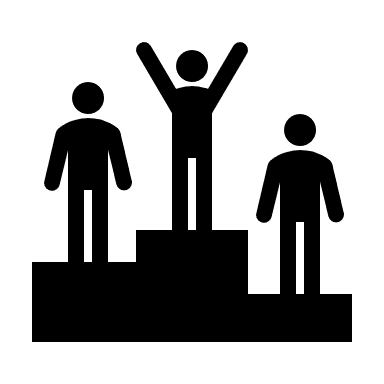
**Skill Sheet: Interpreting Graphs**

***What You Need to Know:***

You might be asked to determine the gradient of a line graph. The formula for a straight line on a graph is:



***Examiners***

***Top Tip***

*When calculating the gradient, use one point from the base of the line and the other point from the end (top) of the line*

y = mx + c

where y is the value on the y axis and c is the value of y where x = 0 (i.e. the line crosses the y axis). The gradient (or slope) m can be calculated using two sets of x and y co-ordinates from points on the line using the formula:

m =(yhigh – ylow) / (xhigh – xlow)

***Example:***

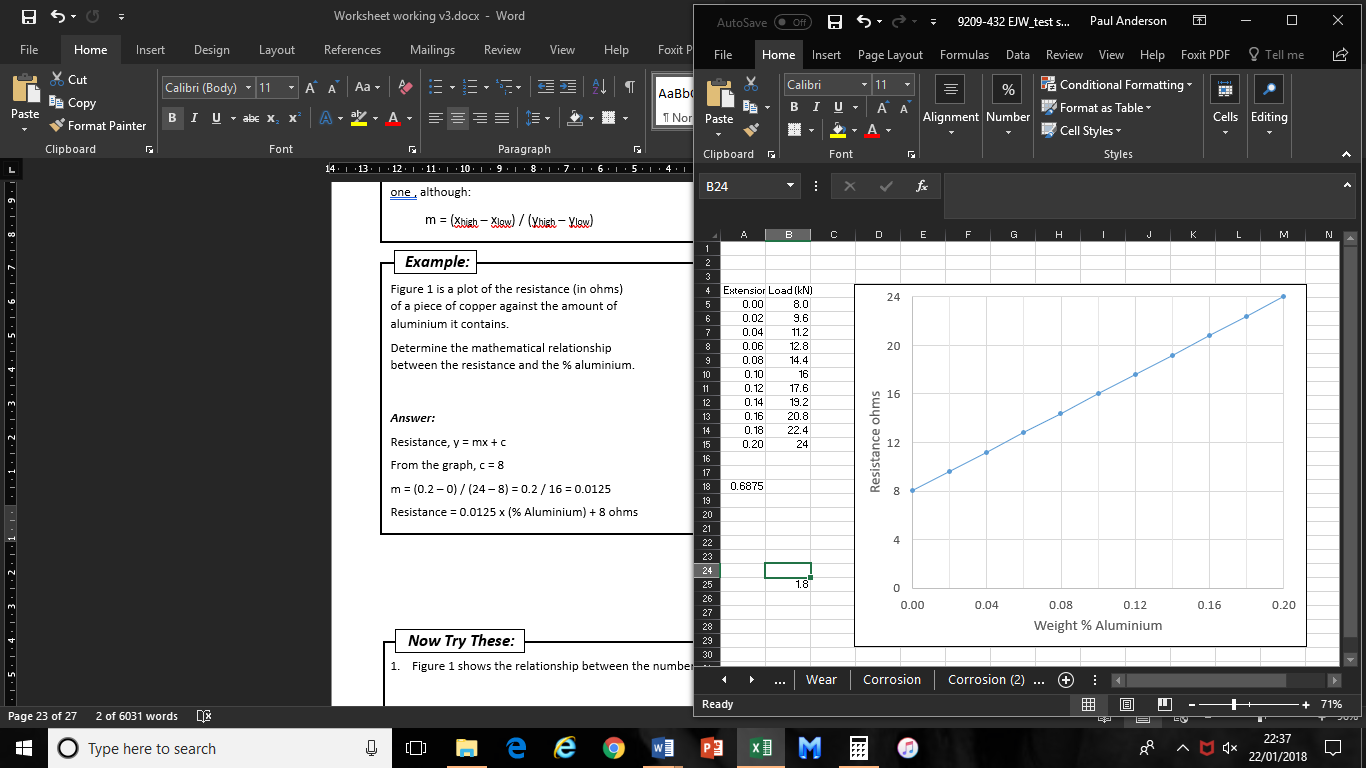


Figure 1 is a plot of the resistance (in ohms) of a piece of copper against the amount of aluminium it contains.

