

Name: _____

Solutions

Date: _____


Baldivis
 Secondary College

Subject :Year 11 Applications
Test 6, 2016
Topics – Linear equations, simultaneous equations, piece-wise functions and step graphs

 50

_____ %

Total Time: 58 minutes

Total Reading: 5 minutes

Total Working: 53 minutes

Weighting: 8% of the year.

Equipment: SCASA Formula Sheet; 1 page notes (A4 double side) unfolded, Classpad; Scientific Calculator

SECTION 1: CALCULATOR FREE

| | |
|----------------------------|--------------------------------------|
| Time: 20 minutes | Marks for Section 1: 16 marks |
| Reading: 2 minutes | Equipment Allowed: Nil |
| Working: 18 minutes | |

1. [4 marks: 1, 1, 1, 1]

Solve the following equations:

a) $5x + 3 = 63$

$x = 12 \checkmark$

b) $-7 - 2y = 23$

$y = -15$

c) $\frac{9-2x}{3} = 7$

$x = -6 \checkmark$

d) $5h + 13 = 2h - 2$

$3h = -15$
 $h = -5 \checkmark$

2. [2 marks]

The sum of three consecutive integers is 144. Determine each of the integers.

$$x + x + 1 + x + 2 = 144 \checkmark$$

$$3x + 3 = 144$$

$$x = 47 \checkmark$$

$$47, 48, 49 \checkmark$$

3. [3 marks: 1, 2]

The cost of hiring a limousine for the year 12 ball is \$175 plus \$3.50 for each kilometer travelled.

- a) Construct a formula to calculate the cost of hiring a limousine with this company

$$C = 3.50k + 175 \checkmark$$

- b) Calculate the cost of hiring a limousine to travel 20 km.

$$\begin{aligned} C &= 3.50 \times 20 + 175 \checkmark \\ &= \$245 \checkmark \end{aligned}$$

4. [4 marks: 1, 1, 2]

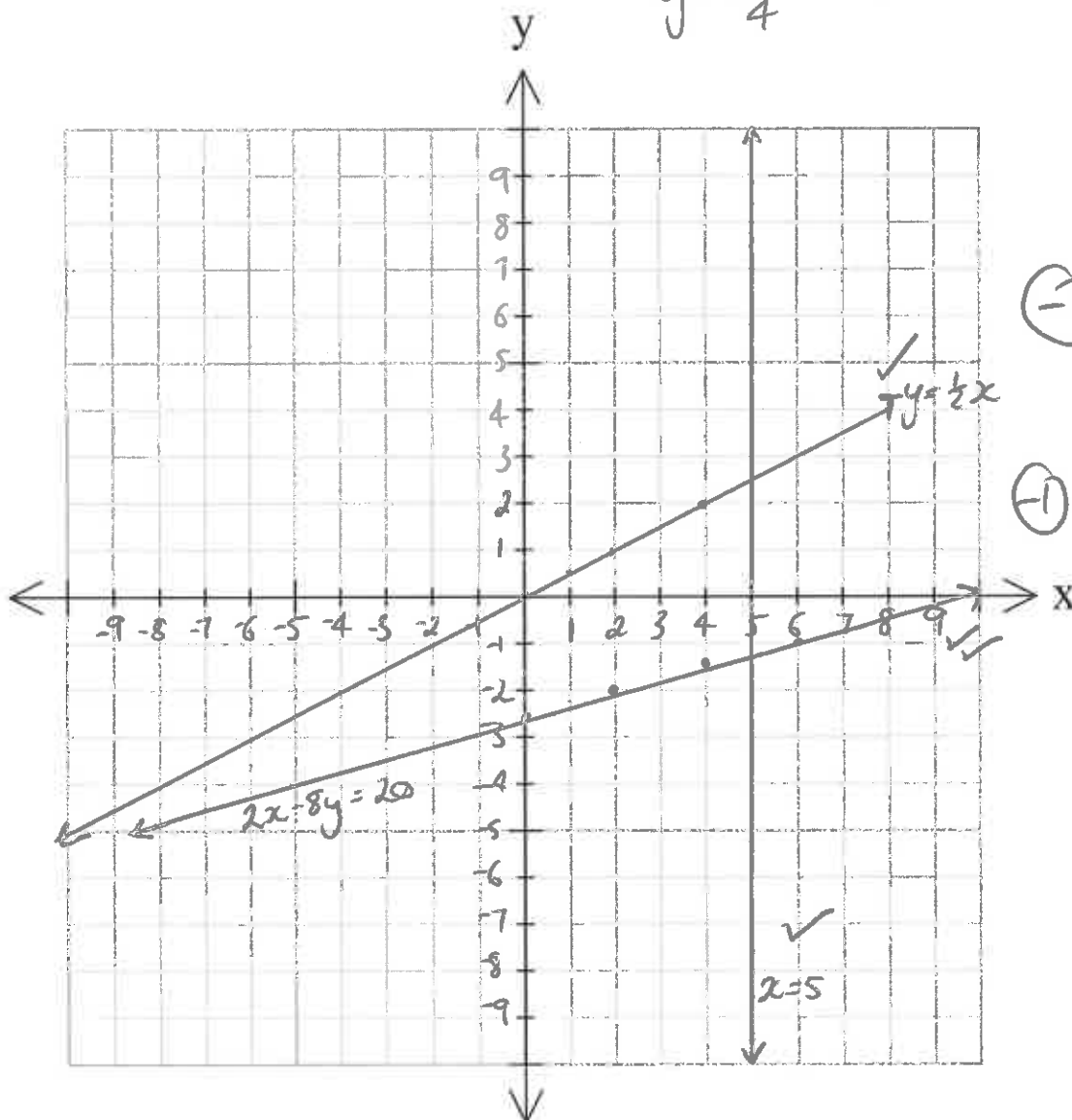
Graph the following linear functions on the number plane provided:

