

MAC 1105 PRACTICE EXAM III (65 points)

(5) ① a) Find the domain of
 $f(x) = \sqrt{x^2 + x - 2}$

Hint: Use a sign chart.

b) For what values of x is the graph of $f(x) = |5x - 2|$ above the graph of $f(x) = 3$?

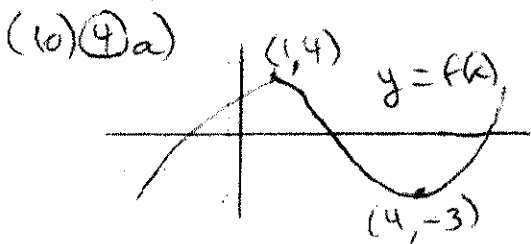
c) Find the domain of

$$y = f(x) = \frac{3}{|x+1| - 4}$$

(5) ② Let $f(x) = 2x^2 - x$. Simplify $\frac{f(x+h) - f(x)}{h}$

(10) ③ a) What's the x intercept of $f(x) = \frac{x-2}{x^2+9}$?

b) What's the y intercept of the function in a)?



On what intervals is $y = f(x)$ increasing?

b) Is $y = f(x) = |x^3|$ even, odd, or neither? Explain using functional notation.

(10) ⑤ a) Sketch $y = f(x) = x^3$
 b) Sketch

$$y = f(x) = \begin{cases} x^2 & \text{if } x < 0 \\ x+1 & \text{if } x \geq 0 \end{cases}$$

(10) ⑥ a) Sketch

$$y = (x+2)^2 + 1$$

b) Sketch $y = |x-3|$

(5) ⑦ 2,000 ft. of fencing is available to enclose a rectangle. Express its area A as a function of its width x .

MAC 110S PRAC. EXAM III KEY

①a) $x^2 + x - 2 \geq 0$

$(x+2)(x-1) \geq 0$

-2	..	1	$x \leq -2$ OR
Test Sign			$x \geq 1$
-3	..	+	
0	..	-	
2	..	+	

b) $|5x - 2| > 3$

$5x - 2 > 3$ OR $5x - 2 < -3$

$5x > 5$ OR $5x < -1$

$x > 1$ OR $x < -\frac{1}{5}$

c) $|x+1| - 4 \neq 0$ $|x+1| \neq 4$

$x+1 \neq 4$ $x+1 \neq -4$

$x \neq 3$ and $x \neq -5$

② $2(x+h)^2 - (x+h) - (2x^2 - x)$

$= 2x^2 + 4xh + 2h^2 - x - h - 2x^2 + x$

$= \frac{h(4x + 2h - 1)}{h} = 4x + 2h - 1$

③ a) $x - 2 = 0 \Rightarrow x = 2$

b) $f(0) = -\frac{2}{9}$

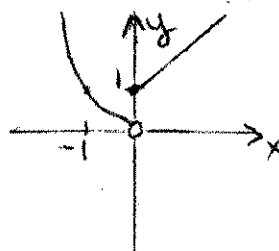
④ a) $x \leq 1, \dots, x \geq 4$

b) $f(-x) = |(-x)^3| = |-x^3|$
 $= |x^3| = f(x)$

even

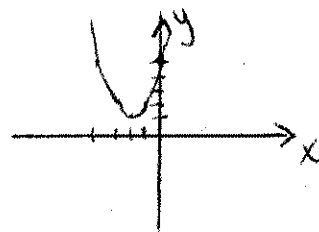
⑤ a) see text

⑤b)



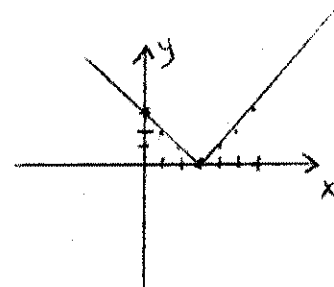
⑥a)

x	y
-4	5
-3	2
-2	1
-1	2
0	5

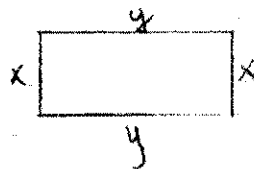


b)

x	y
0	3
1	2
2	1
3	0
4	1
5	2
6	3



⑦



$2x + 2y = 2000$

$\Rightarrow y = 1000 - x$

$A = xy$

$A = x(1000 - x)$

OR $A = 1000x - x^2$