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CALCULUS 12
Ch1 Review Assignment

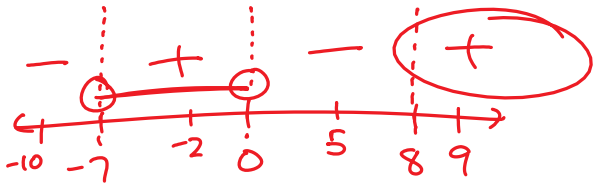
Hello, my name is: _____

1. a) Use interval (set) notation to describe the set of all values of "x" that satisfy the inequality: **(2 marks)**

$$x^3 - x^2 - 56x > 0$$

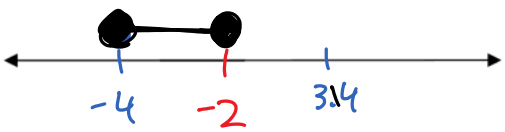
$x(x^2 - x - 56) > 0$

$x(x-8)(x+7) > 0$



$(-7, 0) \cup (8, \infty)$

b) Sketch $(-\infty, -2] \cap [-4, \pi)$ on the number line below. **(1 mark)**



c) Simplify $(-\infty, -2] \cap [-4, \pi)$. (i.e. write it as only one interval) **(1 mark)**

$[-4, -2]$

2. Determine whether the functions are odd, even or neither. No marks will be given if work is not shown for "a". An explanation for "b" will be sufficient. **(3 marks)**

a) $f(x) = \dfrac{x^5 - x}{1 + x^6}$

$$f(-x) = \frac{(-x)^5 - (-x)}{1 + (-x)^6}$$

$$= \frac{-x^5 + x}{1 + x^6} = \frac{-(x^5 - x)}{1 + x^6}$$

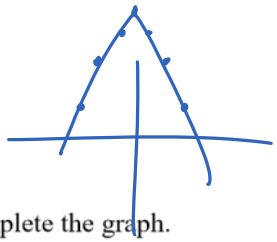
$$= -f(x) \quad \underline{\text{ODD}}$$

b)

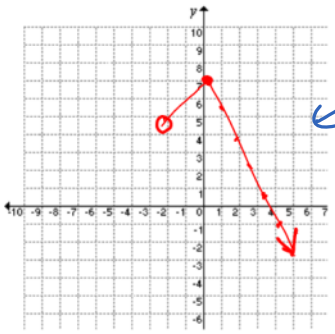
x	g(x)
-3	2
-2	5
-1	8
0	10
1	8
2	5
3	2

$f(-x) = f(x)$

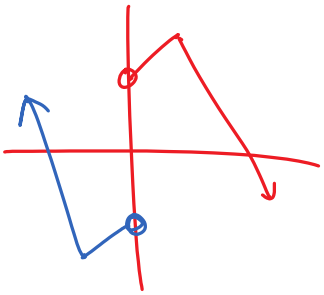
even



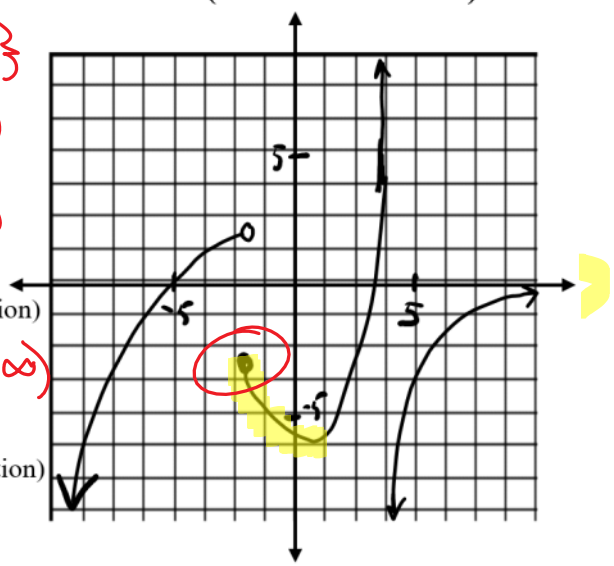
c) Part of the graph of function h(x) is shown. If function h(x) is odd, complete the graph.



messed up. graph should look like



3. For the following function, find the: **(4 marks:1 mark each)**



a. Domain $\{x \mid x \neq 4, x \in \mathbb{R}\}$

or $(-\infty, 4) \cup (4, \infty)$

b. Range $y \in \mathbb{R}$, $\{y \mid y \in \mathbb{R}\}$

$(-\infty, \infty)$

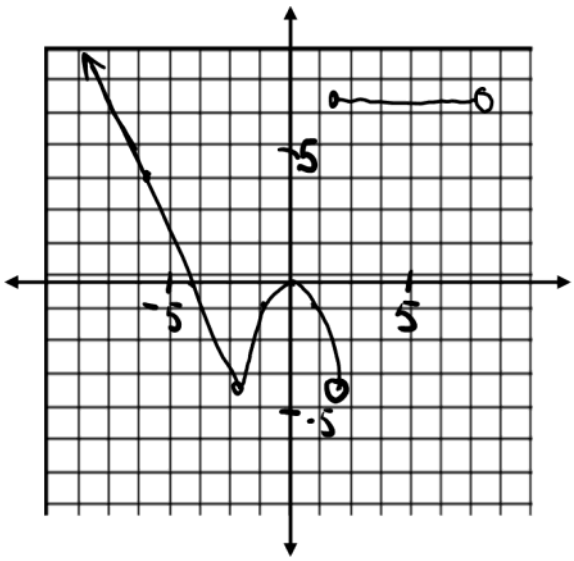
c. Intervals of increasing (use interval notation)

$(-\infty, -2) \cup (1, 4) \cup (4, \infty)$

d. Intervals of decreasing (use interval notation)

$[-2, 1)$

4. Find the piecewise equation for the following function. Show your work. Don't forget the intervals. **(4 marks)**



$$f(x) = \begin{cases} -2x-8, & \text{if } x \le -2 \\ -x^2, & \text{if } -2 < x < 2 \\ 7, & 2 \le x < 8 \end{cases}$$

5. If $f(x) = \sqrt{x-3}$ and $g(x) = 4x^2 - 8x + 1$, find **(6 marks)**

a. $f(x^4+3)$

$= \sqrt{x^4 - 3 + 3}$

$= \sqrt{x^4} = x^2$

b. $g(f(19))$

$f(19) = \sqrt{16} = 4$

$g(4) = 64 - 32 + 1 = 33$

c. $f(g(2x))$

$g(2x) = 4 \cdot 4x^2 - 8(2x) + 1$

$= 16x^2 - 16x + 1$

$f(16x^2 - 16x + 1) = \sqrt{16x^2 - 16x + 1 - 3}$

$\boxed{= \sqrt{16x^2 - 16x - 2}}$

d. $[f(f(x^2+3))]^2$

$\sqrt{x^2+3-3}$

$= f(x) = \sqrt{x-3} \rightarrow x \ge 3$

$f(x)^2 = x - 3 \quad x \in \mathbb{R}$

Domain: $x \ge 3$