MATHEMATICS APPLICATIONS
Test 2 2017-2018
Linear Functions
Resource Free
Marks: 50 Time Allowed: 50 minutes

TOTAL: 50

Name: _Marking Guide_

○ /50

ALL working must be shown for full marks.
For full marks you will need to show _all_ your working out.

Question 1

[2,2,3,3,3,3 = 16 marks]

a) Solve the following Linear functions

i) $4y - 6 = 30$

$$+6 \quad +6 \quad \checkmark$$
$$\frac{4y}{4} = \frac{36}{4}$$
$$y = 9 \quad \checkmark$$

ii) $4x + 12 = 3x + 6$

$$-3x \qquad -3x \quad \checkmark$$
$$x + 12 = 6 \quad \checkmark$$
$$-12 \quad -12$$
$$\underline{x = -6} \quad \checkmark$$

iii) $3(x + 8) - 2 = 7$

$$3x + 24 - 2 = 7 \quad \checkmark$$
$$3x + 22 = 7$$
$$-22 \quad -22 \quad \checkmark$$
$$\frac{3x}{3} = \frac{-15}{3} \quad \checkmark$$
$$\underline{x = -5} \quad \checkmark$$

iv) $2x + 8 = -3(x + 2)$

$$2x + 8 = -3x - 6 \quad \checkmark$$
$$+3x \qquad +3x$$
$$5x + 8 = -6 \quad \checkmark$$
$$-8 \quad -8$$
$$\frac{5x}{5} = \frac{-14}{5}$$
$$x = -2\frac{4}{5} \quad \checkmark$$

○ /10

b) <u>**Give the equation**</u> that represents the following situations and <u>**then solve**</u> to find the value of x.

i) "Three times a number is divided by four and then two is added. The result is one less than the original number"

$$\frac{3x}{4} + 2 = x - 1$$

$-x$ ✓

$\frac{-x}{4} + 2 = -1$

$-2 \quad -2$

$-4 \times \frac{-x}{4} = -3 \times 4$

$x = 12$

3.

ii) "Twice a number divided by three subtracted from 10 results in four minus a number divided by 2"

$$10 - \frac{2x}{3} = 4 - \frac{x}{2}$$

$6 \times 10 - \frac{^{2}2x}{\cancel{3}} = 4 - \frac{^{3}x}{\cancel{2}}$ ×6

$60 - 4x = 24 - 3x$

$+4x \qquad +4x$

$60 = 24 + x$

$-24 \quad -24$

$36 = x$

$\therefore x = 36$

3.

Question 2   [3,3,1,2,3 :12 marks]

For the tables and graphs given below
  i) Decide if a linear relationship is shown.
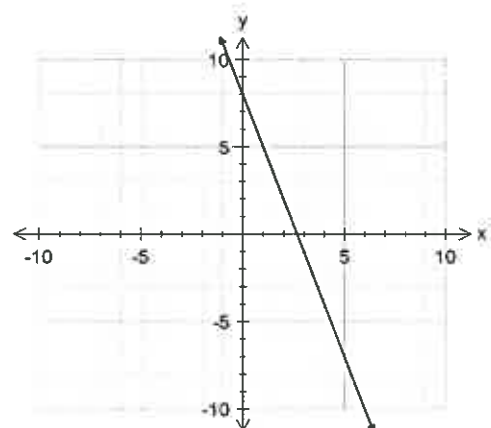 ii) If table or graph is linear, give the linear equation.

a)

x	-2	-1	0	1	2
y	5	8	11	14	17

Linear: (Yes) / No   ✓

Rule: $y = 3x + 11$

✓ ✓

b)

Linear: (Yes) / No   ✓

Rule: $y = -3x + 8$

✓

6.

/12

c)

x	2	-1	1	0	-2
y	10	12	14	16	18

Linear: Yes / (No) ✓

Rule:

d)
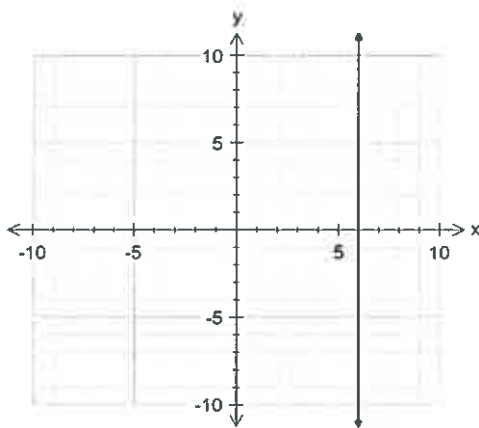
Linear: (Yes) / No ✓

Rule: $x = 6.$ ✓

e)

x	-1	1	3	5	7
y	6	2	-2	-6	-10

Linear: (Yes) / No ✓

Rule: $y = -2x + 4$ ✓ ✓

/6

Question 3   **[2, 2, 3 = 7 marks]**

a) For the function $y = -4x - 4$, give the gradient and y intercept.

(handwritten in red) $M = -4$ ✓

$y\text{-int} = -4$ or $(0, -4)$ ✓

2.

b) For the function $3x - 2y = 30$, give the x-intercept and y intercept.

