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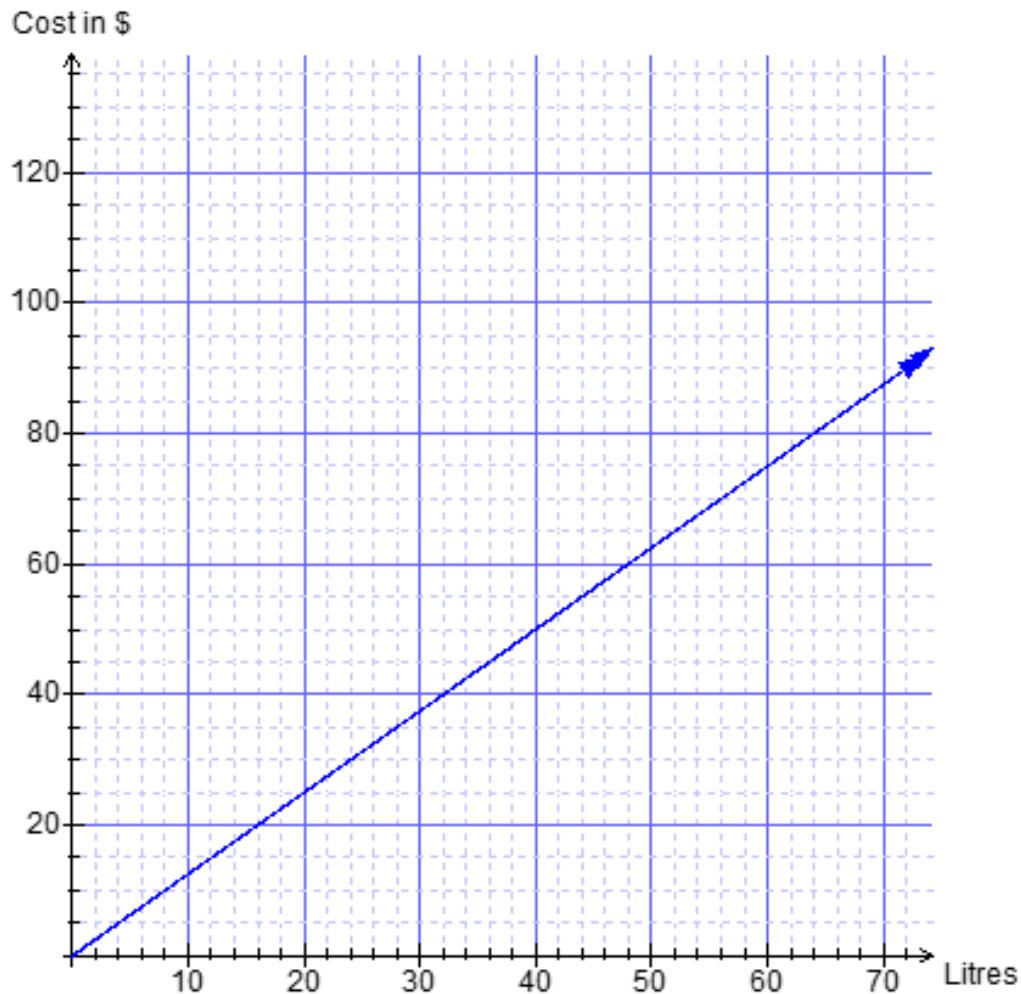**Topic: Linear Applications mixed 2**

Time: 45 mins   Marks: /45 marks

Calculator Assumed

Question One: [2, 2, 2, 2: 8 marks]

The following graph represents the cost of petrol per litre.

a)   What is the cost per litre?

Olly has 10 litres in his tank when he arrives at the petrol station. He fills up with petrol and pays $65.
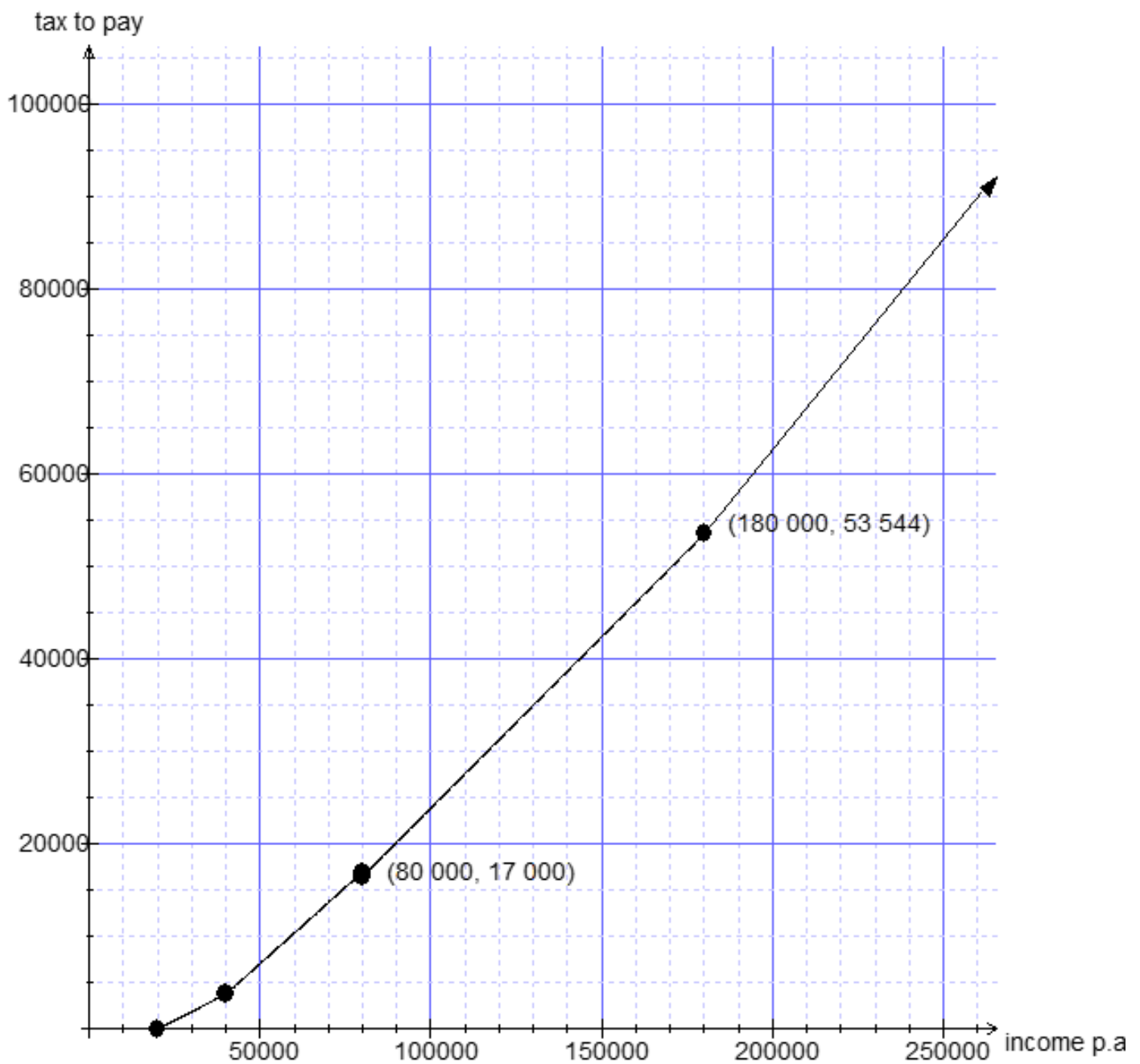
b)   How many litres of petrol are in Olly's tank now?

