**MATH 10C UNIT 4** **REVIEW** (Chapter 5 – Relations and Functions)

1. Explain the difference between a relation and a function.

2. (i) Some of the relations below are functions. Write **function** to indicate which are functions; write **relation** to indicate which are only relations.

(ii) State the domain and range for each relation. Note that two of the graphs require inequalities to state the domain and range.

a) {(2,5), (3,5), (4,5), (5,5)} d) {(-6,2), (-5,1), (-6,-2), (-3,1), (-5,-1)}

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D:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ D:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

R:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ R:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

*x*

*y*

5

b) e)

*x*

*y*

25

-20

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

D:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ D:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

R:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ R:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

4

8

4

8

-8

-4

-8

-4

*x*

*y*

c) f)

-7

-3

1

5

9

12

13

14

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

D:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ D:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

R:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ R:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

(iii) Which one(s) of the graphs above shows a **linear function**? Briefly explain your reasoning.

3. The graph at right shows a car leaving Fort Saskatchewan and driving south on highway 21.

Speed

Time

A

B

D

E

C

F

a) Describe what is happening in each section of the graph, using statements like “stopped”, “slowing down”, “speeding up”, and “constant speed.”

A: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

B:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

C: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

D: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

E: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

F: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

0

Speed

A

15 m/s

3 s

b) In what section is the rate of change of speed compared

to time the greatest? Is this rate of change positive or negative?

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

4. Section A of the graph for question #3 is shown to the right, with values of speed and time given. What is the value of the rate of change in this section?

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5. Construct a table of values that would allow you to draw the graph of the linear function *f(x)* = 4*x* + 1. Draw the graph of the function on the left-hand axis on the following page.

6. You are given the function *f(x)* = 3*x*2 – 11.

a) Is this a linear function? Without drawing the graph, how do you know?

b) Construct a table of values for the function, using domain values from -3 to +3. Then sketch the graph of the function on the right-hand axis on the following page.

4

*x*

*f(x)*

0

8

-4

16

-8

8

4

*x*

*f(x)*

0

8

-4

8

-4

4

7. The table gives the costs for a banquet at the Capri restaurant.

|  |  |
| --- | --- |
| Number of People (*n*) | Total Cost (*C* - dollars) |
| 10 | 700 |
| 20 | 1200 |
| 30 | 1700 |
| 40 | 2200 |
| 50 | 2700 |

a) Is this a linear relation? How do you know?

b) Find the rate of change for the banquet costs.

c) Write the linear function representing the banquet costs.

d) What would the Capri charge for a banquet of 120 people?

8. The graph to the right shows a large water tank being emptied over a certain time period.

Water in Tank (litres)

Time (minutes)

10

200

20

30

600

800

400

a) What was the initial volume of water in the tank?

b) How long did it take to completely empty the tank?

c) What is the rate of change of water in the tank?

d) About how long did it take to remove 500 litres of water from the tank?