Lesson #8 Assignment.

(a) For each table values

Table 1

difference X-values	X	Y	difference of Y values	Ratio.
1-0=1	0	64	32 - 64 = -32	$\frac{32}{64} = \frac{1}{2}$
2-1=1	1	32	16 - 32 = -16	$\frac{16}{32} = \frac{1}{2}$
3-2=1	2	16	8 - 16 = -8	$\frac{8}{16} = \frac{1}{2}$
4-3=1	3	8	4 - 8 = -4	$\frac{4}{8} = \frac{1}{2}$
5-4=1	4	4	2 - 4 = -2	$\frac{2}{4} = \frac{1}{2}$
	5	2.		

(i) The ratio is the same $= \frac{1}{2}$

(ii) The relation is exponential

(iii) The relation is exponential therefore the decay factor $= y = 5.(\frac{1}{2})^x$

Table 2.

X	Y	
0	25	21 - 25 = -4
2	21	17 - 21 = -4
4	17	13 - 17 = -4
6	13	9 - 13 = -4
8	9	5 - 9 = -4
10	5	

(i) The first difference (the difference between any two successive output values) is the same value (-4)

(ii) The relation is linear

(iii) The slope and y-intercept are:

equation = $y = -4x + 10$

$y = mx + c$

slope $= -4$ and y intercept $= 10$

Table 3

x	y		
0	15		
		16 − 15 = 1	
5	16		3 − 1 = 2
		19 − 16 = 3	
10	19		5 − 3 = 2
		24 − 19 = 5	
15	24		7 − 5 = 2
		31 − 24 = 7	
20	31		9 − 7 = 2
		40 − 31 = 9	
25	40		

(ii) The second differences is the same.

(iii) This is quadratic model because the second differences are the differences that have the same value (2)

(iv) The direction of opening

$y = 25x^2 + 40x + 15$ thus the direction of opening is 15.

(c) Graph each relation.