The next day the same petrol station is selling petrol for 165c per litre.

c)   Graph this line on the previous axis.

d)   If the petrol station sells 4000L of petrol each day, calculate the revenue from the sale of petrol over these two days.

Question Two: [1, 2, 3, 3: 9 marks]

Below is a graph showing the tax associated with each level of taxable income.

Using the graph,

a)   How much tax do you pay if you earn $130 000 per year?

b)   What is the tax rate for people earning between $2 000 - $4 000?
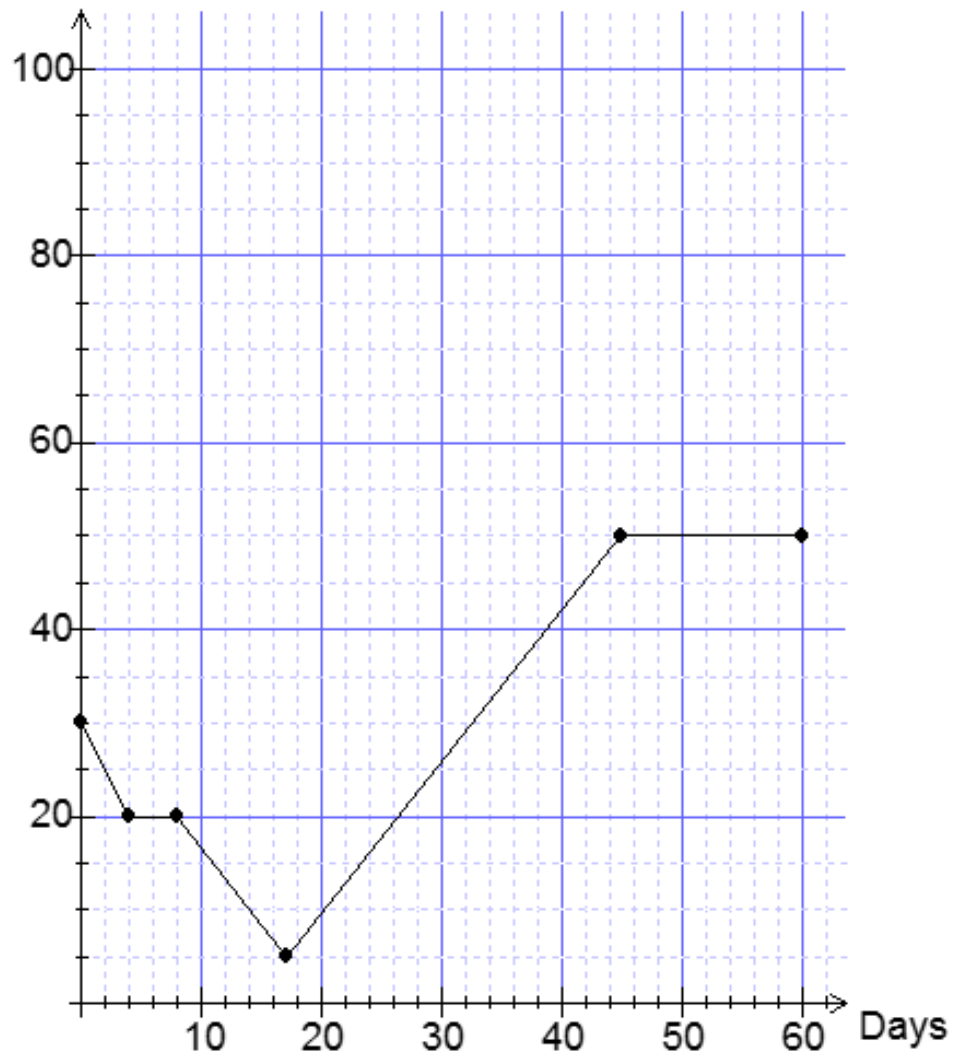
c)   Use the graph on the previous page to complete the table showing how to calculate
         the tax payable, based on the level of income.

Taxable Income	Income Tax to Pay
$0 to $20 000	Nil
$20 001 to $40 000	19% of the taxable income over $20 000
$40 001 to $80 000	$3 800 + 33% of the taxable income over $40 000
$80 001 to $180 000	
$180 001 and above	

Question Three: [5, 5: 10 marks]

