
0	7
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Two students investigated reflex action times.

This is the method used.

1. Student **A** sits with his elbow resting on the edge of a table.
2. Student **B** holds a ruler with the bottom of the ruler level with the thumb of Student **A**.
3. Student **B** drops the ruler.
4. Student **A** catches the ruler and records the distance.
5. Steps **1** to **4** are then repeated.

The same method was also used with Student **A** dropping the ruler and Student **B** catching the ruler.

0	7
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1

Give **two** variables the students controlled in their investigation.

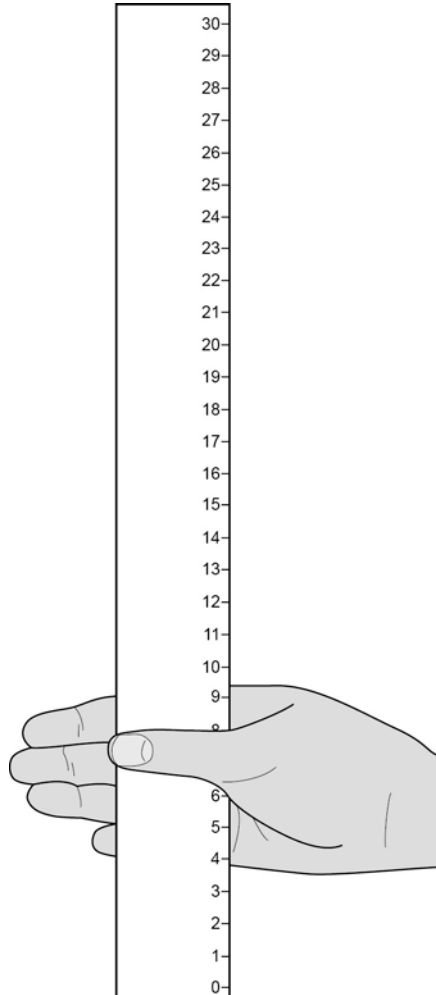
[2 marks]

1 _____

2 _____

Figure 9 shows one of the results for the Student A.

Figure 9



0 7 . 2 What is the reading shown in **Figure 9**?

[1 mark]

Reading on ruler = _____ cm

Question 7 continues on the next page

Table 2 shows the students' results.

Table 2

Test number	Distance ruler dropped in cm	
	Student A	Student B
1	9	12
2	2	13
3	6	13
4	7	9
5	7	8
Mean	7	X

0 7 . 3 Circle the anomalous result in Table 2 for Student A.

[1 mark]

0 7 . 4 What is the median result for Student B?

[1 mark]

Tick **one** box.

8

11

12

13

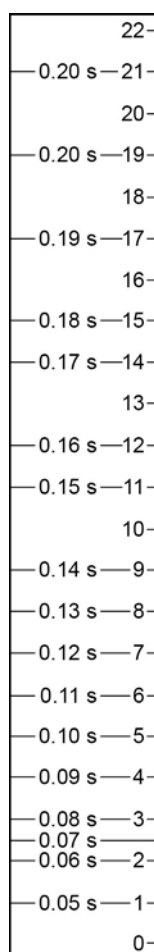
0 7 . 5 Calculate the value of **X** in **Table 2**.

[1 mark]

Mean distance ruler dropped = _____ cm

0 7 . 6 **Figure 10** shows the scale used to convert distance of the ruler drop to reaction time.

Figure 10



Calculate how much faster the reaction time of Student **A** was compared to Student **B**.

Use **Figure 10** and **Table 2**.

[2 marks]

Answer = _____ s

Question 7 continues on the next page

- 0 7** . **7** What improvement could the students make to the method so the results are more valid?

[1 mark]

Tick **one** box.

Use alternate hands when catching the ruler

Carry out more repeats

Use a longer ruler for catching

Use more than two students to collect results

- 0 7** . **8** Student **A** carried out a second investigation to see the effect of caffeine on the reflex action.

Table 3 shows his results.

Table 3

Test number	Distance ruler dropped in cm	
	Without caffeine	With caffeine
1	9	5
2	6	5
3	9	4
4	6	7
5	10	4
Mean	8	5

Give **one** conclusion about the effect of caffeine on reflex actions.

[1 mark]

Question 7

Question	Answers	Extra information	Mark	AO / Spec. Ref.
07.1	any two from: <ul style="list-style-type: none"> • drop the ruler from the same height • use the same / dominant hand each time • thumb same distance from ruler at the start • use same type / weight of ruler • drop the ruler without any force each time • keep arm resting on the edge of the table 		2	AO2/2 4.5.2.1
07.2	8	allow 8.0	1	AO2/2 4.5.2.1
07.3	2 (in test number 2)		1	AO3/1a 4.5.2.1
07.4	12		1	AO2/2 4.5.2.1
07.5	$(12 + 13 + 13 + 9 + 8 / 5 =)$ 11		1	AO2/2 4.5.2.1
07.6	0.15 – 0.12 (s)		1	AO2/2 4.5.2.1
	0.03 (s)	allow 0.03 (s) with no working shown for 2 marks	1	AO2/2 4.5.2.1
07.7	carry out more repeats		1	AO3/3b 4.5.2.1

Question 7 continued

Question	Answers	Extra information	Mark	AO / Spec. Ref.
07.8	caffeine speeds up reflex actions or reduces reaction time		1	AO3/2b 4.5.2.1
Total			10	