a) $x = 5$

b) $y = \frac{1}{2}x$

c) $2x - 8y = 20$

$$\begin{aligned} -8y &= -2x + 20 \\ y &= \frac{x}{4} - 2.5 \end{aligned}$$



⊖ lines not labelled
⊖ no ruler

5. [2 marks: 1, 1]

Write the linear equation for the following table of values:

a)

| | | | | | | |
|---|---|---|---|----|----|----|
| x | 0 | 1 | 2 | 3 | 4 | 5 |
| y | 1 | 5 | 9 | 13 | 17 | 21 |

↖
+4

$$y = 4x + 1 \checkmark$$

b)

| | | | | | | |
|---|---|----|----|----|----|----|
| x | 6 | 7 | 8 | 9 | 10 | 11 |
| y | 8 | 10 | 12 | 14 | 16 | 18 |

↖
+2

$$y = 2x - 4 \checkmark$$

6. [3 marks: 1, 2]

Solve the following simultaneous equations:

a) $y = 2x + 6$

$y + 3x = -4$

$$2x + 6 + 3x = -4$$

$$5x + 6 = -4$$

$$5x = -10$$

$$x = -2$$

$$y = -2 \times 2 + 6$$

$$= -4 + 6$$

$$= 2$$

$$x = -2, y = 2 \checkmark$$

b) $10x + 11y = 39$

$5x - 22y = 47$

$$20x + 22y = 78$$

$$+ \quad 5x - 22y = 47$$

$$25x = 125$$

$$x = 5$$

$$10 \times 5 + 11y = 39$$

$$50 + 11y = 39$$

$$11y = -11$$

$$y = -1$$

$$x = 5, y = -1 \checkmark \checkmark$$

~ END OF TEST SECTION 1~

Name: _____

Date: _____

SECTION 2: CALCULATOR ASSUMED

| | | | |
|----------|------------|----------------------|---|
| Time: | 38 minutes | Marks for Section 2: | 34 marks |
| Reading: | 2 minutes | Equipment Allowed: | SCSA, FormulaSheet, 1 page notes(A4 double side), Classpad, scientific calculator |
| Working: | 36 minutes | | |

7. [5 marks: 1, 1, 3]

The value (V) of a car t years after it is purchased is given by the equation $V = 350 - 10t$.