The Watson family have a large 80 000L water tank on their farm and they tracked the number of litres of water in total over time. The results are shown in the graph below.
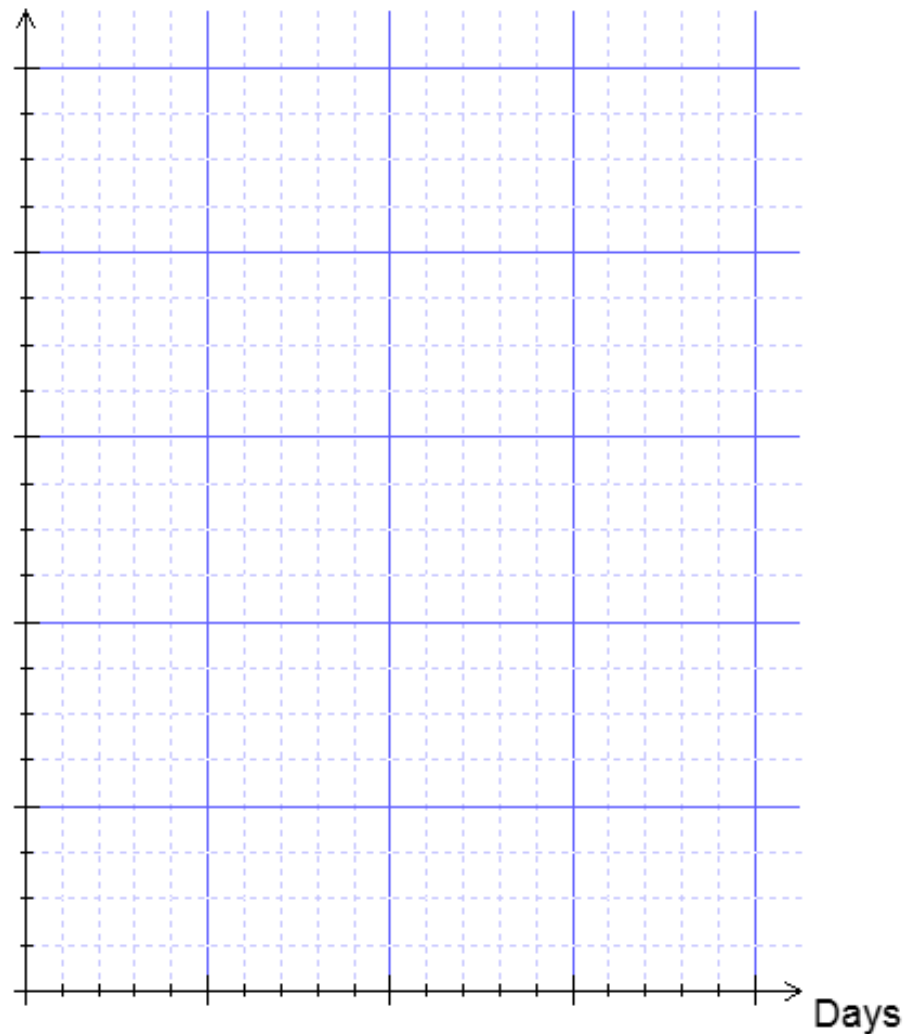
Litres of water in the tank (1000s)

a)   Describe in detail the changes in the level of water in the water tank over the 60 days.

Over the next 20 days the Watsons observe the water level dropping slowly at a rate of 1000L per day for 9 days. Following this there is a rapid downpour of rain which sees the water tank reach its capacity within 5 days. The rain continues for the rest of the 20 days.

Litres of water in the tank (1000s)

b)   Show the litres of water in the tank for the next 20 days on the graph below.
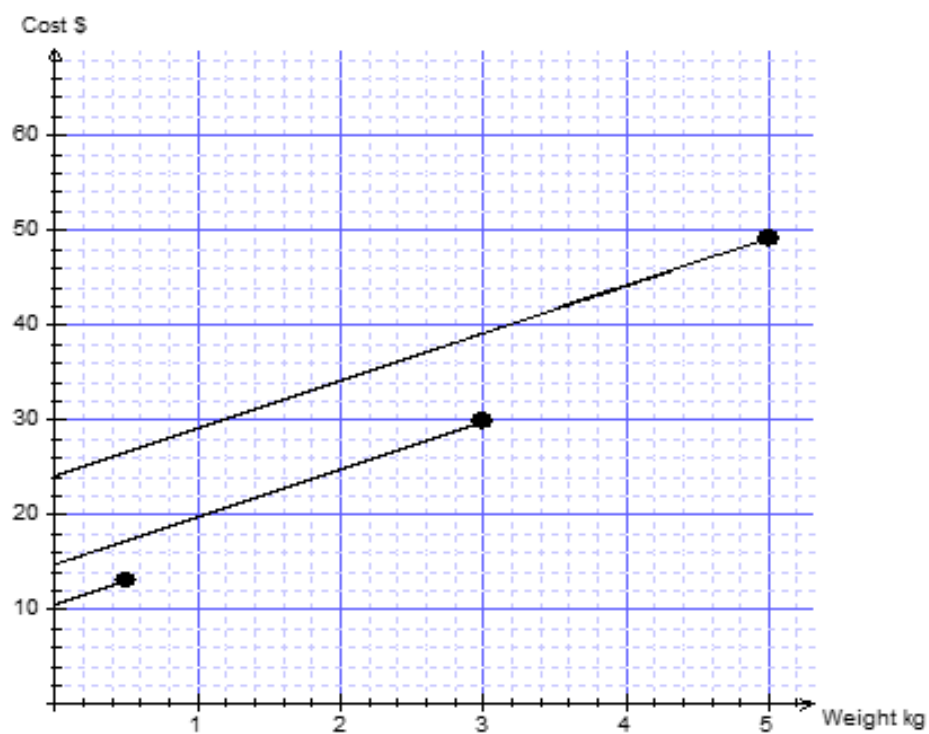
Question Four: [8 marks]

Australia Post has different types of prepaid satchels for sending parcels.

Courier Post	Express Post	Parcel Post
	Small satchel $10.55 Holds up to 500g 355 x 220mm[*]	**Small satchel $8.25** Holds up to 500g 355 x 220mm[*]
Medium satchel $34.95 Holds up to 3kg 405 x 310mm[*]	**Medium satchel $14.80** Holds up to 3kg 405 x 310mm[*]	**Medium satchel $13.40** Holds up to 3kg 405 x 310mm[*]
	Large satchel $24.15 Holds up to 5kg 510 x 435mm[*]	**Large satchel $17.10** Holds up to 5kg 510 x 435mm[*]

In addition to the price of the satchel you also pay $1/200g of the weight of the parcel.

