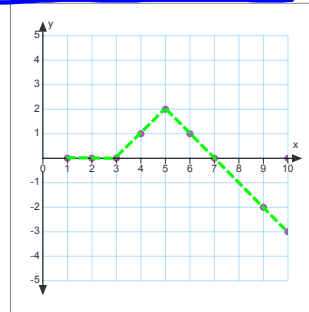


Unit 5 Test tomorrow

- 8 problems
 - * Trends in graphs
 - * Rate of change
 - * Linear model
 - * Quadratic model
 - * Exponential model
- } given a table of values, graph and equations, determine the corresp. model
- * Perform a linear, quadratic and exponential regression at www.desmos.com
 - * Use the equations from regressions to make predictions.

Ex: Determine when the rate of change in a soccer player's plus/minus score is zero, constant, or changing.

Ans:
 zero: 1-3
 changing: 3, 5
 constant: 3-5, 5-10
 ↑ ↓
 increasing decreasing



[2] 1. Calculate the average rate of change for each table. Show your work beside the table.

i)

Pages printed	Cost (\$)
1000	56
5000	145

$(1000, 56) \rightarrow$ $(5000, 145) \rightarrow$

$$\begin{aligned} \text{A.R.Ch.} &= \frac{145 - 56}{5000 - 1000} \\ &= \frac{89}{4000} \\ &= 0.02225 \\ &(\$0.02 \text{ per page}) \end{aligned}$$

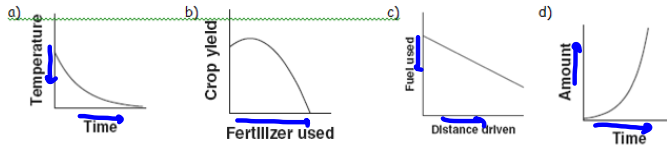
ii)

Distance driven (km)	Fuel used (L)
45	3
60	12

$(x_1, y_1) \rightarrow (45, 3)$
 $(x_2, y_2) \rightarrow (60, 12)$

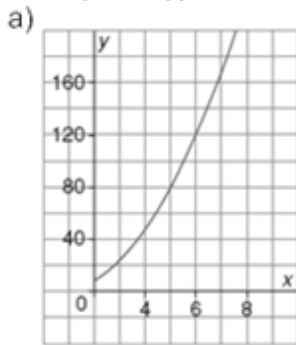
$$\begin{aligned} \text{A.R.Ch.} &= \frac{y_2 - y_1}{x_2 - x_1} \\ &= \frac{12 - 3}{60 - 45} \\ &= \frac{9}{15} \\ &= \frac{3}{5} \\ &= 0.6 \\ &(0.6 \text{ L per km driven}) \end{aligned}$$

[4] 2. Describe the relations shown below.

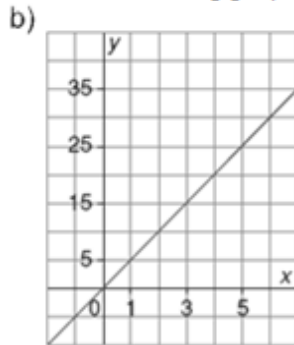


- Ans:
- a) As time increases, Temperature decreases rapidly/exponentially.
 - b) As the amount of fertilizer used increases, crop yield increases, reaches its maximum, and then decreases.
 - c) As distance driven increases, fuel used decreases (fuel efficiency) at a constant rate.
 - d) As time increases, the amount increases exponentially.

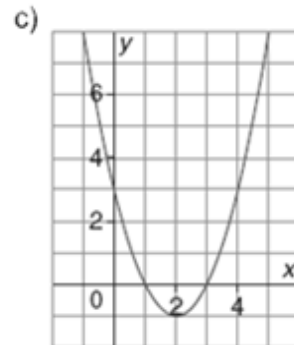
[3] 3. Identify the type of relation for the following graphs.



Exponential



Linear



Quadratic

[3] 4. Identify the type of relation being modeled by each equation. Justify your answer.

a) $y = 2 + 4x$

Linear
($y = mx + b$)

b) $y = 2 + 4x^2$

Quadratic
($y = ax^2 + bx + c$)

c) $y = 2(4)^x$

Exponential
($y = a(b)^x$)

[6] 5. Identify at least one Linear, one Quadratic and one Exponential relation from the tables given. Provide support for your choice by including appropriate calculations.

t	0	1	2	3
A	35	25	15	5

linear relation (constant 1st diff.)
1st d | -10 -10 -10

d	0	1	2	3
P	51.2	64	80	100

Exponential (ratio: 1.25)

t	0	1	2	3	4
c	0.5	2	8	32	128

Exponential relation (constant ratios)
ratio: 4 4 4 4

Time (s)	0	1	2	3
Height (m)	60	55	40	15

quadratic relation (2nd diff. are constant)
1st diff. | -5 -15 -25
2nd diff. | -10 -10

$-15 - (-5) = -15 + 5 = -10$

Hours	0	5	10	15
Earnings (\$)	0	40	80	120

linear

Review:

Pg. 332; # 1-9, 11-16