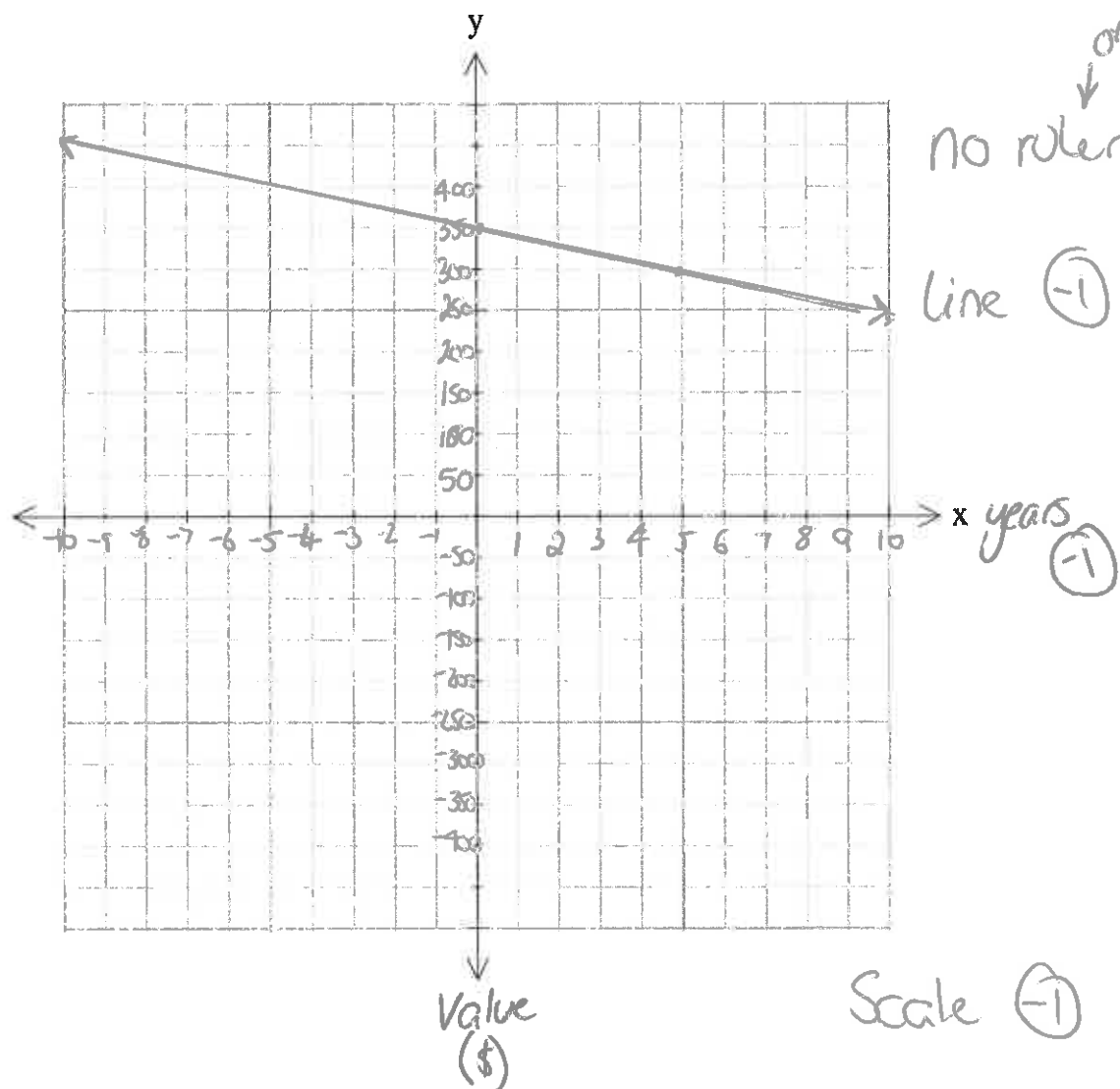
- a) Find the value of the car when it was new

$$V = \$350 \checkmark$$

- b) After 5 years

$$\begin{aligned} V &= 350 - (10 \times 5) \\ &= 300 \checkmark \end{aligned}$$

- c) Plot the relationship.



$$(5000, 4) \quad (9500, 7)$$

8. [3 marks]

A swimming pool is being filled at a constant rate so that after 4 hours it contains 5000 litres, and 3 hours later it contains 9500 litres. Write an equation representing this relationship, letting V be the volume in the pool after t hours.

$$V = 1500t - 1000 \quad \checkmark$$

$$m = \frac{9500 - 5000}{7 - 4} \\ = 1500 \text{ L} \quad \checkmark$$

$$c = 5000 - (1500 \times 4) \\ = -1000 \quad \checkmark$$

9. [2 marks: 1, 1]

Find the equations of the line that passes through the points below:

a) $(-1, 3) (0, 4)$

$$m = \frac{4-3}{0-(-1)} = 1 \quad \checkmark \quad y = x + 4 \quad \checkmark$$

$$c = 4$$

b) $(-2, -2) (0, 2)$

$$m = \frac{2-(-2)}{0-(-2)} = 2 \quad \checkmark \quad y = 2x + 2 \quad \checkmark$$

$$c = 2$$

10. [2 marks: 1, 1]