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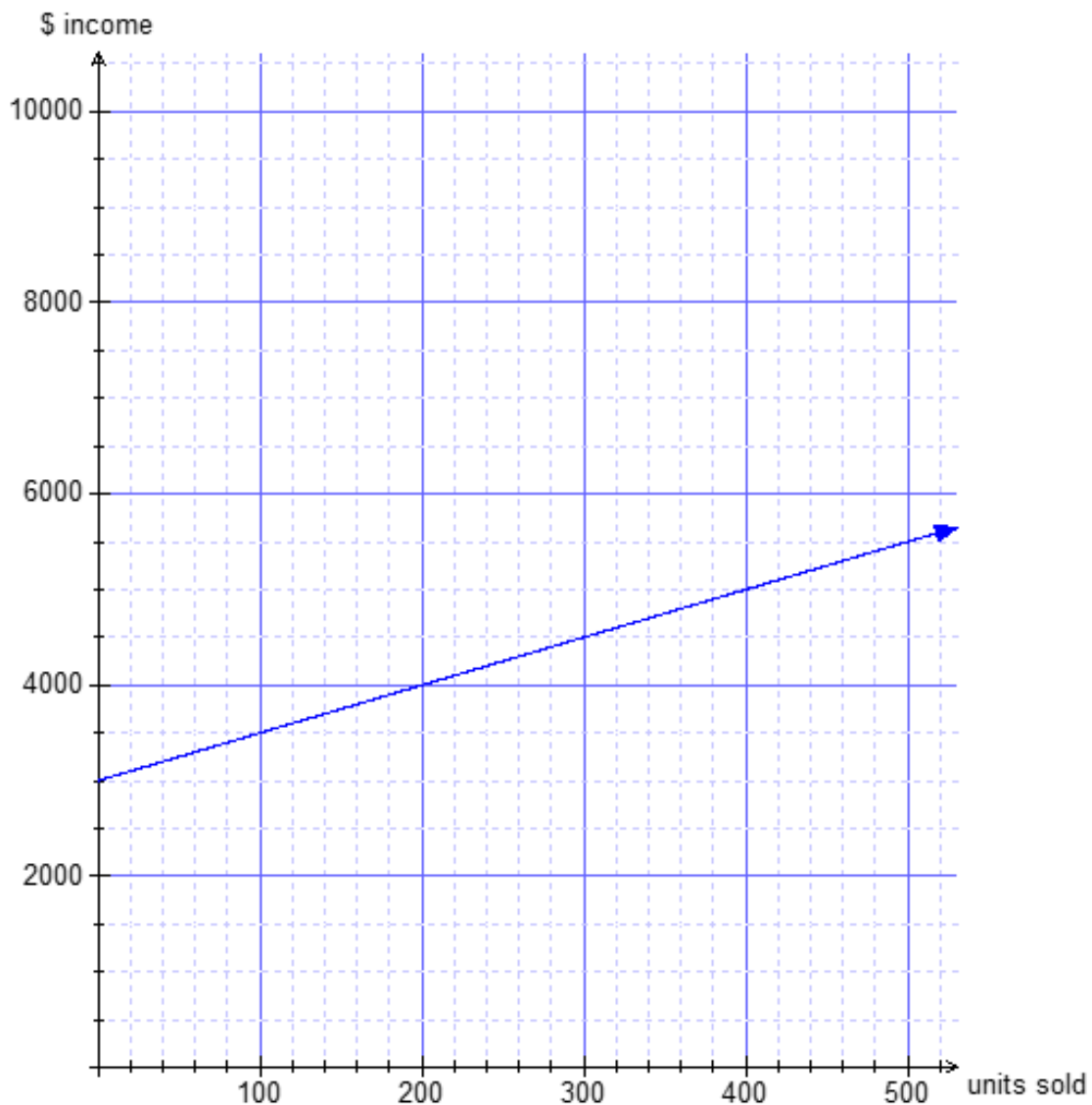The Express Post pricing is shown on the graph below.

Cost $

Graph the costs associated with Courier Post and Parcel Post on the axis below.

Cost $

Question Five: [2, 1, 2, 2, 3: 10 marks]

A company's operational costs are modeled on the graph below.

They sell each unit for $15.

a)   Add the line to the graph which represents the company's income from sales.

b)   From the graph how many units do they have to sell before they 'break even'?

c)   What is the company revenue when:

      i)   100 units are sold?

      ii)   400 units are sold?

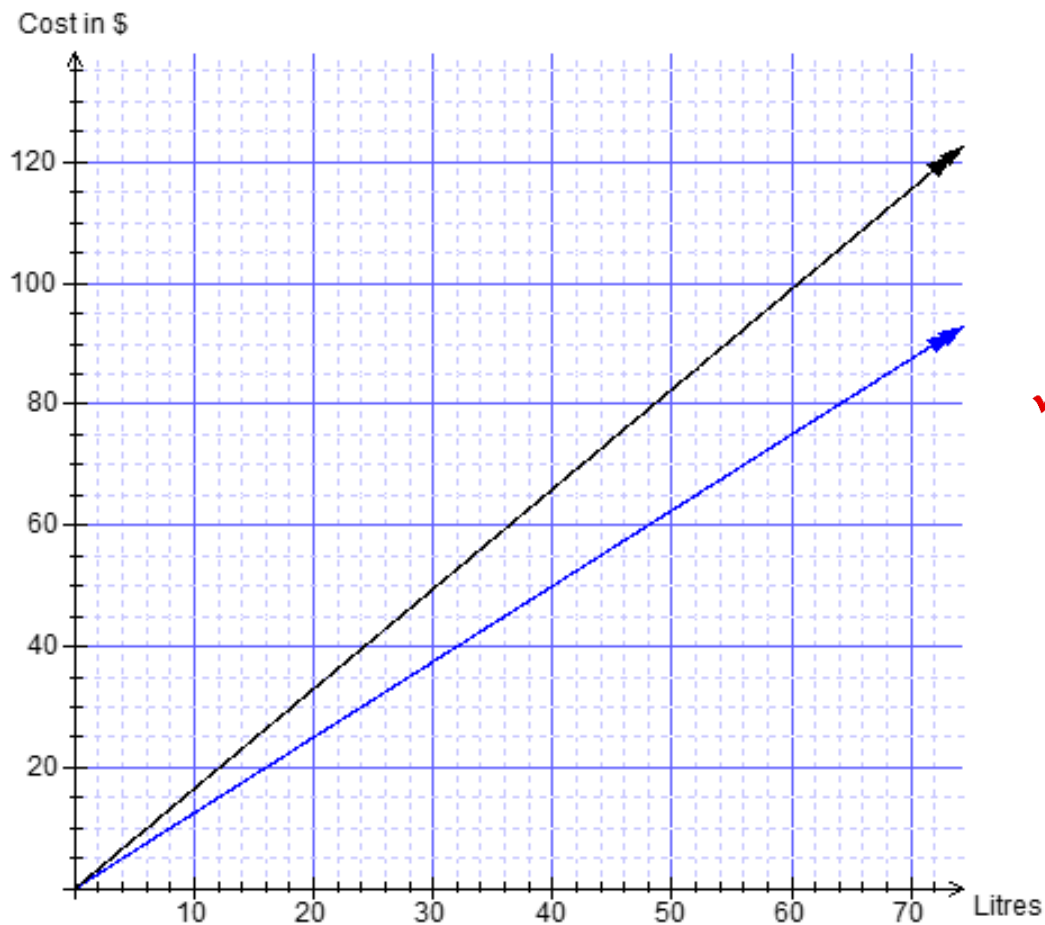d)   Write a single equation which can be used to model the revenue.

