

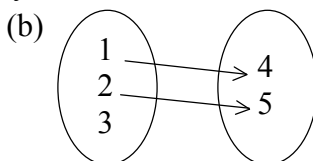
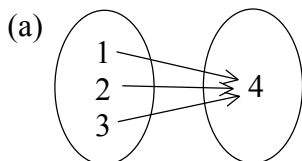
MPS21 – Precalculus
Exam 2 Review Sheet

Topics:

- definition of a function and evaluating functions
- finding the domain of a function
- finding intervals where a function is positive/negative
- applications involving cost, revenue, and profit
- graphing linear and quadratic functions
- graphing piecewise functions
- finding intervals where a function is increasing/decreasing/constant

Practice Problems:

1. Find the domain and the range of the function $f(x) = \sqrt{16 - x^2}$.
2. Determine whether each relation represents a function. If not, why not? If it is a function, state whether it is one-to-one or many-to-one.



(c) $y = x^2$ (d) $x = y^2$

(e) $y = -5$ (f) $x = 3$

(g)

Input	-1	0	1	0	2
Output	4	5	6	2	7

3. Solve the inequality by finding the critical points and making a sign chart:

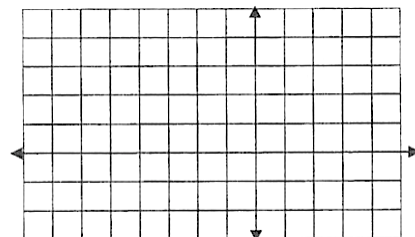
$$x^3 + 6x^2 + 8x < 0$$

4. State the domain of each function:

(a) $f(x) = 3x - 1$ (b) $f(x) = \frac{3x-1}{x+2}$ (c) $f(x) = \sqrt{25-x^2}$

(d) $f(x) = \frac{\sqrt{4-x}}{3}$ (e) $f(x) = \frac{x+5}{\sqrt{3-x}}$

5. Sketch the graph of $f(x) = \begin{cases} 5, & x \leq -4 \\ -x+1, & -4 < x \leq 2 \\ x^2 - 3x, & x > 2 \end{cases}$



Determine the open intervals over which $f(x)$ is

- (a) increasing: _____
- (b) decreasing: _____
- (c) constant: _____

6. Given $f(x) = x^3 - 4x^2 - 7x + 10$, use synthetic division to determine if -2 is a root. Find all roots of the function.
7. A company produces a product for which the variable cost is \$5.35 per unit and fixed costs are \$16,000. The company sells the product for \$8.20 and sells all that it produces.
 - (a) Find the total cost C as a function of x , the number of units produced.
 - (b) Find the profit P as a function of x .
 - (c) If the company sells 5,000 units of the product, do they make a profit? Explain.

8. Given $f(x) = \begin{cases} -x-3, & x \leq -1 \\ x^2-2, & x > -1 \end{cases}$

(a) $f(-2)$ (b) $f(-1)$ (c) $f(0)$ (d) $f(2)$

9. Sketch a graph of a function $f(x)$ that satisfies the following conditions:

- (i) increasing on $(-\infty, -5)$ (iii) constant on $(-5, 2)$
- (ii) decreasing on $(2, \infty)$ (iv) $f(0) = 3$