Name: _____Solutions_____ Date: _____

Year 11 Mathematics: Applications

Investigation 4, 2016

Topic – Linear Equations and their graphs

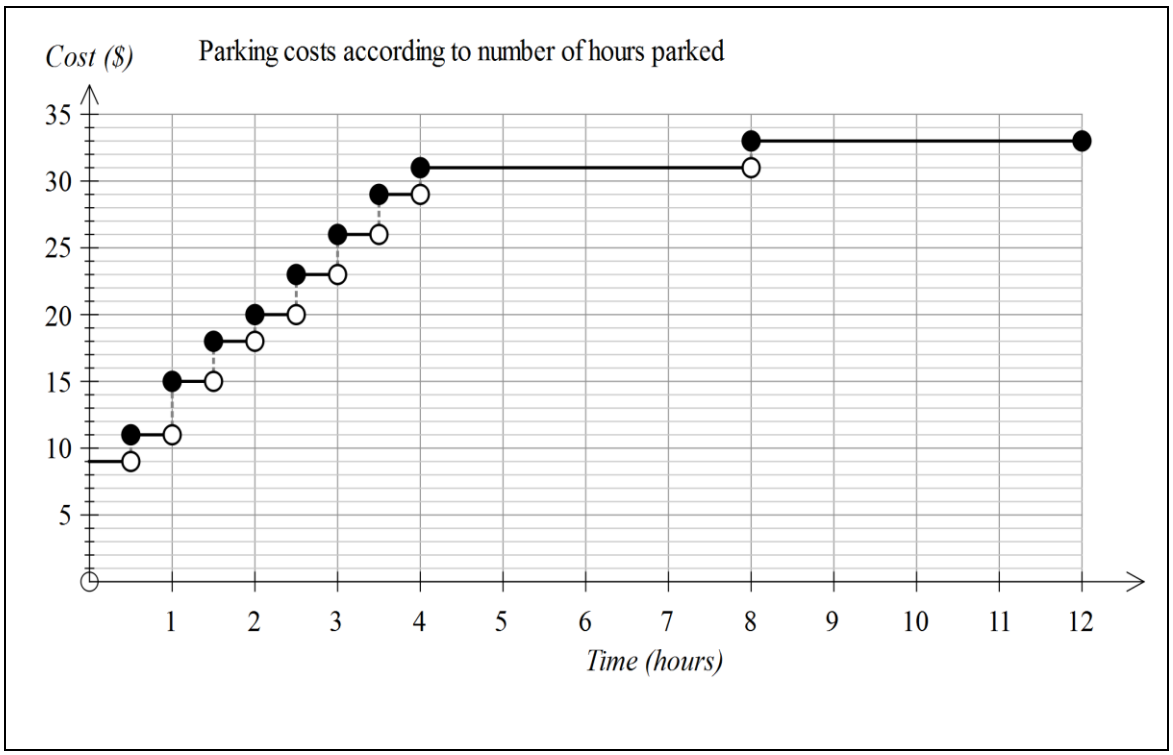
Take-Home Component

Important Information:
Although the take-home component is not worth any marks, it is essential in preparation for the in-class component. Knowledge and skills gained will be extended in the in-class validation component. This in-class validation will be completed under test conditions on the day in which this take-home component is due. The take-home component may be used when completing the in-class component. Contact may be made to parent(s) if the take-home component is not available for submission (at the start of the lesson).

Date out:	*Week ____ Date _____*	**Date Due:**	*Week ____ Date _____*
Take home component weighting:	*0% of the year*	**In-class component weighting:**	*10% of the Semester, 5% of the Year*

AIM: *In this assessment, you will be investigating linear equations and their graphs.*

Question 1



Question 2

(a)

	Swim	Cycle	Run
Men's event	18 mins	58.7 mins	31.2 mins
Women's event	19.6 mins	64.0 mins	34.4 mins

(b)

	Swim	Cycle	Run
Men's event	5 km/h	40.9 km/h	19.2 km/h
Women's event	4.6 km/h	37.5 km/h	17.4 km/h

