36 Total

Baldivis Secondary College

Year 10 Investigation: Repairing Airconditioners

Name: Mark Inkey

Three airconditioner repairers, Mr Hothouse, Mr Summer and Mr Seawater, all work in the same town. Their prices are often compared by locals needing repairs. Customers pay for the time the repairmen take to do the job. The cost of parts are charged separately.

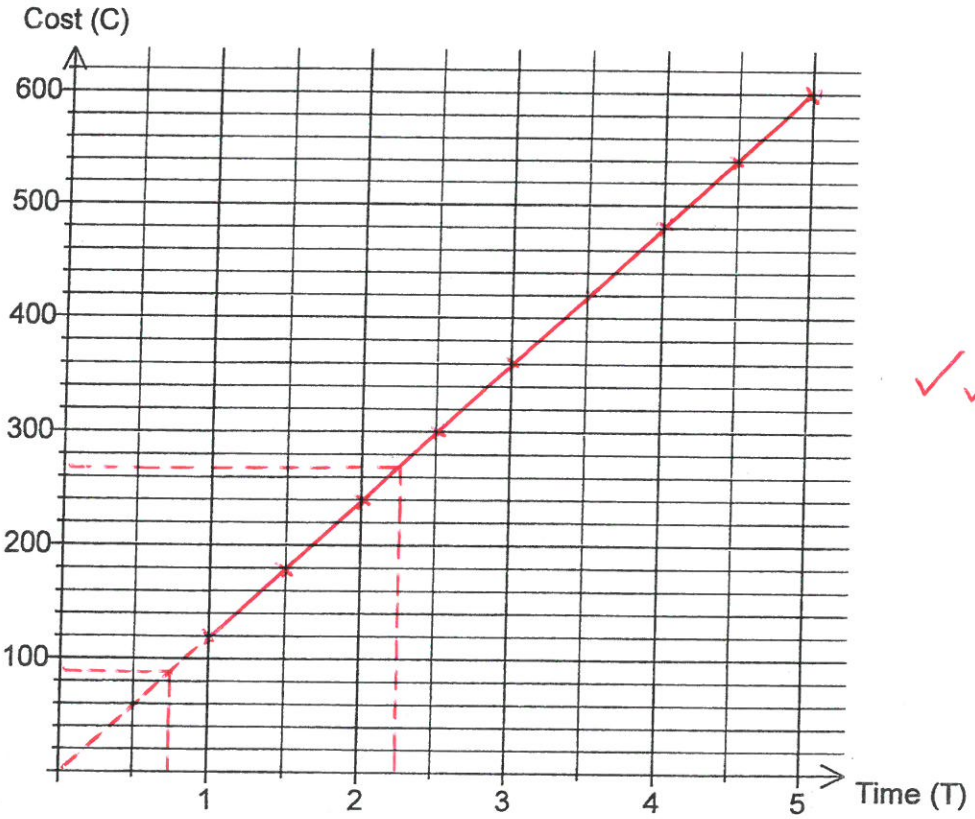
1. Mr Hothouse (8 marks)

Mr Hothouse simply charges $120 per hour for his services. Complete the table showing his charges:

Time (in hours)	1	1.5	2	2.5	3	3.5	4	4.5	5
Cost (in dollars)	$120	$180	$240	$300	$360	$420	$450	$540	$600

✓✓✓

Plot the values on the axes below. Join the points up to make a straight line:



✓✓

✓

a) What would Mr Hothouse charge if he was with a customer for 2 hours and 15 minutes? $270

b) What would Mr Hothouse charge if he repaired a customer's airconditioner in just 45 minutes with a new part costing $95? $90 + $95 = $185 ✓

c) What is the equation of the line you have drawn?