Find the equation of the line given the gradient and one point:

a) $m = 6 \quad (-1, 5)$

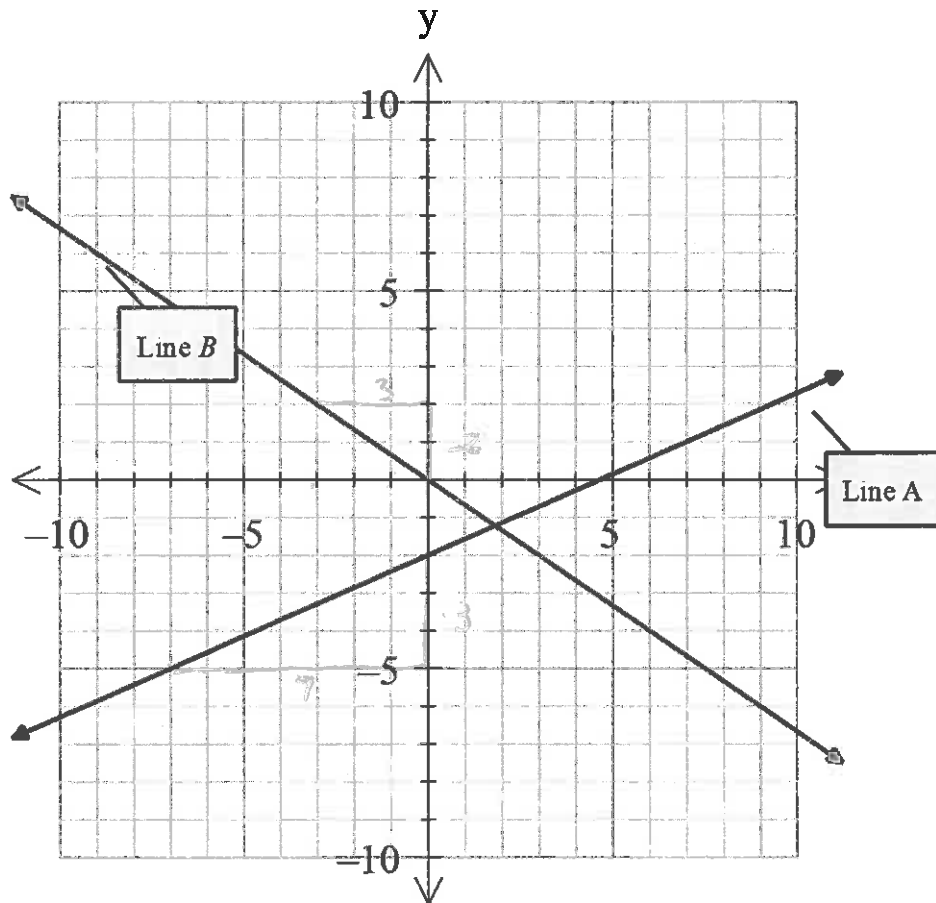
$$c = 5 - (6 \times -1) \\ = 11 \quad \checkmark \quad y = 6x + 11 \quad \checkmark$$

b) $m = -2 \quad (0, 3)$

$$c = 3 - (-2 \times 0) \\ = 3 \quad \checkmark \quad y = -2x + 3 \quad \checkmark$$

11. [2 marks: 1, 1]

Find the equation of the line from the following graphs:



a) Line A
 $y = \frac{3}{7}x - 2$ ✓

b) Line B
 $y = -\frac{2}{3}x$ ✓

12. [4 marks: 2, 2]

The year 12's are looking at transportation to their school ball. A hummer limo can carry 10 people, and a normal taxi can carry 2 people. There are 40 people that need transportation, and they need 8 vehicles for safety requirements.

a) Write the simultaneous equations for this information

$h = \text{hummer}$
 $t = \text{taxi}$
 $8 = h + t$ ✓
 $40 = 10h + 2t$ ✓

b) Find the number of hummer limo's and taxi's they will need

$h = 3$ ✓
 $t = 5$ ✓

13. [11 marks: 2, 6, 3]

A real estate agent charges the following commission rates for selling property.

