Mathematics
For Business Informatics (MATH-105)
Assignment Nr. 1

Student Name: App. ID: Tutorial Number: .

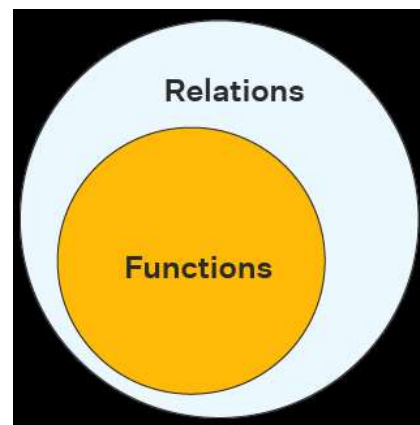## Print, Solve and submit till Thursday 7th November, 2024 at 3:45 PM

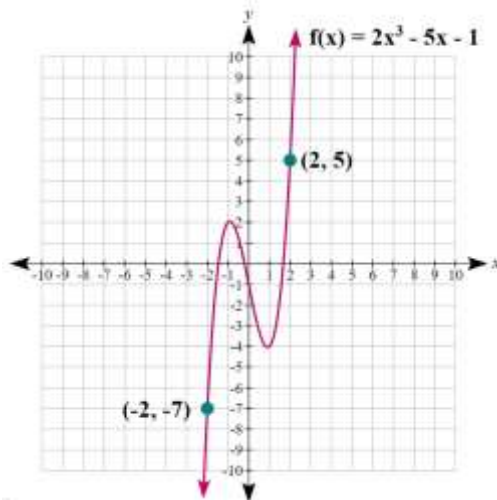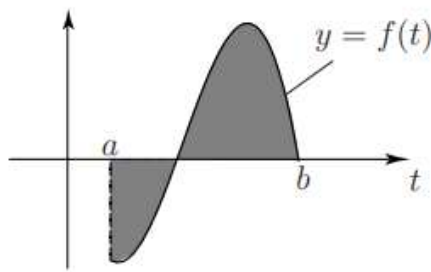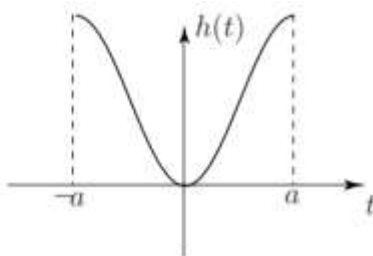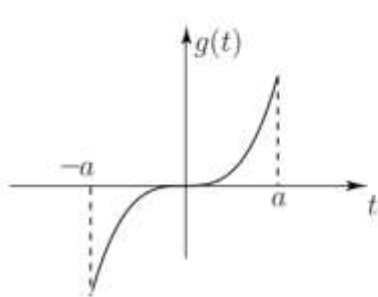**Exercise 1: Decide whether the given relations are functions or not and justify your answer:**

a) $y^2 = x - 3$
b) $y = -x^4 + 7$

Exercise 2: Determine algebraically whether the following Functions are even, odd or neither:

a) $y = x - 3$
b) $y = -x^4 + 7$
c) $f(x) = -x^3 - x$

Exercise 3: Decide from the graph whether the following Functions are even, odd or neither nor;

$f(x) = 2x^3 - 5x - 1$

(2, 5)

(-2, -7)

Justify your answer

Exercise 4: Solve the following:

a) $\quad -8 \leq -\frac{x}{6} \leq 1$

b) $\quad -3 \leq 1 - \frac{2x}{5} \leq 3$
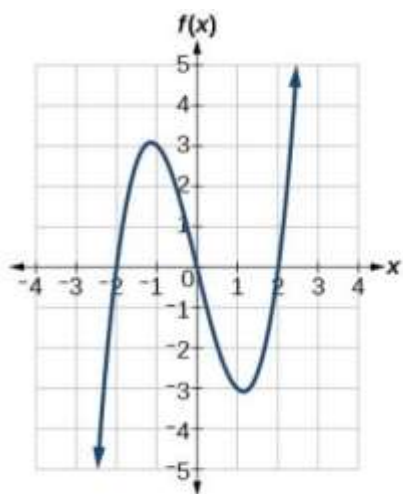
c) $\quad |3x + 4| = |2x + 6|$

d) $\quad (x - 4)^2 = 9$ "*take square root both sides and recall that* $\sqrt{x^2} = \pm x$ "
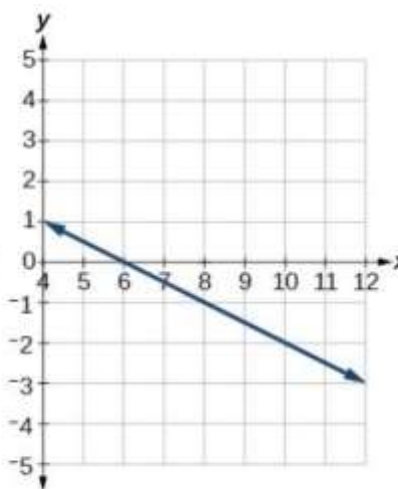
e) $\quad 3(4 - y) \geq 9$