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Question One: [2, 2, 2, 2: 8 marks]

The following graph represents the cost of petrol per litre.

a)   What is the cost per litre?

$$\$25/20L \quad ✓$$

$$= \$12.50/10L$$

$$= \$1.25/L \quad ✓$$

Olly has 10 litres in his tank when he arrives at the petrol station. He fills up with petrol and pays $65.

b)   How many litres of petrol are in Olly's tank now?

$$\frac{65}{1.25}$$

$$= 10 + 52 = 62 \, L \quad \checkmark$$

✓
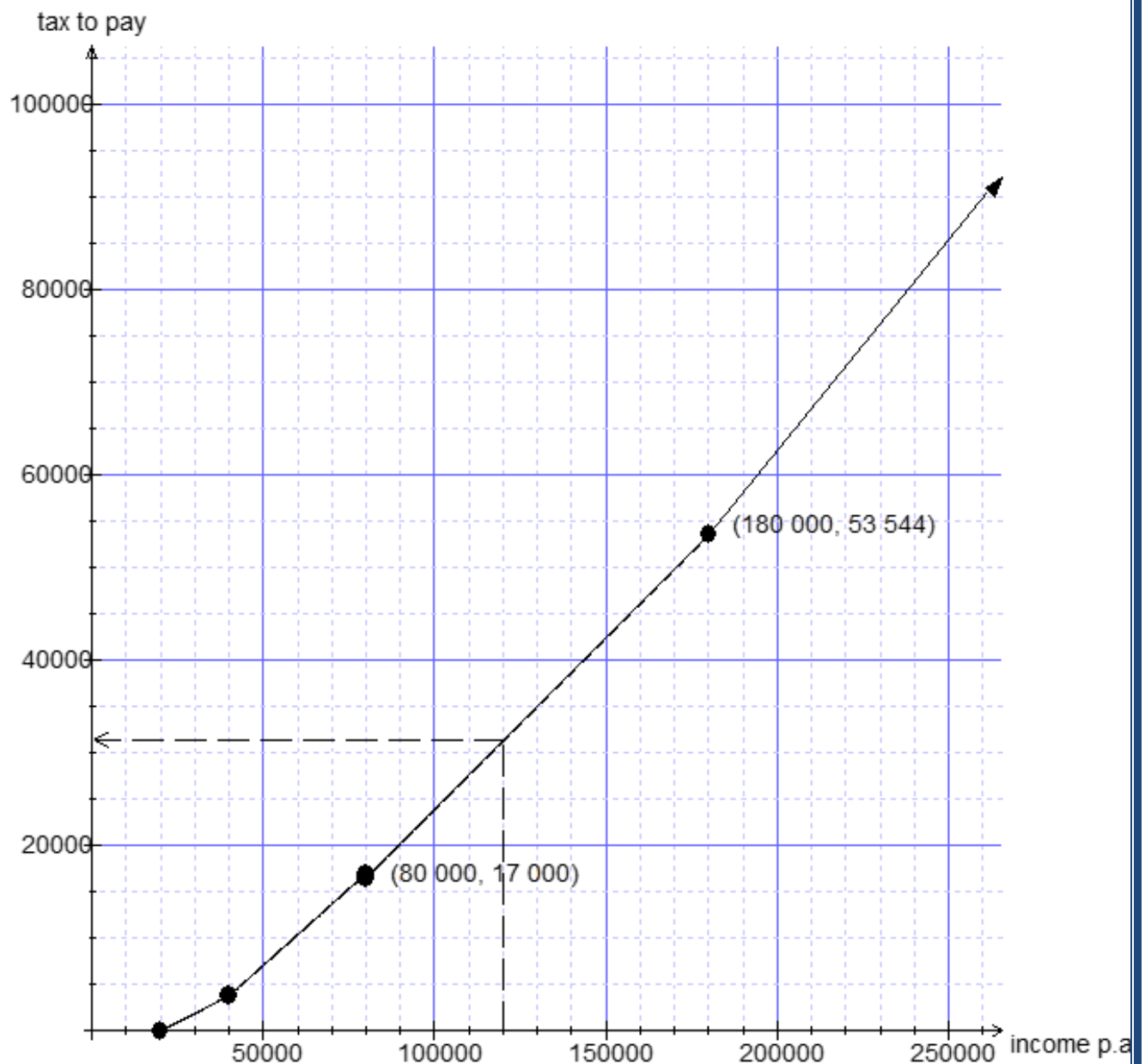
The next day the same petrol station is selling petrol for 165c per litre.

c)   Graph this line on the previous axis.

d)   If the petrol station sells 4000L of petrol each day, calculate the revenue from the sale of petrol over these two days.

$$R = 4\,000 \times 1.25 + 4\,000 \times 1.65 = \$11\,600$$

✓   ✓

Question Two: [1, 2, 3, 3: 9 marks]

Below is a graph showing the tax associated with each level of taxable income.

Using the graph,

a)   How much tax do you pay if you earn $130 000 per year?

Approximately $31 000   ✔

b)   What is the tax rate for people earning between $2 000 - $4 000?

No tax payable ✓ ✓

c)   Use the graph on the previous page to complete the table showing how to calculate the tax payable, based on the level of income.