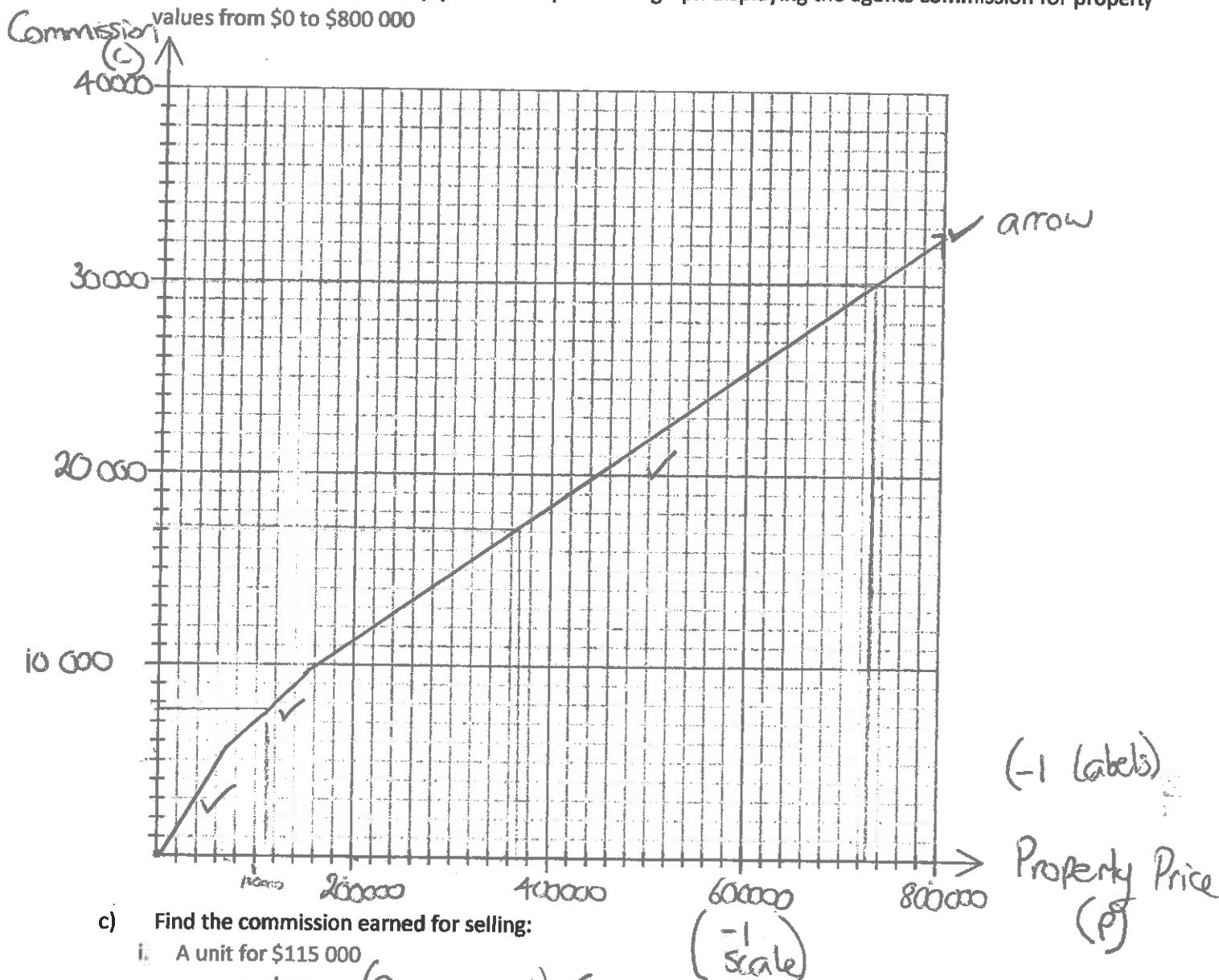
- 8% of the first \$70 000 of the properties price
- 5% of the next \$80 000
- 3.5% of the remaining amount

a) Complete the table of values using the rates given above:

| Property price (\$P) | 0 | 70 000 | 150 000 | 800 000 |
|----------------------|---|--------|---------|---------|
| Commission (C) | 0 | 5600 | 9600 | 32350 |