Exercise 5: Determine whether the graph is a Function or Not a Function:
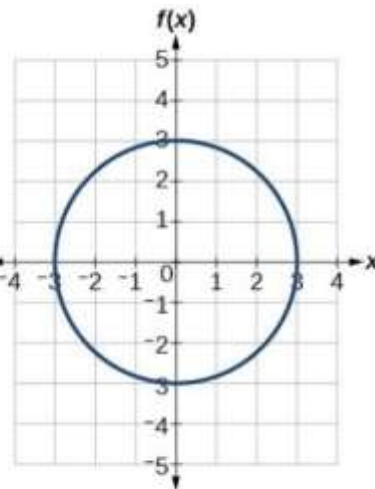If the graph represents a function, use the graph to find the **Domain** and **Range** of the functions.
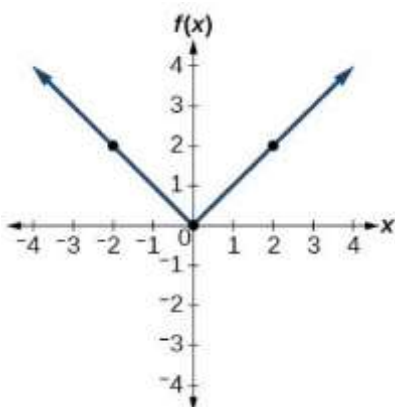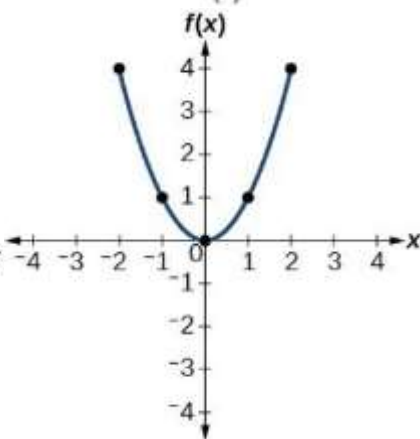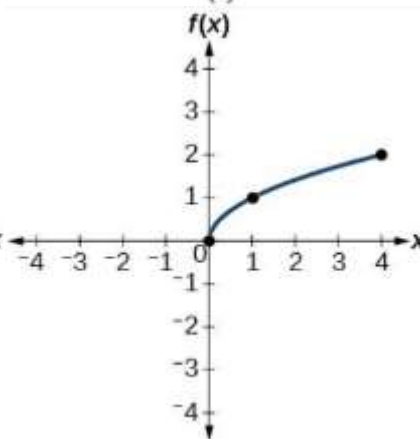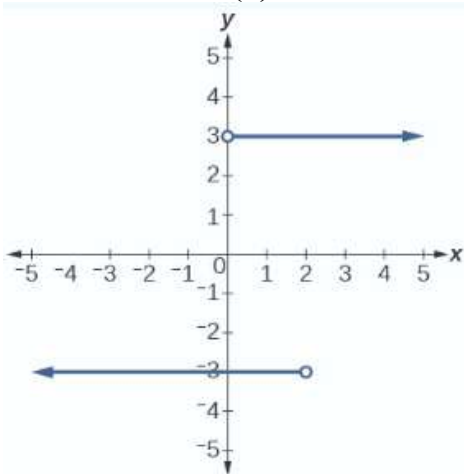

(a)

(b)

(c)

(d)

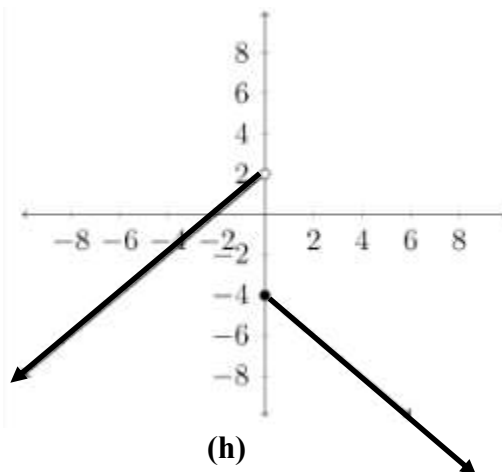(e)

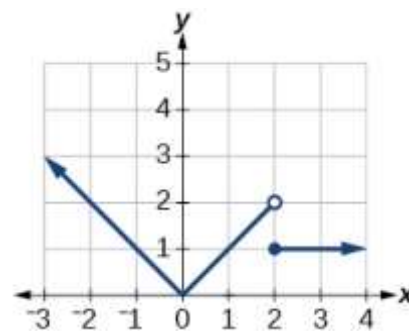

(f)

