

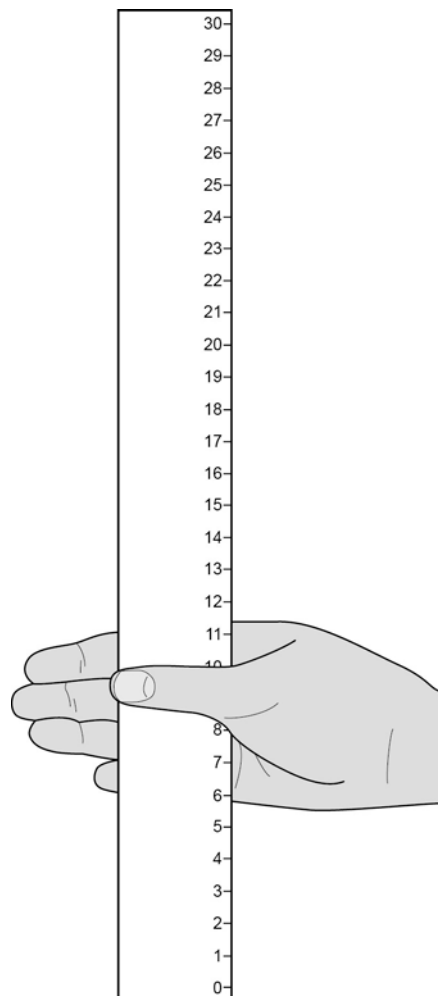
**0 6**

Two students investigated reflex action times.

This is the method used.

1. Student **A** sits with her 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, as shown in **Figure 7**.
5. Steps **1** to **4** were then repeated.

**Figure 7**



---

**0 6** . **1**

Suggest **two** ways the students could improve the method to make sure the test would give valid results.

**[2 marks]**

1 \_\_\_\_\_

\_\_\_\_\_

2 \_\_\_\_\_

\_\_\_\_\_

**Question 6 continues on the next page**

---

**Table 3** shows Student **A**'s results.

**Table 3**

Test Number	Distance ruler dropped in mm
1	117
2	120
3	115
4	106
5	123
6	125
7	106

**0 6** . **2** What is the **median** result?

**[1 mark]**

Tick **one** box.

106

115

116

117

123

---

**0 6** . **3** The mean distance the ruler was dropped is 116 mm.

Calculate the mean reaction time.

**[3 marks]**

Use the equation:

$$\text{reaction time in s} = \sqrt{\frac{\text{mean drop distance in cm}}{490}}$$

Give your answer to 3 significant figures

---

---

---

Mean reaction time = \_\_\_\_\_ s

**0 6** . **4** The students then measured Student **A**'s reaction time using a computer program.

This is the method used.

1. The computer shows a red box at the start.
2. As soon as the box turns green the student has to press a key on the keyboard as fast as possible.
3. The test is repeated five times and a mean reaction time is displayed.

Student **A**'s mean reaction time was 110 ms.

Using a computer program to measure reaction times is likely to be more valid than the method using a dropped ruler.

Give **two** reasons why.

**[2 marks]**

1 \_\_\_\_\_

\_\_\_\_\_

2 \_\_\_\_\_

\_\_\_\_\_

**Question 6 continues on the next page**

---

**0 6** . **5** A woman has a head injury.

Her symptoms include:

- finding it difficult to name familiar objects
- not being able to remember recent events.

Suggest which part of her brain has been damaged.

**[1 mark]**

---

**0 6** . **6** A man has a head injury.

He staggers and sways as he walks.

Suggest which part of his brain has been damaged.

**[1 mark]**

---

**Question 6**

Question	Answers	Extra information	Mark	AO / Spec. Ref.
<b>06.1</b>	any <b>two</b> from: <ul style="list-style-type: none"> <li>• drop the ruler from the same height each time</li> <li>• let the ruler drop without using any force</li> <li>• same type / weight of ruler</li> <li>• thumb should be same distance from the ruler each time at the start</li> <li>• use the same hand to catch the ruler each time</li> <li>• carry out the experiment with the lower arm resting in the same way on the table</li> </ul>	allow description of holding bottom edge of ruler opposite the catcher's thumb	2	AO3/3a 4.5.2.1
<b>06.2</b>	117		1	AO2/2 4.5.2.1
<b>06.3</b>	$\sqrt{\frac{11.6}{490}}$ 0.1539  0.154	allow 01539 with no working shown for <b>2</b> marks  allow 0.154 with no working shown for <b>3</b> marks  allow ecf as appropriate	1  1  1	AO2/2 4.5.2.1  AO2/2 4.5.2.1  AO2/2 4.5.2.1

**Question 6 continues on the next page**

## Question 6 continued

Question	Answers	Extra information	Mark	AO / Spec. Ref.
<b>06.4</b>	no indication beforehand when the colour will change <b>or</b> you might be able to tell when the person is about to drop the ruler		1	AO3/2a 4.5.2.1
	measurement of time is more precise (than reading from a ruler) <b>or</b> resolution (of computer timer) is higher		1	AO3/2a 4.5.2.1
<b>06.5</b>	cerebral cortex	allow cerebrum  ignore identified lobes	1	AO2/2a 4.5.2.2
<b>06.6</b>	cerebellum		1	AO2/2a 4.5.2.2
<b>Total</b>			<b>10</b>	