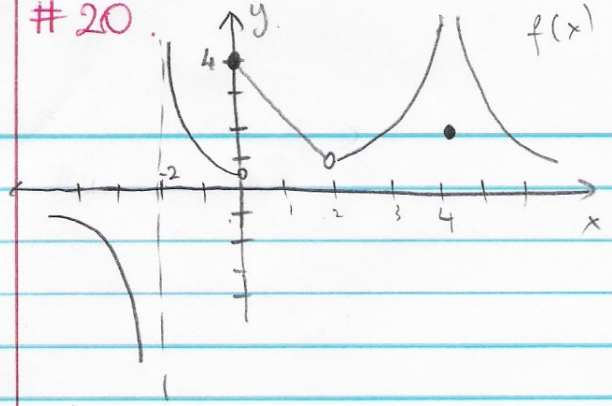
MATH 149 HOMEWORK 4 SOLUTIONS

1.2 #20.



a) $f(-2)$: not defined

b) $\lim_{x\to -2} f(x)$ does not exist

$\left(\lim_{x\to -2^+} f(x) \to \infty \text{ and } \lim_{x\to -2^-} f(x) \to -\infty\right)$

c) $f(0) = 4$

d) $\lim_{x\to 0} f(x)$ does not exist.

$\left(\lim_{x\to 0^+} f(x) = 4,\ \lim_{x\to 0^-} f(x) = \frac{1}{2}\right)$

e) $f(2)$ not defined

f) $\lim_{x\to 2} f(x) = \frac{1}{2}$ $\left(\lim_{x\to 2^-} f(x) = \frac{1}{2},\ \lim_{x\to 2^+} f(x) = \frac{1}{2}\right)$

g) $f(4) = 2$

h) $\lim_{x\to 4} f(x)$ does not exist.

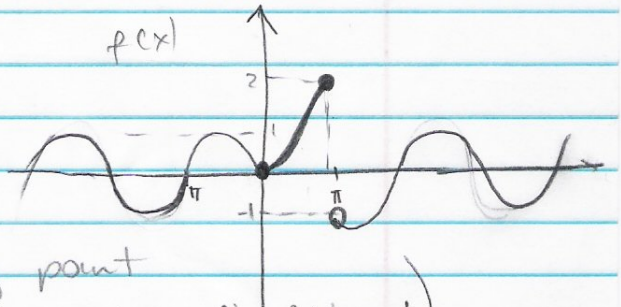
$\left(\lim_{x\to 4^-} f(x) = \lim_{x\to 4^+} f(x) \to \infty\right)$

#22. Looking at the graph ① $\lim_{x\to -2} f(x)$ does not exist (because f goes to $-\infty$ as $x \to -2$)

② $\lim_{x\to 0} f(x)$ does not exist because $\lim_{x\to 0^+} f(x) = 4$ whereas $\lim_{x\to 0^-} f(x) = 0$

The limit exists at all points except -2 and 0.

#24. $f(x) = \begin{cases} \sin x, & x < 0 \\ 1 - \cos x, & 0 \le x \le \pi \\ \cos x, & x > \pi \end{cases}$



Looking at the graph limit of $f(x)$ exists at every point except at $x = \pi$. $\left(\lim_{x\to \pi^-} f(x) = 2 \text{ whereas } \lim_{x\to \pi^+} f(x) = -1\right)$

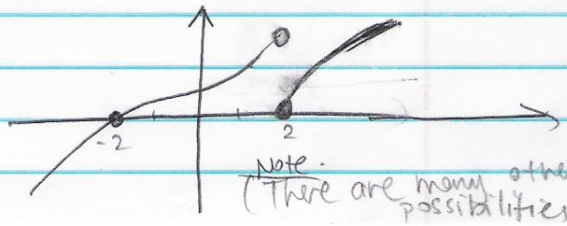
#26. $f(-2) = 0$

$f(2) = 0$

$\lim_{x\to 2} f(x) = 0$

$\lim_{x\to 2} f(x)$ does not exist

Draw graph for an f.



Note. (There are many other possibilities)