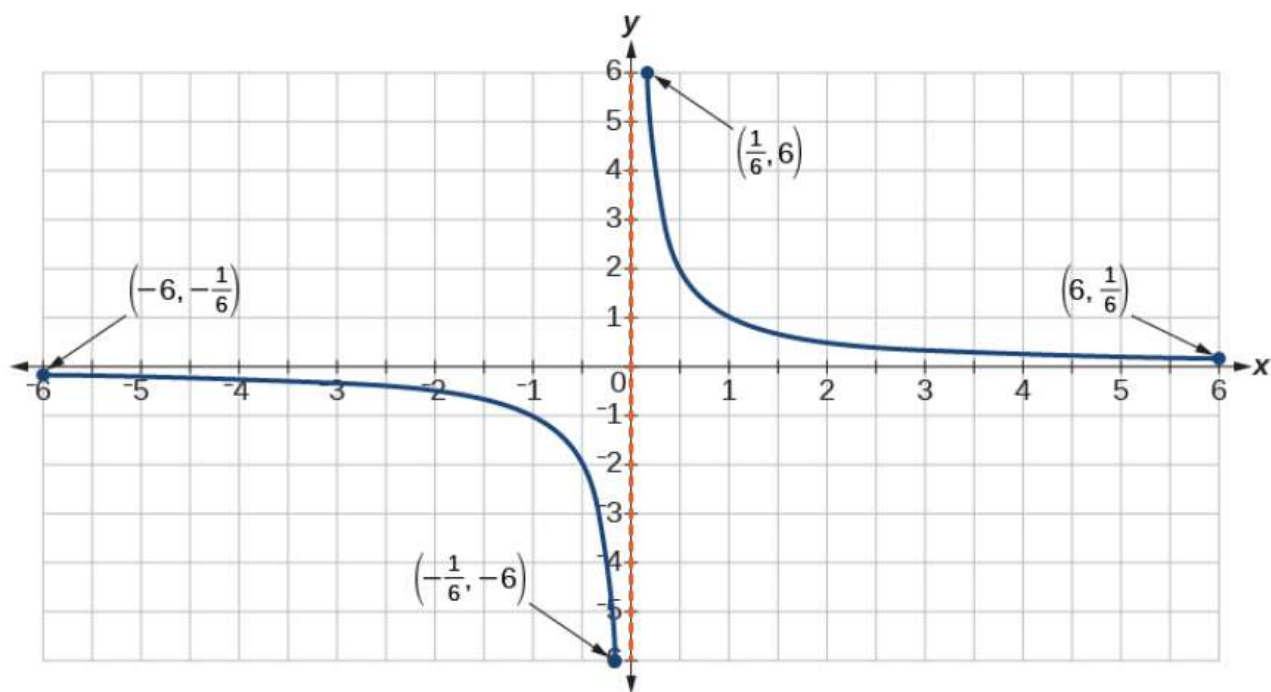

(g)

(h)

(i)

(j)

Exercise 6:

1- If a function is defined by:

$$f(x) = \begin{cases} x, & x < 0 \\ x^2, & 0 < x \le 2 \\ 8 - x, & x > 2 \end{cases}$$

Evaluate:

a) $f(5)$ b) $f(-5)$ c) $f(1)$ d) $f(0)$ e) $f(2)$

Exercise 7:

(Linear Depreciation = the same amount is depreciated every year from the equipment's value)
A small business purchased a piece of equipment for \$1000. After 4 years the equipment will be outdated, having no value.

(a) **Construct a linear model (linear equation) giving the value y of the equipment in terms of the time t in years, $0 \le t \le 4$.**
(b) **What is the value of the equipment after 2 years?**
(c) **Find the time when the value of the equipment will be \$550.**

Exercise 8:

Find the slope and $y-$intercept of the following straight line, and then graph the line:

$$-x + 2y = 6$$

Exercise 9:

Find the limit (if exists):

a) $\lim\limits_{x \to 2} \sqrt[3]{x + 2}$

b) $\lim\limits_{x \to 8} \dfrac{|x - 8|}{x - 8}$

c) $\lim\limits_{y \to 2} f(y)$, where $f(y) = \begin{cases} \dfrac{1}{2}y - 5 & y \leq 2 \\ -3y + 4 & y > 2 \end{cases}$

Exercise 10:

Discuss the continuity of the following function at the given point:

$$f(x) = \frac{2x}{x^2 - 4x - 12} \qquad \text{at } x = -2 \text{ and at } x = -6$$

$$f(x) = \begin{cases} 3 - x, & x < 2 \\ \dfrac{x}{2}, & x > 2 \end{cases} \qquad \text{at } x = 2, x = 5 \text{ and at } x = -3$$

Viel Erfolg! ☺