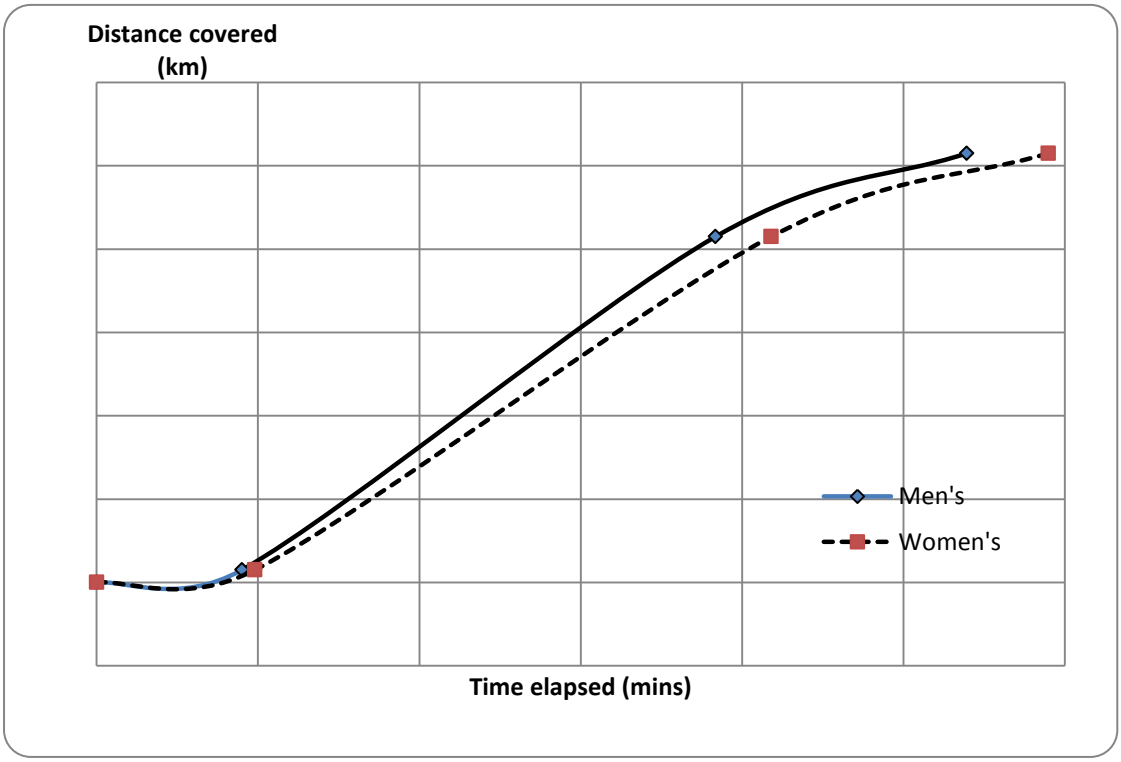
(c) Table of data for graph. Graph drawn on the next page.

Triathlon	Time elapsed (to nearest minute)		Distance
	Men's	Women's	km
Start	0	0	0
After swim	18	20	1.5
After cycle	77	84	41.5
End	108	118	51.5

(d) For each stage of the triathlon, the female winner was slower than the male.

(e) For both triathletes, the fastest stage was the cycle leg and the slowest was the swimming leg. Both athletes ran about four times as fast as they swam and cycled about twice as fast as they ran.

Question 2 (c)



Question 3

(a) (i) About \$15 by air and \$10 by sea (ii) \$57 (iii) \$57
(iv) \$50 (v) \$90

(b) See graphs below
The graph for transport by sea is located directly underneath the first graph until the price reaches 2 kg. After 2 kg, the graph is lower but the line is not as steep for transport by sea.

(c) True
For the same values (weight range) along the horizontal axis, the values for the cost of transport by sea are lower than (below) those for transport by air on the vertical axis.

