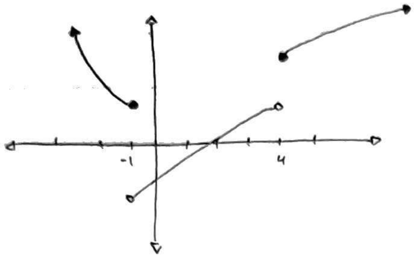
James
[illegible]

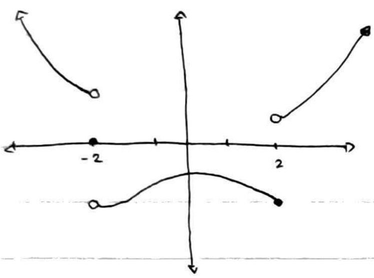
Math Calc AB HW 1.8A

4. ~~[illegible]~~
$(-3,-2) \cup (-2,0) \cup (0,1) \cup (1,3)$

6.



8.

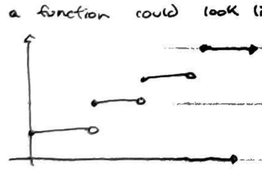


10. a. Continuous. This is because temperature doesn't suddenly change, but rather slowly adjusts

b. Continuous. Temperature doesn't change instantly when you head inland, but rather slowly / smoothly changes

c. Discontinuous, Altitude can suddenly change

d. Discontinuous. Most taxis charge by mile so a function could look like



e. Discontinuous, Lights only have a on/off state, which means it jumps from one state to another It could look like:

12. $g(t) = \dfrac{t^2+5t}{2t+1}$

g(t) is a rational function, whose domain is ℝ except for $-\frac{1}{2}$. Because $a=2$, g(t) must be continuous.

$g(2)$ is defined ✓
$\lim_{x\to 2} g(t)$ exists ✓
$\lim_{x\to 2^-} g(t) = 2.8 = \lim_{x\to 2^+} g(t)$
$g(2) = 2.8 = \lim_{x\to 2} g(t)$ ✓

14. $f(x) = 3x^4 - 5x + \sqrt[3]{x^2+4}$

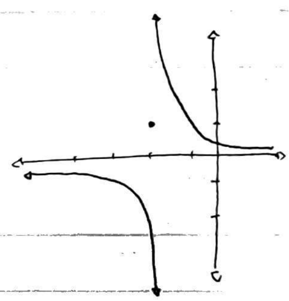
$f(2)$ is defined ✓
$\lim_{x\to 2} f(x)$ exists ; $\lim_{x\to 2^-} f(x) = 40 = \lim_{x\to 2^+} f(x)$ ✓
$f(2) = 40 = \lim_{x\to 2} f(x)$ ✓

f(x) is a polynomial function, with a root function. Because the root function is odd, this function is continuous as it is made of 2 continuous functions added together.

16. $f(x) = \dfrac{x-1}{3x+6}$

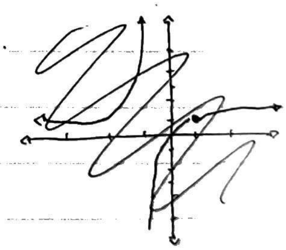
f(x) is a rational function. $x-1$ is continuous at ℝ – it's linear. However f(x)'s domain is ℝ except -2. Because the given interval is $(-\infty,-2)$, f(x) must be continuous, as -2 is not included

18.



$\lim_{x\to -2} f(x)$ DNE.
∴ f(x) isn't continuous at -2

20.



~~f(x) is undefined~~
~~[illegible]~~
~~[illegible]~~
~~[illegible]~~
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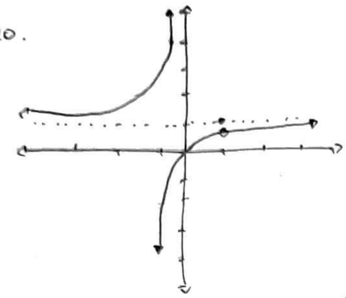
20.



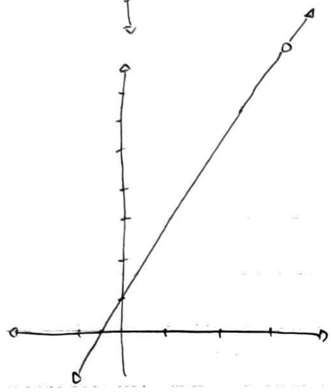
$\lim_{x\to 1} f(x) \neq f(x)$

when $x = 1$

$\therefore f(x)$ isn't continuous

at 1

22.



$f(x)$ isn't defined

when $x = 3$

$\therefore f(x)$ isn't continuous

at 3

24. $f(x) = \dfrac{x^3-8}{x^2-4}$

$= \dfrac{(x-2)(x^2+2x+4)}{(x+2)(x-2)}$

$= \dfrac{x^2+2x+4}{x+2} \; ; \; x \neq 2$

$\boxed{\text{Define as } \dfrac{x^2+2x+4}{x+2}}$