(1/2 each)

b) Use the table above to help you draw a piecewise graph displaying the agents commission for property values from \$0 to \$800 000



c) Find the commission earned for selling:

i. A unit for \$115 000

$\approx \$7800$ (from graph) ✓
or $\approx \$7850$ (calculated) ✓

ii. A house for \$370 000

$\approx \$17100$ (from graph) ✓
or $\approx \$17300$ (calculated) ✓

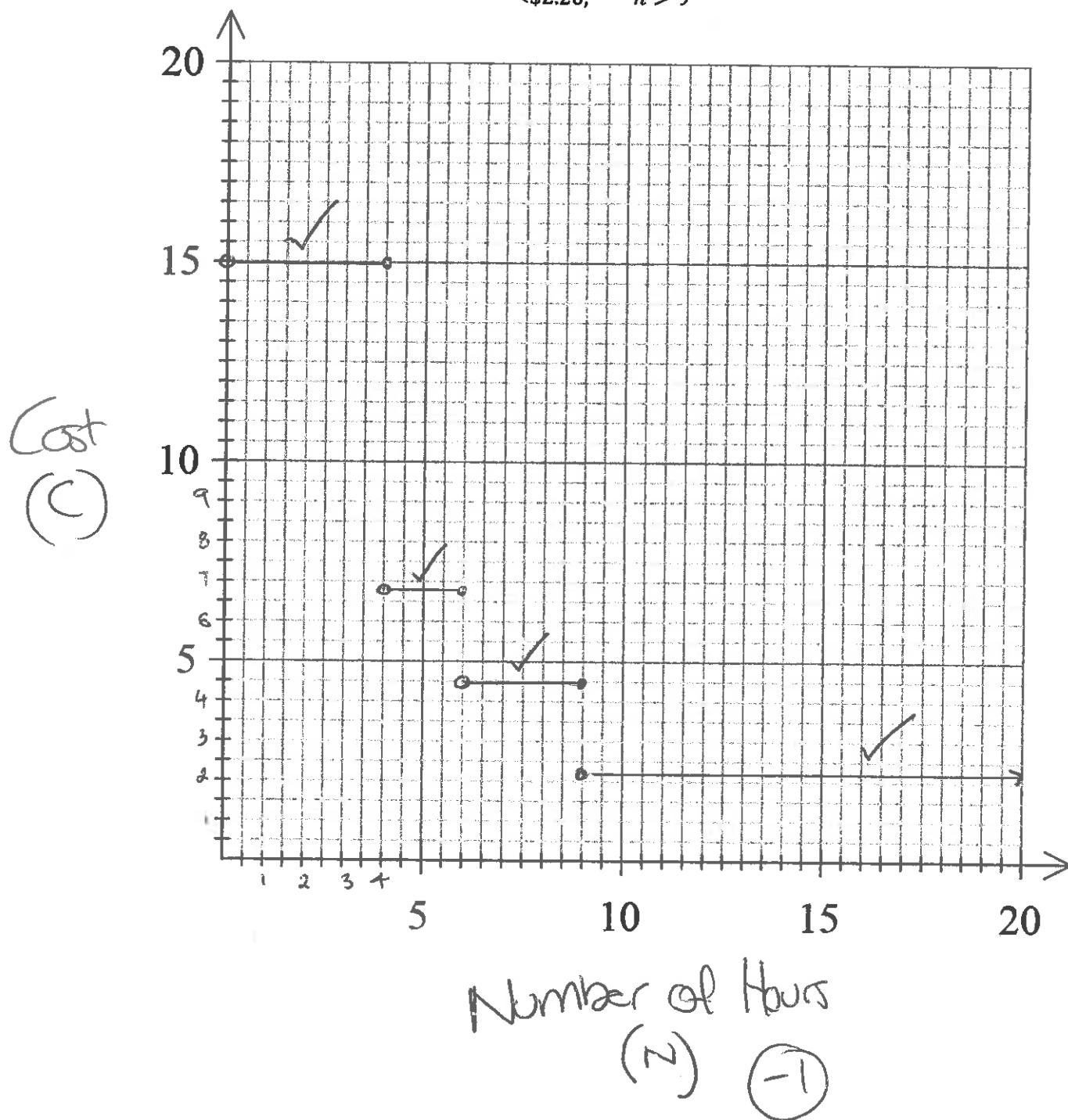
iii. A farm house and land for \$730 000

$\approx \$30000$ (from graph) ✓
or $\approx \$29900$ (calculated) ✓

14. [5 marks]

Graph the following step graph, showing the cost (\$C) for the number of hours (n) spent in a car park:

$$C = \begin{cases} \$15, & \text{for } 0 < n \leq 4 \\ \$6.80, & \text{for } 4 < n \leq 6 \\ \$4.50, & \text{for } 6 < n \leq 9 \\ \$2.20, & \text{for } n > 9 \end{cases}$$



~ END OF TEST SECTION 2 ~