Taxable Income	Income Tax to Pay
$0 to $20 000	Nil
$20 001 to $40 000	19% of the taxable income over $20 000
$40 001 to $80 000	$3 800 + 33% of the taxable income over $40 000
$80 001 to $180 000	$16 544 + 37% of the taxable income over $80 000 ✓ ✓ ✓ $y = 0.37(x - 80000) + 16544;\ 80001 \leq x \leq 180000$
$180 001 and above	$53 544 + 45% of the taxable income over $180 000 ✓ ✓ ✓ $y = 0.45(x - 180000) + 53544;\ x \geq 1800001$

Mathematics General Unit 2
(Applications Course in WA)

Question Three: [5, 5: 10 marks]

The Watson family have a large 80 000L water tank on their farm and they tracked the number of litres of water in total over time. The results are shown in the graph below.

Litres of water in the tank (1000s)
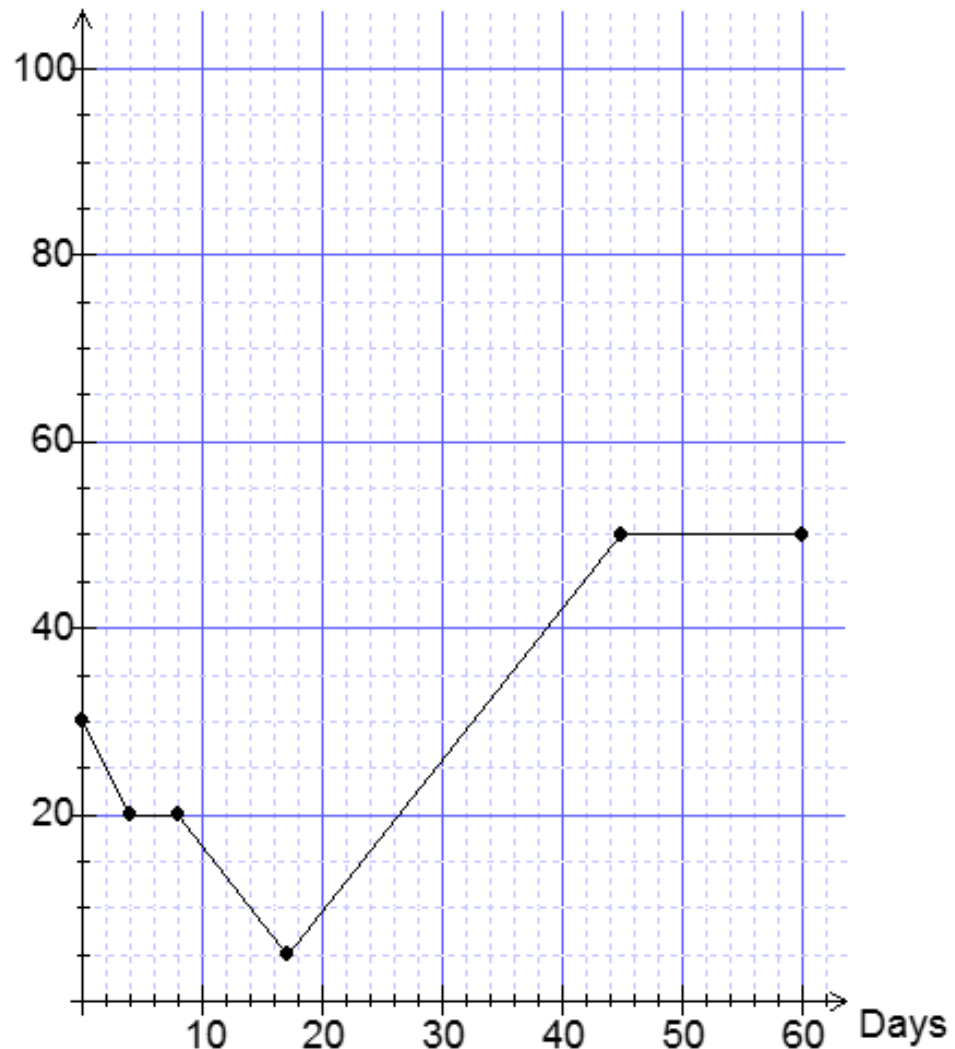
a)   Describe in detail the changes in the level of water in the water tank over the 60 days.

The tank starts off with 30 000L inside. ✔

It loses 2 500L per day for four days and then remains constant at 20 000L for 4 days. ✔

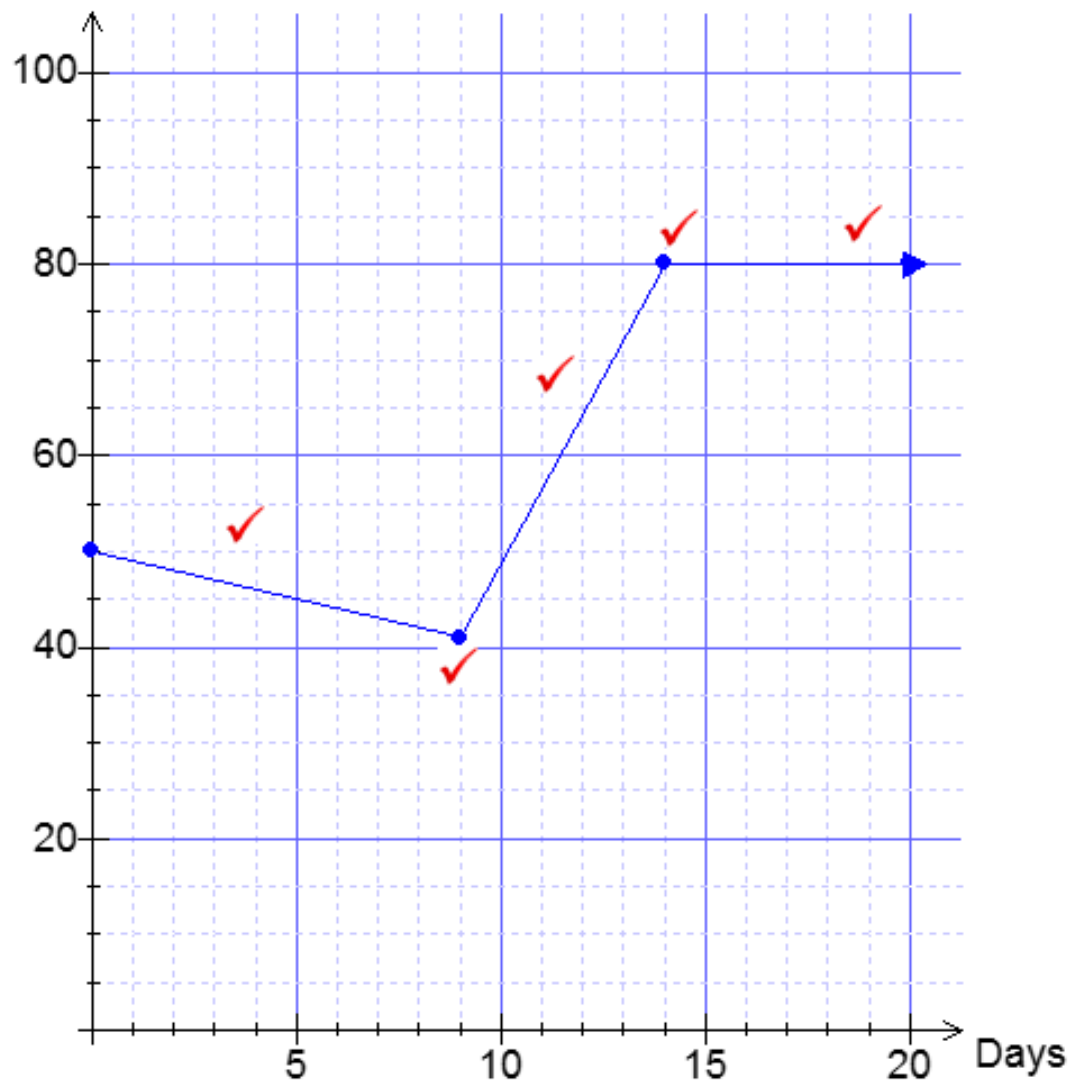From day 9 to day 17 the water drops from 20 000L to 5 000L. ✔