$y = 120x$ (where x is time in hours) ✓ or $C = 120t$

or $y = 2x$ (where x is time in minutes) or $C = 2t$

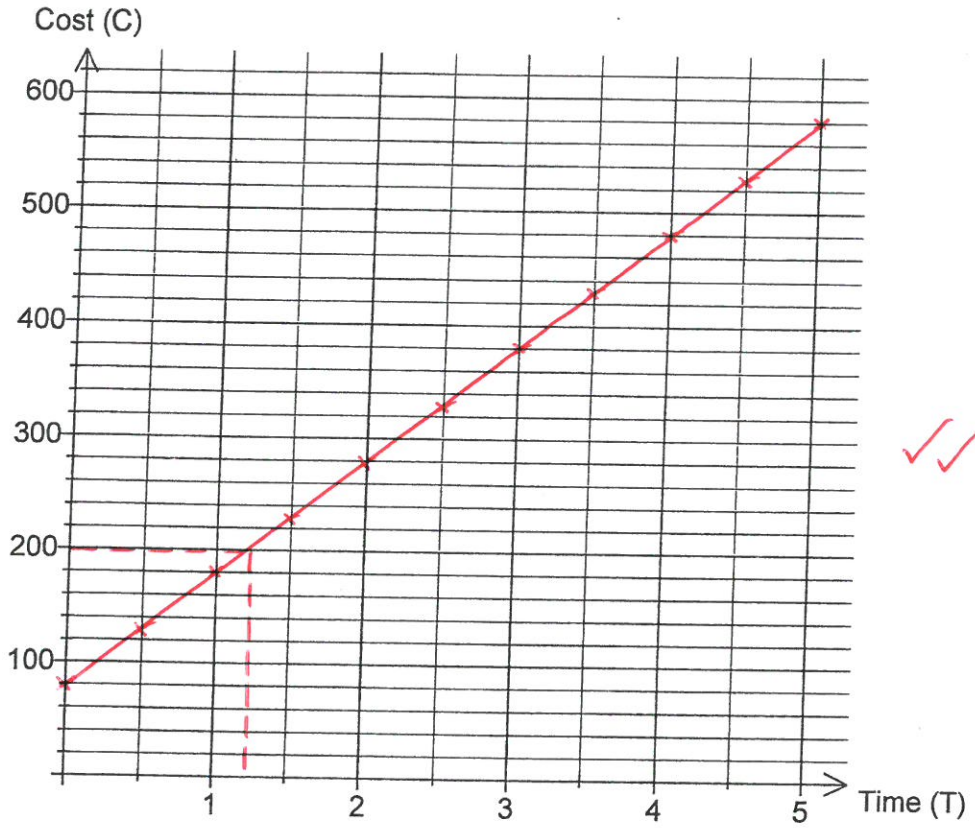
2. Mr Summer (10 marks)

Mr Summer took a different approach. He decided that customers should pay a call out fee, called a standing charge, of $80 just for arriving at the customer's house. Then he would also charge $100 per hour for his work. Complete the table below to show his charges:

Time (in hours)	0	0.5	1	1.5	2	2.5	3	3.5	4	4.5	5
Cost (in dollars)	$80	$130	$180	$230	$280	$330	$380	$430	$480	$530	$580

✓✓✓

Now plot the values on the axes below. Join them up to make a straight line.



✓✓

a) What does Mr Summer charge for a job that takes 1 hour and 15 minutes? $205 ✓

$80 + (1.25 × 100) = 80 + 125 = $205.

b) Mr Summer had a part in his van for the next customer. He charged $45 for it. He spent 45 minutes at the house altogether. How much was the customer's bill?

$45 + $80 + (0.75 × 100) = $200 ✓

c) What is the equation of the line that you have drawn?

$y = 100x + 80$ ✓ or $c = 100t + 80$

d) What part of the charges is the y-intercept?

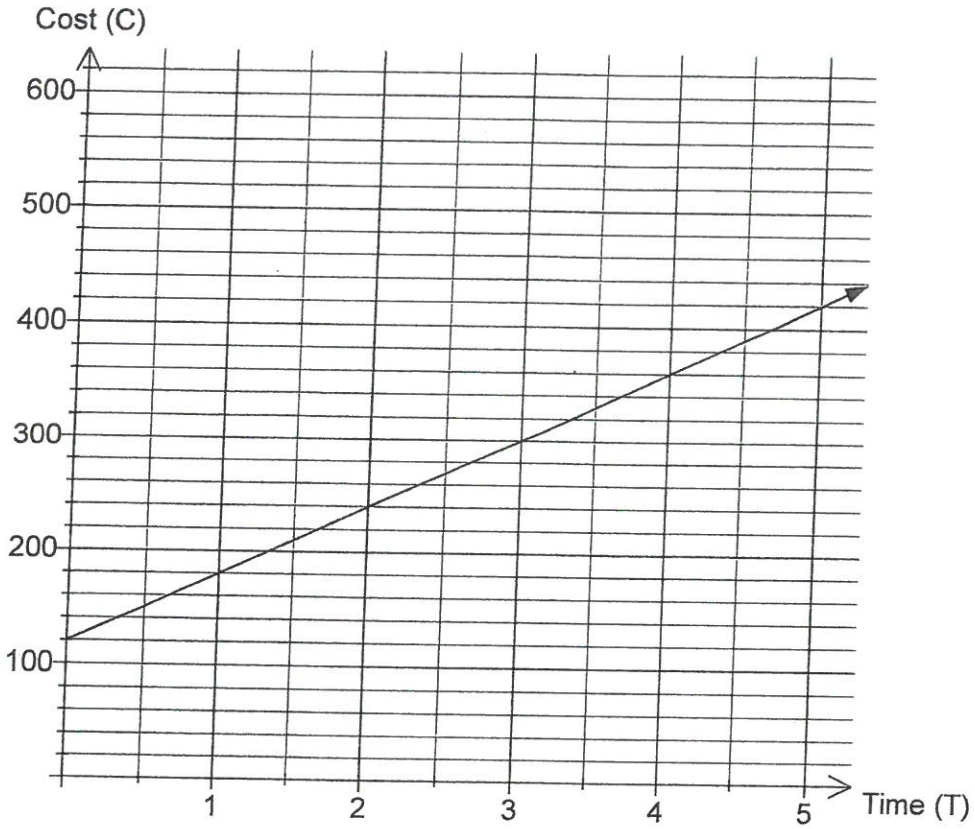
the callout charge ✓

e) What part of the charges is the gradient?

the hourly rate. ✓

3. Mr Seawater (7 marks)

Mr Seawater has another set of charges for his customers, which can be seen on the graph below.



a) What is the y-intercept of this line? What is its gradient?