(handwritten in red, left)
Sub $y=0$ into eq^n.
$3x - 2\times0 = 30$
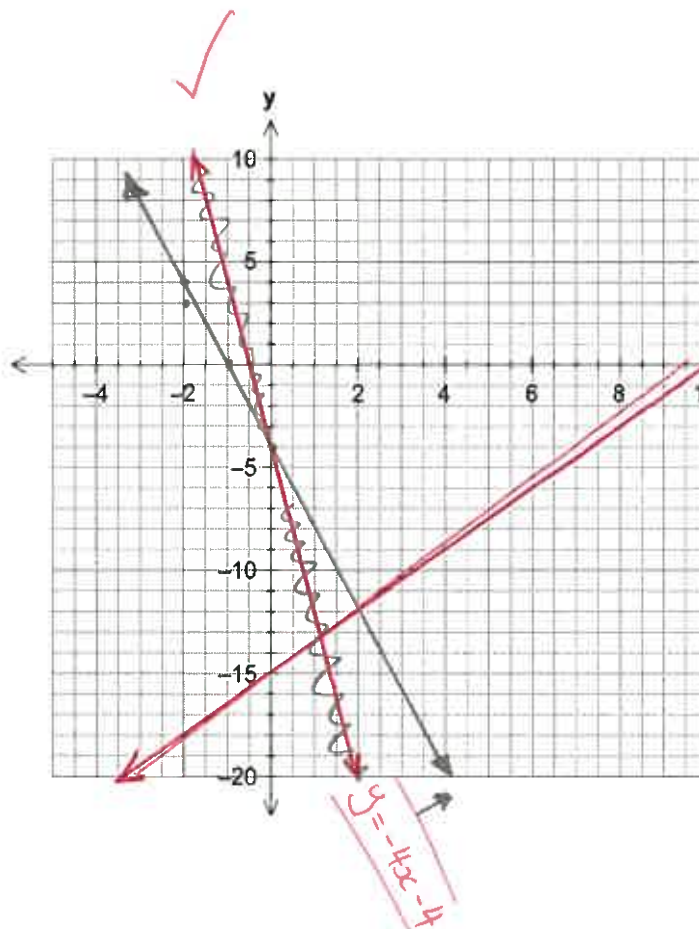$3x = 30$
$x = 10$, $(10, 0)$ ✓

(handwritten in red, right)
Sub $x=0$ into eq^n.
$3\times0 - 2y = 30$
$-2y = 30$
$y = -15.$ $(0, -15)$ ✓

2.

c) Sketch the functions above on the following axis. (must be ruled)

3.

(handwritten annotations in red)
b) $3x - 2y = 30$ ✓

✓ = Lines ruled

$y = -4x - 4$

(circled at bottom) $\frac{7}{7}$

Question 4 [1,2,2,1,3,2,4 = 15 marks]

Amber is a plumber. She charges $60 for arriving at a job, and $75 per hour that she works.
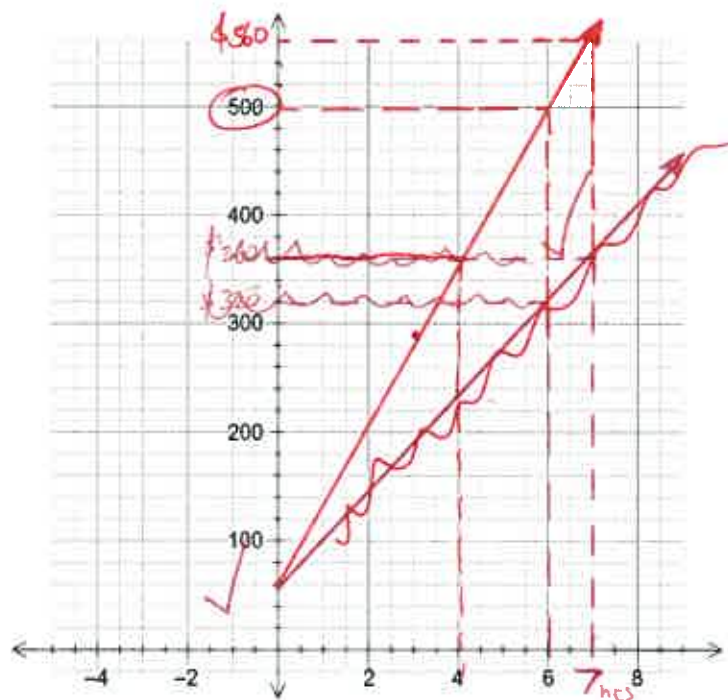
a) What is the independent variable in this relationship?

Time worked. ✓   1

b) Use the information above to complete this table

Time worked, t (hours)	0	1	2	3	10
Cost, C($)	$60	$135	$210	$285	$810 ~~$60~~

✓ ✓   −1 Mark per error. 2.

c) Graph the data in the table on the axis below.

d) What is the significance of the intercept on the y axis?

It represents the callout fee / arriving at job fee. ✓ 1

e) Determine the equation of the line for the relationship between t and C.
(must be in terms of **t** and **c**)

$$C = 75t + 60$$

✓ ✓ ✓   3.

/9

f) What is the significance of the Gradient?

2

It represents cost per hour ✓

g) Use your graph to answer the following questions

4

   i) How much would Amber charge for working 6 hours?

$510 +/- 40 ~~$500 less~~ (see graph). ✓

  ii) How long has Amber worked if she charges $360?

4.7 hrs. (see graph). ✓

• ·)x Mark each
  for showing
  graphically.

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