Determine the mathematical relationship between the resistance and the % aluminium.

***Answer:***

Resistance, y = mx + c

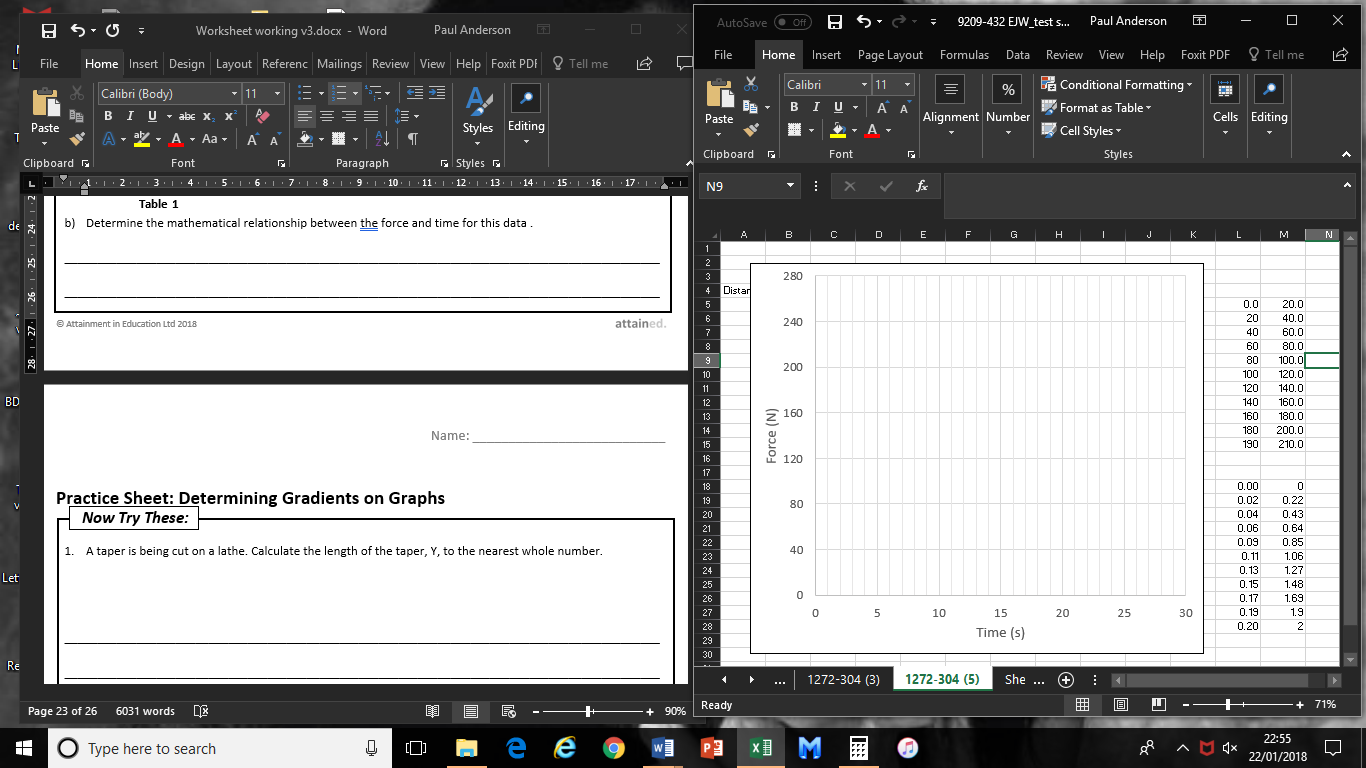
From the graph, c = 8

m = (24 – 8) / (0.2 – 0) = 16 / 0.2 = 80

Resistance = (80 x % aluminium) + 8 ohms

**Figure 1**

***Now Try These:***

1. a) Table 1 shows the relationship between the force applied by a press and time. On the grid provided, plot a line graph showing this data.

**Table 1**

|  |  |
| --- | --- |
| Time (s) | Force (N) |
| 0 | 40 |
| 5 | 80 |
| 10 | 120 |
| 15 | 160 |
| 20 | 200 |
| 25 | 240 |
| 30 | 280 |

1. Determine the mathematical relationship between force and time for this data.

***Now Try These:***

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**Practice Sheet: Interpreting Graphs**

***Now Try These:***

1. Figure 1 shows the results of a test to find the strength of a material.

Determine the mathematical relationship between the load and the extension.

