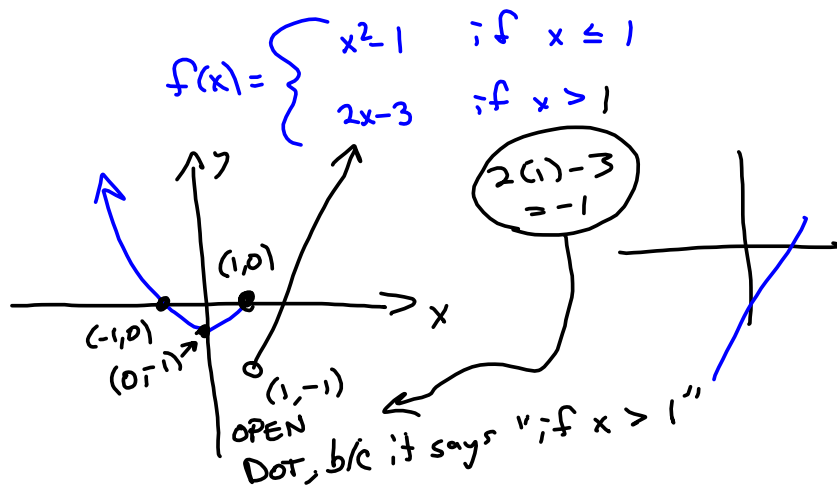
a) $x = -2$, it's an ∞ discontinuity

e) $x = +2$, it's a removable discontinuity

$$\lim_{x \rightarrow 2^-} f(x) = \lim_{x \rightarrow 2^+} f(x) = \frac{1}{2}$$

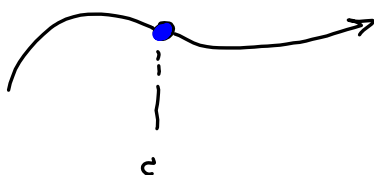
It's a hole!

Jump discontinuity



$$\lim_{x \rightarrow 1^-} f(x) = 0 \neq -1 = \lim_{x \rightarrow 1^+} f(x)$$

f is $\text{ent}^3(a) c$ if $\lim_{x \rightarrow c} f(x) = f(c)$.

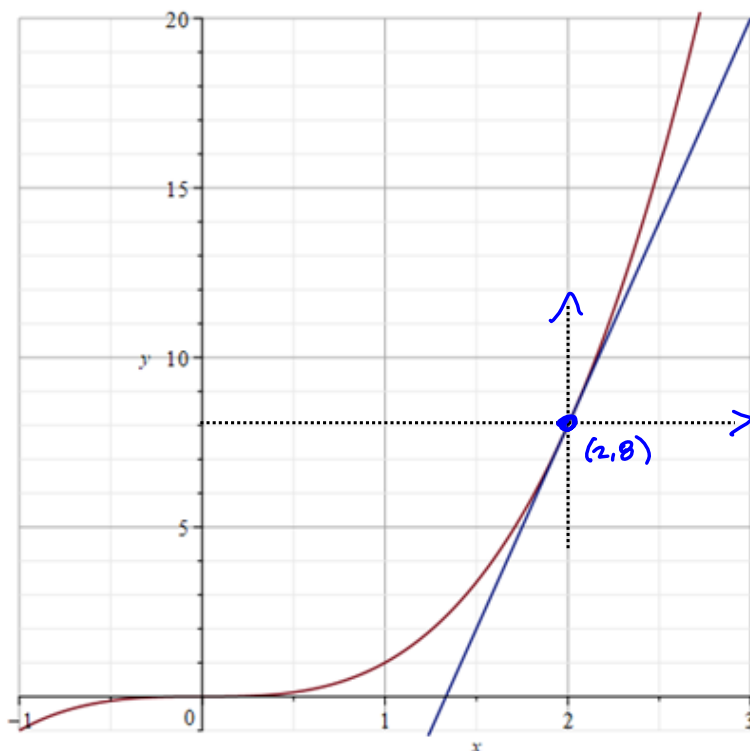
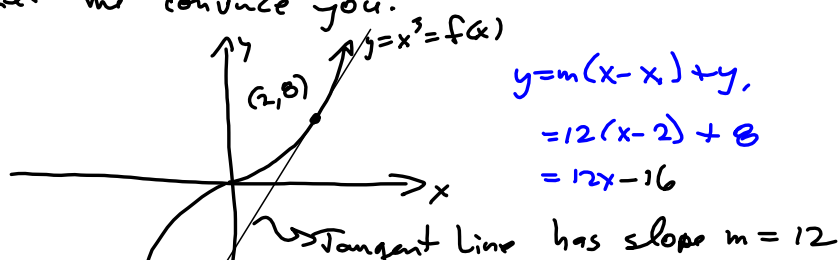


All the "cool" calculus limits are removable discontinuities in the Difference Quotient.

What's the slope of $x^3 @ x=2$?

$$\begin{aligned} \frac{(x+h)^3 - x^3}{h} &= \frac{x^3 + 3x^2h + 3xh^2 + h^3 - x^3}{h} \\ &= \frac{h(3x^2 + 3xh + h^2)}{h} = 3x^2 + 3xh + h^2 \xrightarrow{h \rightarrow 0} 3x^2 \\ &\Rightarrow m @ x=2 \text{ is } 3(2)^2 = 12. \end{aligned}$$

Let me convince you.



Note x^3 is close to $y = 12x - 16$ in the vicinity of $x=2, y=8$