120. ✓ 60 or $\frac{180}{30}$ ✓

b) What does Mr Seawater charge as his call out fee?

$120. ✓

c) What does he charge per hour?

$60 ✓

d) What is the equation of the line that represents Mr Seawater's charges?

$y = \$60x + 120$ ✓ or $C = 60t + 120$.

e) What would Mr Seawater charge if it was a quick repair, only taking half an hour?

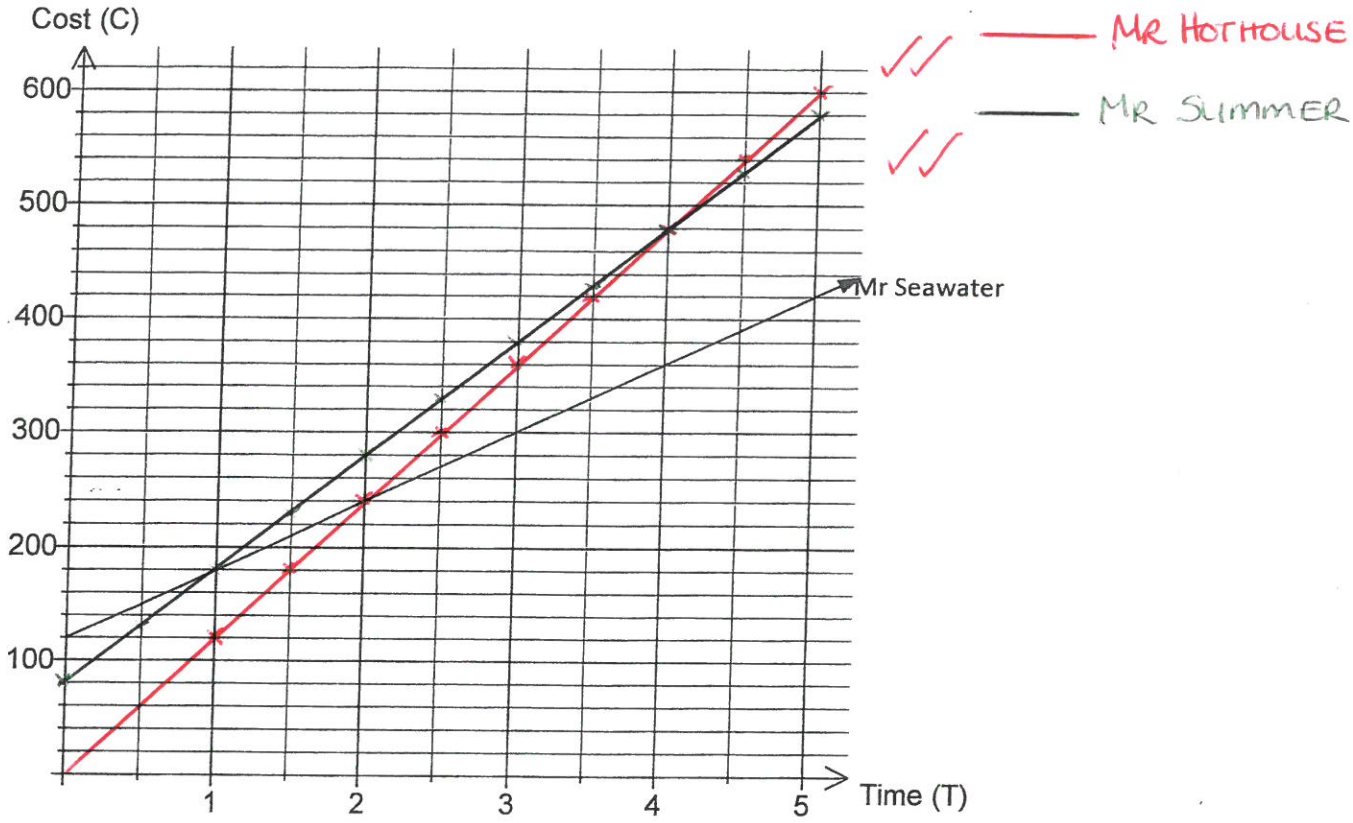
$y = \frac{1}{2}(60) + 120$ or $C = \frac{1}{2}(60) + 120$

$= 30 + 120$ ✓ $= 30 + 120$

$= \$150$. ✓ $= \$150$

4. Comparing all three (11 marks)

One customer decided to analyse all three repairmen to help him to choose the best one. Help him by putting all three lines drawn earlier onto the same axes and label them. Mr Seawater's has been done for you.



a) If the customer knew it was only going to be a quick repair, which repairman would he use? Why?

MR Hothouse
He doesn't charge a callout fee.

b) At what time does this repairman stop being the cheapest?

2 hours.

c) Which repairman would he then choose?

Mr Seawater

d) Which repairman would he never choose? Why?

Mr Summer
He is the most expensive for at least the first 4 hours and is more expensive than mr Seawater after the first hour.