 Then the water begins to steadily increase and goes from 5 000L to 50 000L over the next 28 days. ✔

Then the water level remained constant at 50 000L until day 60. ✔

Over the next 20 days the Watsons observe the water level dropping slowly at a rate of 1000L per day for 9 days. Following this there is a rapid downpour of rain which sees the water tank reach its capacity within 5 days. The rain continues for the rest of the 20 days.

b)   Show the litres of water in the tank for the next 20 days on the graph below.

Question Four: [8 marks]

Australia Post has different types of prepaid satchels for sending parcels.

Courier Post	Express Post	Parcel Post
Medium satchel $34.95 Holds up to 3kg 405 x 310mm[*]	**Small satchel $10.55** Holds up to 500g 355 x 220mm[*] **Medium satchel $14.80** Holds up to 3kg 405 x 310mm[*] **Large satchel $24.15** Holds up to 5kg 510 x 435mm[*]	**Small satchel $8.25** Holds up to 500g 355 x 220mm[*] **Medium satchel $13.40** Holds up to 3kg 405 x 310mm[*] **Large satchel $17.10** Holds up to 5kg 510 x 435mm[*]

In addition to the price of the satchel you also pay $1/200g of the weight of the parcel.

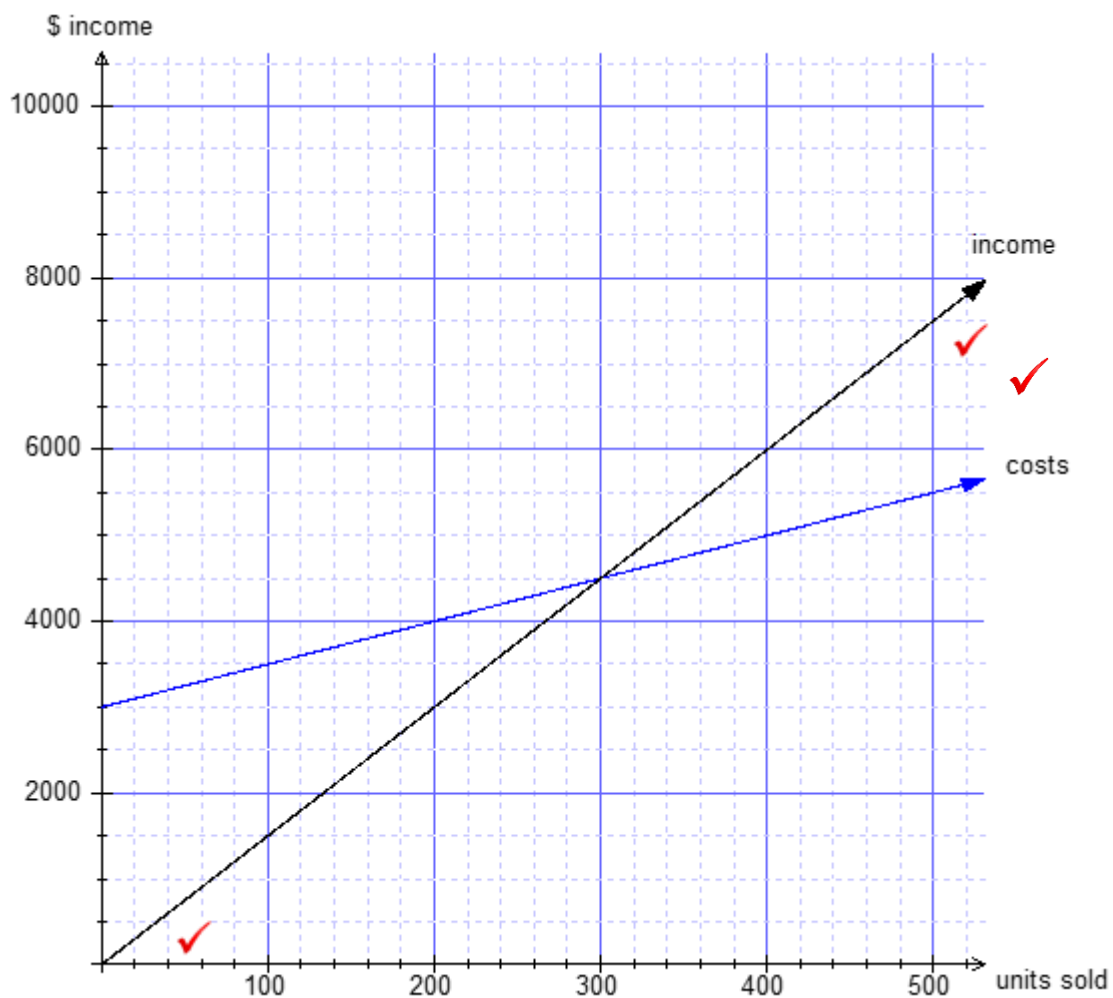The Express Post pricing is shown on the graph below.
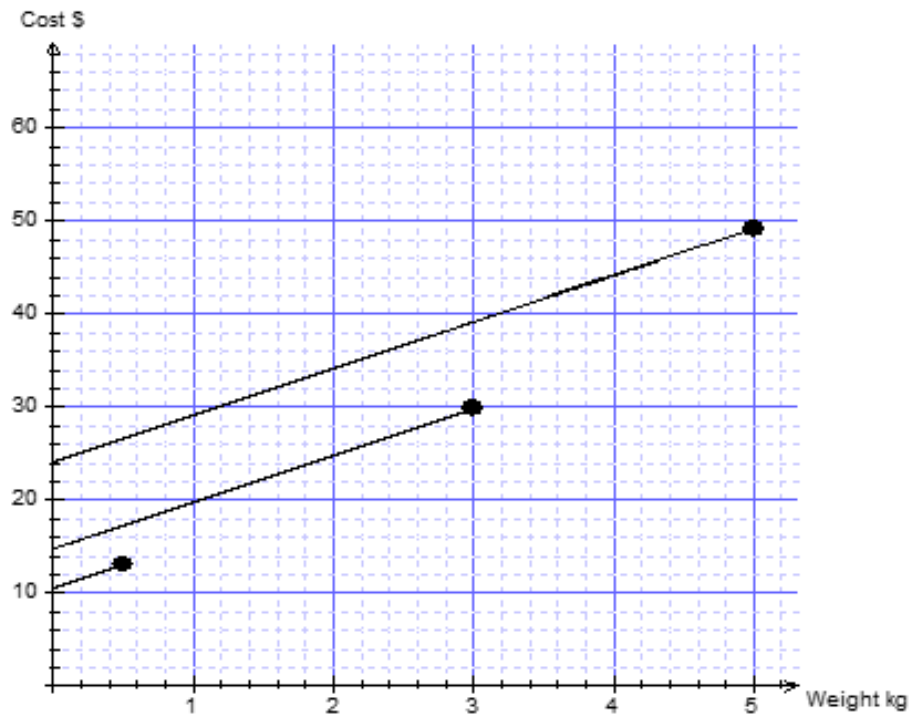
Graph the costs associated with Courier Post and Parcel Post on the axis below.
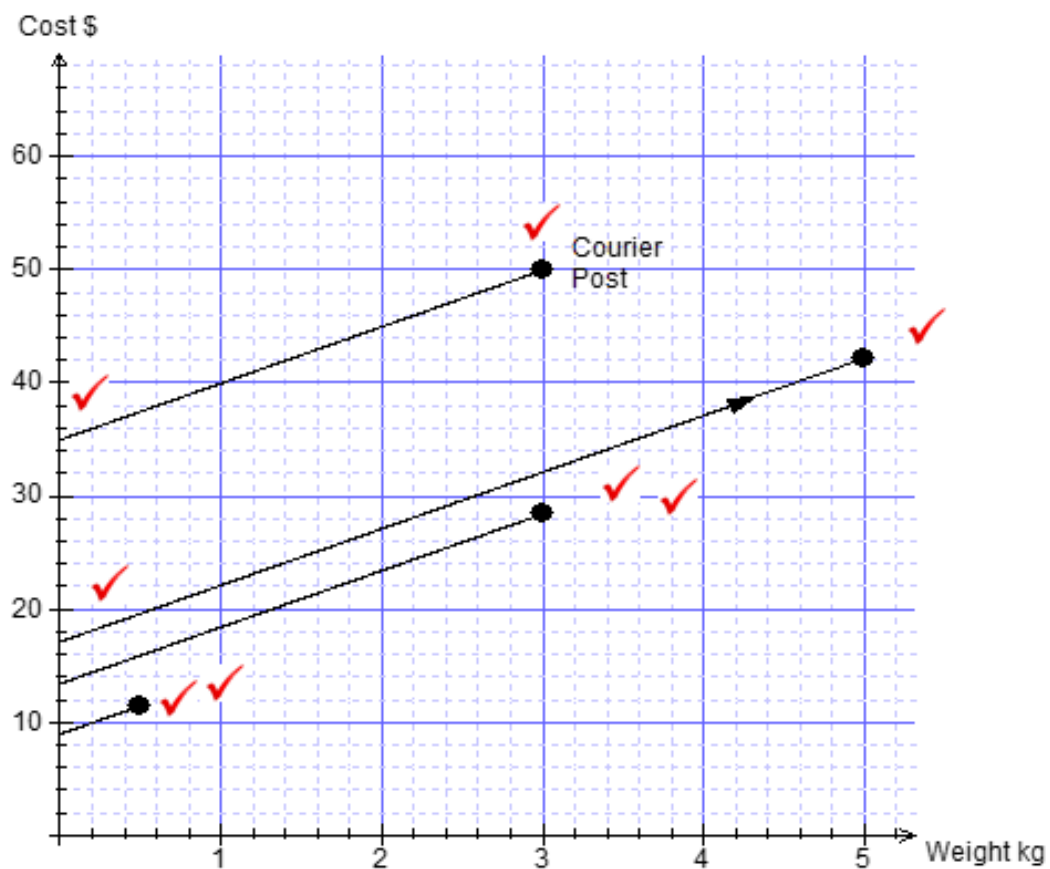
Question Five: [2, 1, 2, 2, 3: 10 marks]

A company's operational costs are modeled on the graph below.

They sell each unit for $15.

a)   Add the line to the graph which represents the company's income from sales.

b)   From graph how many units do they have to sell before they 'break even'?

    300 units ✓

c)   What is the company revenue when:

     i)   100 units are sold?

            $1500 - 3500 = loss\ of\ \$2000$ ✓ ✓

     ii)   400 units are sold?

            $6000 - 5000 = profit\ of\ \$1000$ ✓ ✓

d)   Write a single equation which can be used to model the revenue.

✓ ✓

$$y = 15x - (3000 + 5x)$$

$$= 15x - 3000 - 5x$$

$$= 10x - 3000$$ ✓