

Math 141 Exam 1 (sample)

Name:

1. Solve the following inequalities.

(a) $2x \leq 4x + 7$

(b) $|2x + 1| > 3$

2. (a) A relation is given: $\{(a, 3), (b, 3), (c, 2), (c, 1)\}$. Is it a function? What are the domain and the range?

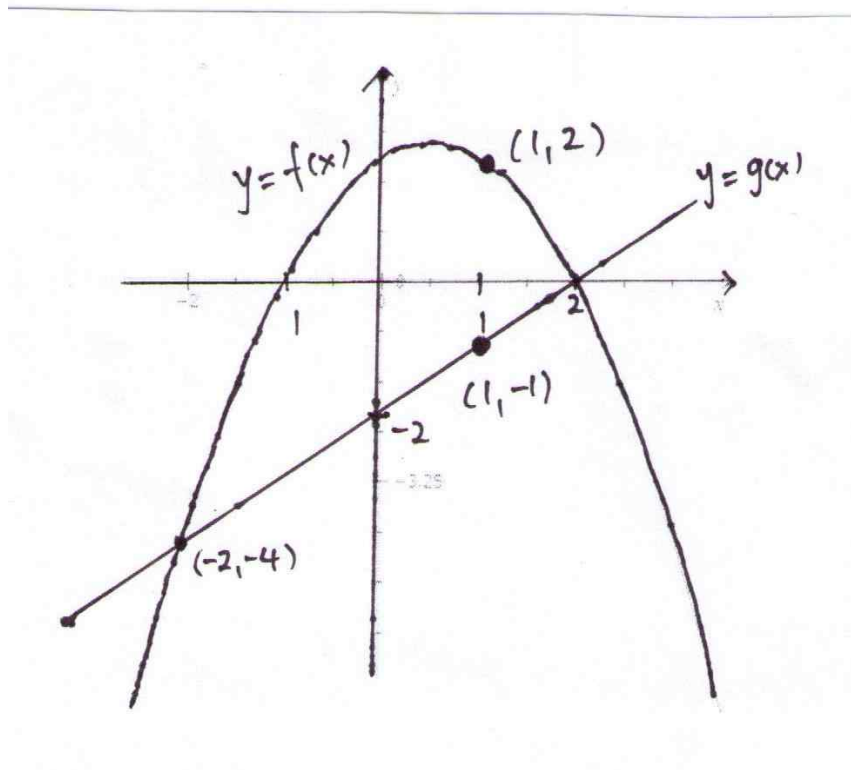
(b) A relation is given: $\{(a, 2), (b, 4), (c, 2), (e, 4)\}$. Is it a function? What are the domain and the range?

(c) What is the domain of $f(x) = \frac{1}{x^2+3}$?

(d) What is the domain of $f(x) = \frac{1}{(x-1)(x-2)}$?

3. Algebraically show that $f(x) = 2x^2 - \frac{1}{x^2}$ is an even function.

4. The graph of two functions, f and g , is illustrated. Use the graph to answer the parts (a)-(d).



(a) $f(1)$

(b) $g(0)$

(c) $(f+g)(1)$

(d) $\left(\frac{f}{g}\right)(-2)$

5. $f(x)$ is a function defined by $f(x) = x^2 + 2x + 3$. Calculate the following.

(a) $f(3)$

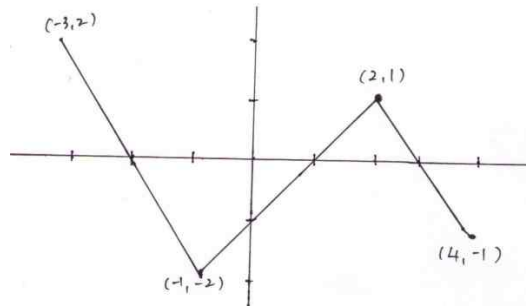
(b) $f(-x)$

(c) $-f(x)$

6. Points $(1,2)$ and $(3,8)$ are on the graph of a linear function $y = f(x)$. Find $f(x)$.

7. A farmer with 1000 meters of fencing wants to enclose a rectangular plot that borders on a river. The farmer does not fence the side along the river. Express the area A of the rectangle as a function of the width x of the rectangle.

8. The graph of a function f is given as below.



Find the following:

(a) The intercepts, if any.

(b) The domain and the range.

(c) The intervals on which it is increasing, decreasing, or constant.

(d) The local maxima and local minima, if any.

(f) Sketch the graph of $F(x) = f(x + 1)$.

(g) Sketch the graph of $G(x) = -f(x)$.

(h) Sketch the graph of $H(x) = f(-x)$.