**Figure 1**

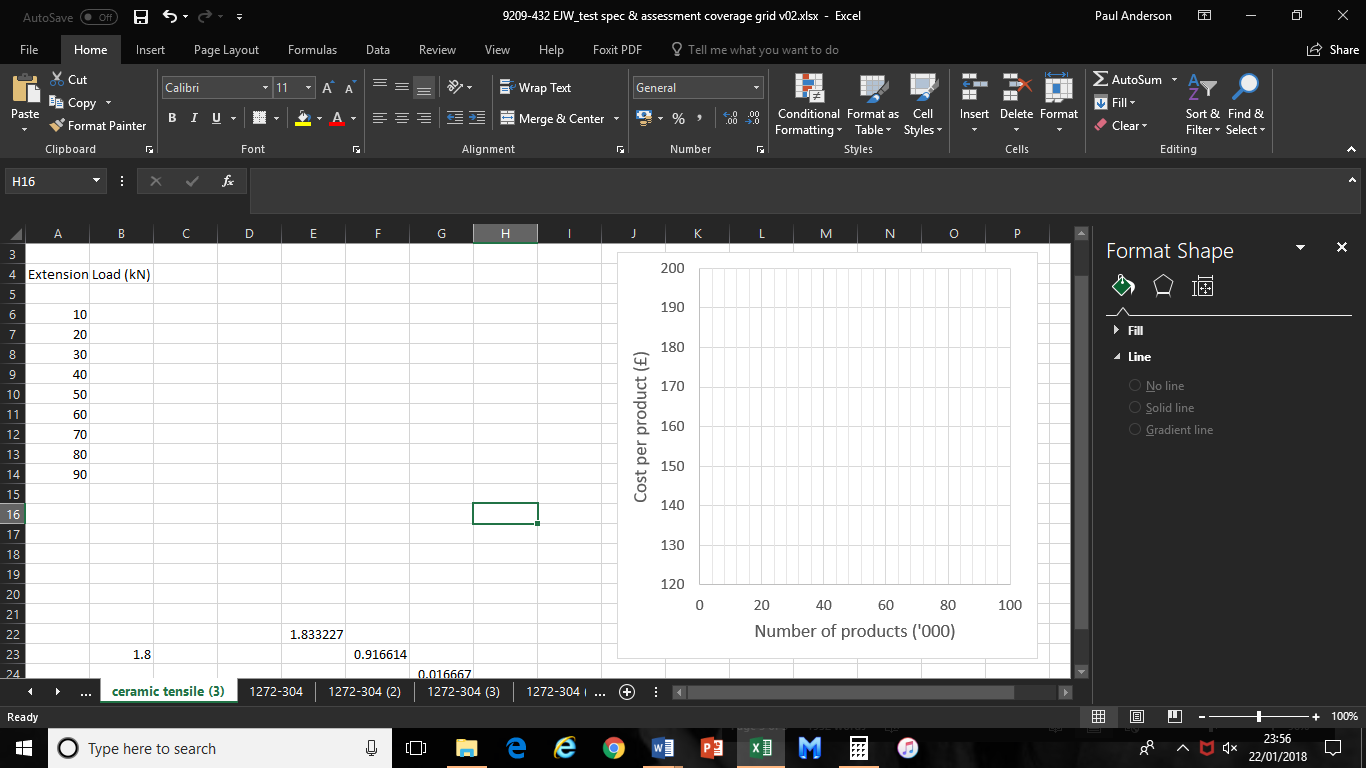
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1. Table 1 shows how the cost to manufacture a product varies with the number of products to be made.

**Table 1**

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Number of products to be made (thousands) | 10 | 20 | 30 | 40 | 50 | 60 | 70 | 80 | 90 |
| Cost per product, £ | 180 | 175 | 170 | 165 | 160 | 155 | 150 | 145 | 140 |

1. Plot the cost per product against the number of products to be made.
2. Calculate the mathematical relationship between the cost per product and the number of products to be made.

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**Answers:**

**Skill Sheet: Interpreting graphs**



b) Force, y = mx + c

From the graph, c = 40

m = (280 – 40) / (30 – 0) = 240 / 30 = 8

Force = (8 x time) + 40 seconds

**Practice Sheet: Interpreting graphs**

1. Load, y = mx + c

From the graph, c = 20

m = (200 – 20) / (1.2 – 0) = 180 / 1.2 = 150

Load = (150 x extension) + 20 kN

1. a)

b) Cost per product, y = mx + c

Extrapolating from the graph, c = 185

m = (140 – 180) / (90000 – 10000) = -40 / 80000 = -5 x 10-4

Cost per product = £ ((-5 x 10-4 x number of products) + 185)

[or £(185 – (5 x 10-4 x number of products))]