(d) (i) A (ii) B

(e) 73-57 = \$16 per kg

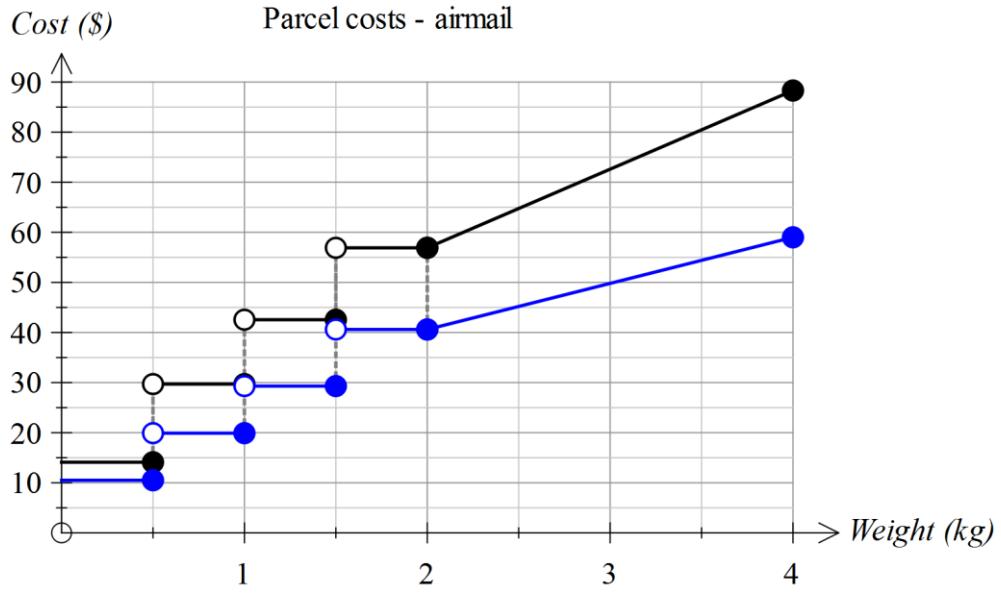
(f) 60-50 = \$10 per kg

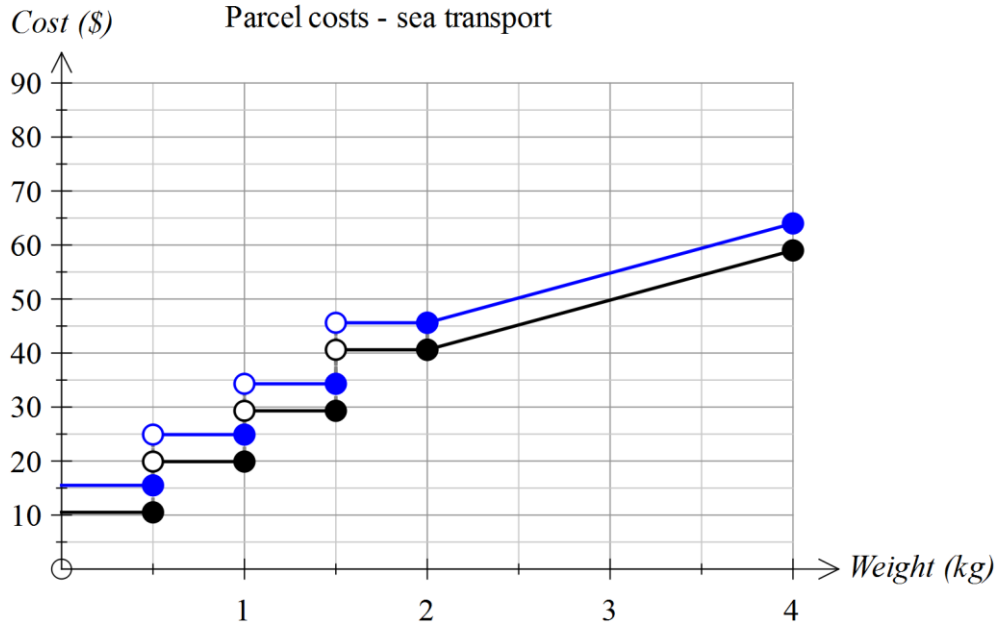
(g) (i) 0 (ii) 16 (iii) 10 (iv) 0

(h) See addition to second graph below

Question 3 (cont'd)

(c), (h)





Question 4

Other data for which step graphs are suitable include

- Cost of posting parcels interstate
- Parking fees in city car parks
- Costs of travelling on public transport
- Costs of medical consultations
- Interest rates on long term deposits

Question 5

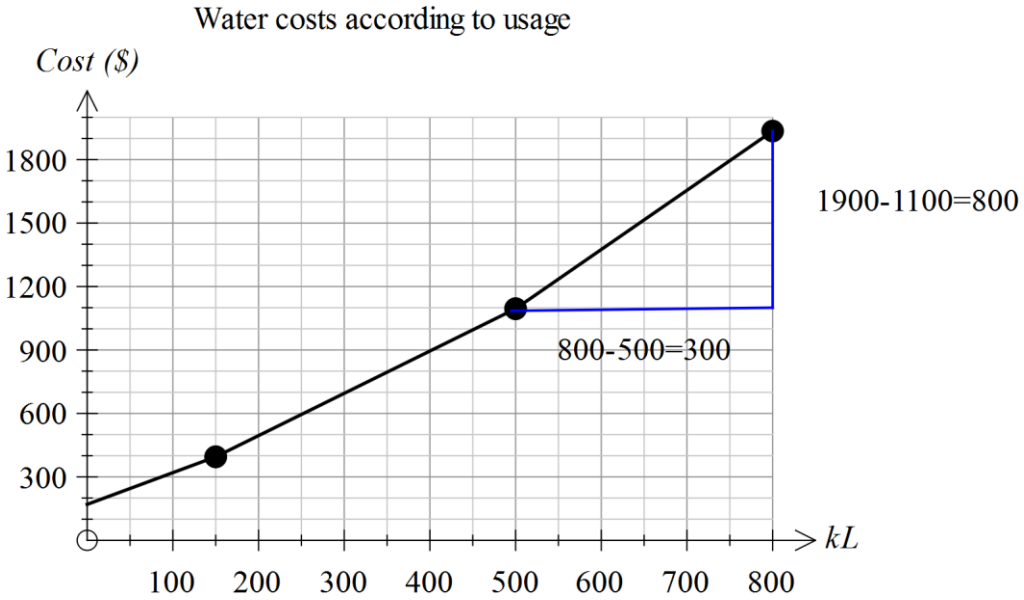
(a) $180

(b) at 150 kL and 500 kL

(c) Yes. As the number of kL increases, the gradient of the line segment increases because the line segments are increasingly steeper.

(d) (i) $310 (ii) $600 (iii) $1500 (iv) $250

(e)



Rate = 800 ÷ 300 = $2.7 per kL

(f) Vertical intercept = $180, gradient = (400-180) ÷ 150 ~ 1.5
Cost = $1.5 x Number of kL + $180

(g) The cost per kL ~ $2 which is the gradient of the line in that section of the graph.