(a) $y = 3x + 15$

(b) $y = -(x + 3)^2 + 5$

Tables

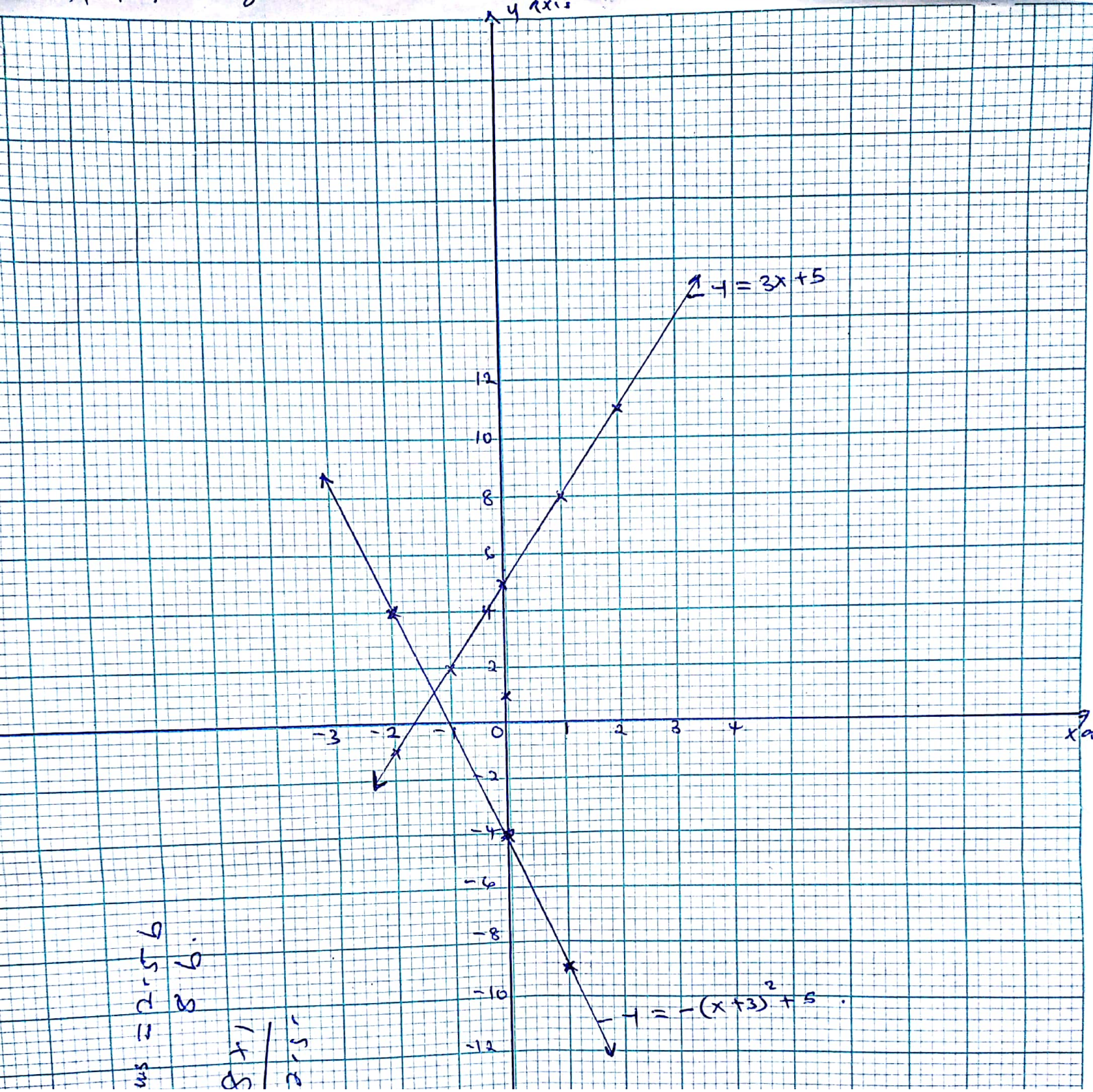
(a) $y = 3x + 15$

x	y
-2	-1
-1	2
0	5
1	8
2	11

(b) $y = -(x^2 + 6x + 9) + 5$.

x	y
-2	4
-1	1
0	-4
1	-11
2	-20

A Graph of $y = 3x + 5$ and Graph of $y = -(x+3)^2 + 5$.



(x+3)²

③ Determine the slope of the line between the points (-6, 10) and (14, 18)

slope of the line, $M = \frac{y_2 - y_1}{x_2 - x_1}$

$(x_1, y_1) = (-6, 10)$

$(x_2, y_2) = (14, 18)$

$M = \frac{18 - 10}{14 + 6}$

$M = \frac{8}{20}$

$M = 2/5$

④

(a) Identify the dependent and independent variable. Choose the appropriate variable to represent each one.

$50 is the dependent variable and $75 is the independent variable.

(b) Write the equation to represent the pay at each shop.

Shop B = C = $50x + 75$.

Shop A.

Slope $= \frac{\Delta y}{\Delta x} = \frac{\Delta \text{income}}{\Delta \text{time}} = \frac{225 - 75}{3 - 1}$

$\frac{150}{2} = 75$.

Equation $= y = mx + c$

$y = 75x + 0$.

Shopi Roy

(a) Structure is direct variation? which is Partial variation?

Shop A is direct variation - The equation is $y = mx$
$y = 75x$. Dependent variable depends directly to the change in independent variable.

Shop B is Partial variation.
y intercept $\neq 0$ since the equation $= y = 50x + 75$

(d) Use the equation to determine mechanics income in 9 hrs

Shop B $y = 50x + 75$

$C = 50 \times 9 + 75$

$C = \$525$

Shop A

$y = 75x$

$C = 75 \times 9 = 675$

$C = \$ 675$

Total cost $= \$ 1200$

(e) Equation A $y = 75x + 0$

Equation B $y = 50x + 75$

$0 = 25x - 75$

$\frac{25x}{25} = \frac{75}{25}$

$x = 5$

5 hours

⑤ (a) What is the maximum height the rocket reaches? How long after it is launched does it reach the height.

$h = -5(t-2.5)^2 + 32$.

$h = -5(t^2 - 5t + 6.25) + 32$

$h = -5t^2 + 25t - 31.25 + 32$

$h = -5t^2 + 25t + 0.75$.

Time to reach Max height

$t_{max} = -b/2a$.

$t_{max} = \frac{-25}{2x-5} = \frac{-25}{-10} = 5/2$

$T_{max} = 5/2$ sec

$H_{max} = -5 x t_{max}^2 + 25 x t_{max} + 0.75$

$= -5 \times \frac{25}{4} + 25 \times 5/2 + 0.75$

$= \frac{-125}{4} + \frac{125}{2} + 0.75$

Maximum height = 32m.

Time to reach the height = 5/2 sec.

(b) From what height above the ground is the rocket launched

$h = 1/2 gt^2$

$h = 1/2 \times 9.8 \times 25/2$.

$h = 4.9 \times \frac{25}{2}$

$h = 61.25$m.

(c) How long above the ground is the rocket 4 seconds after it is launched

$h = -5 \times t^2 + 25 \times t + 0.75$

$h = -5 \times 16 + 25 \times 4 + 0.75$

$h = -80 + 100 + 0.75$

$h = 20.75\text{m}$.

(6) Complete the table and graph each relation on the same set grids. Label each ~~grid~~ graph with its equation. Identify the relation that grows the most rapidly and the one that grows slowest.

x	$y = 2x$	$y = x^2$	$y = 2^x$
0	0	0	1
1	2	1	2
2	4	4	4
3	6	9	8
4	8	16	16
5	10	25	32
6	12	36	64

(a) Relation that grow most rapidly is $y = 2^x$

(b) Relation that grows slowly is $y = 2x$.

4 axis · A Graph of $y = 3x + 5$ and Graph of $y = -(x+3)^2 + c$ ·

A Graph of $y = 2x$, $y = x^2$ and $y = 2^x$