

NAME: .....

### TURNING EFFECT OF A FORCE

1. The weight of an object is to be found using the balance shown in the diagram.

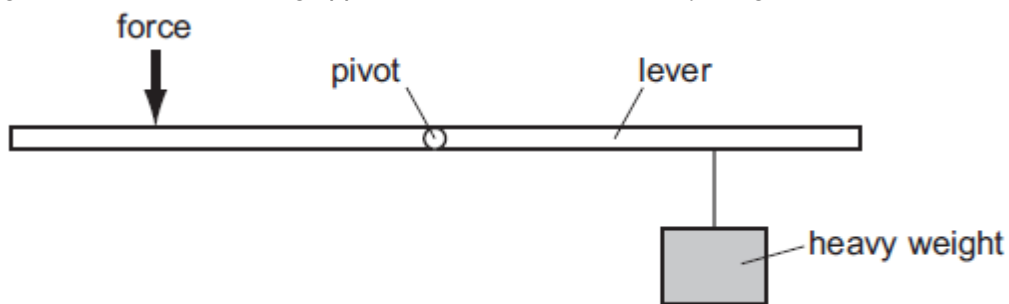


Weights in the right-hand pan	Effect
0.1 N, 0.1 N, 0.05 N, 0.02 N	balance tips down slightly on the left-hand side
0.2 N, 0.1 N, 0.01 N	balance tips down slightly on the right-hand side

What is the best estimate of the weight of the object?

- A. 0.27 N
- B. 0.29 N
- C. 0.31 N
- D. 0.58 N

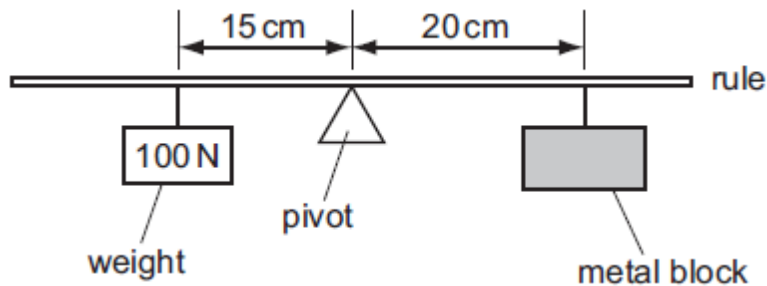
2. The diagram shows a force being applied to a lever to lift a heavy weight.



Which change would enable the heavy weight to be lifted with a smaller force?

- A. Move the force to the right.
- B. Move the heavy weight to the right.
- C. Move the force to the left.
- D. Move the pivot to the left.

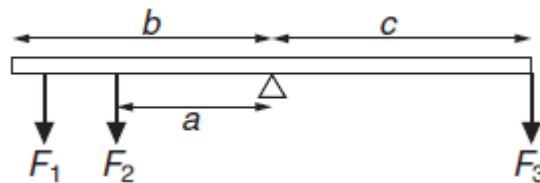
3. The diagram shows a uniform half-metre rule balanced at its mid-point.



What is the weight of the metal block?

- A. 50 N
- B. 75 N
- C. 100 N
- D. 150 N

4. A beam is pivoted at its centre. Three forces,  $F_1$ ,  $F_2$  and  $F_3$ , act on the beam as shown in the figure below.



When the beam is released, the right-hand side of the beam starts to go down. Which of the three distances,  $a$ ,  $b$  or  $c$ , should be decreased in order to balance the beam? Explain your answer.

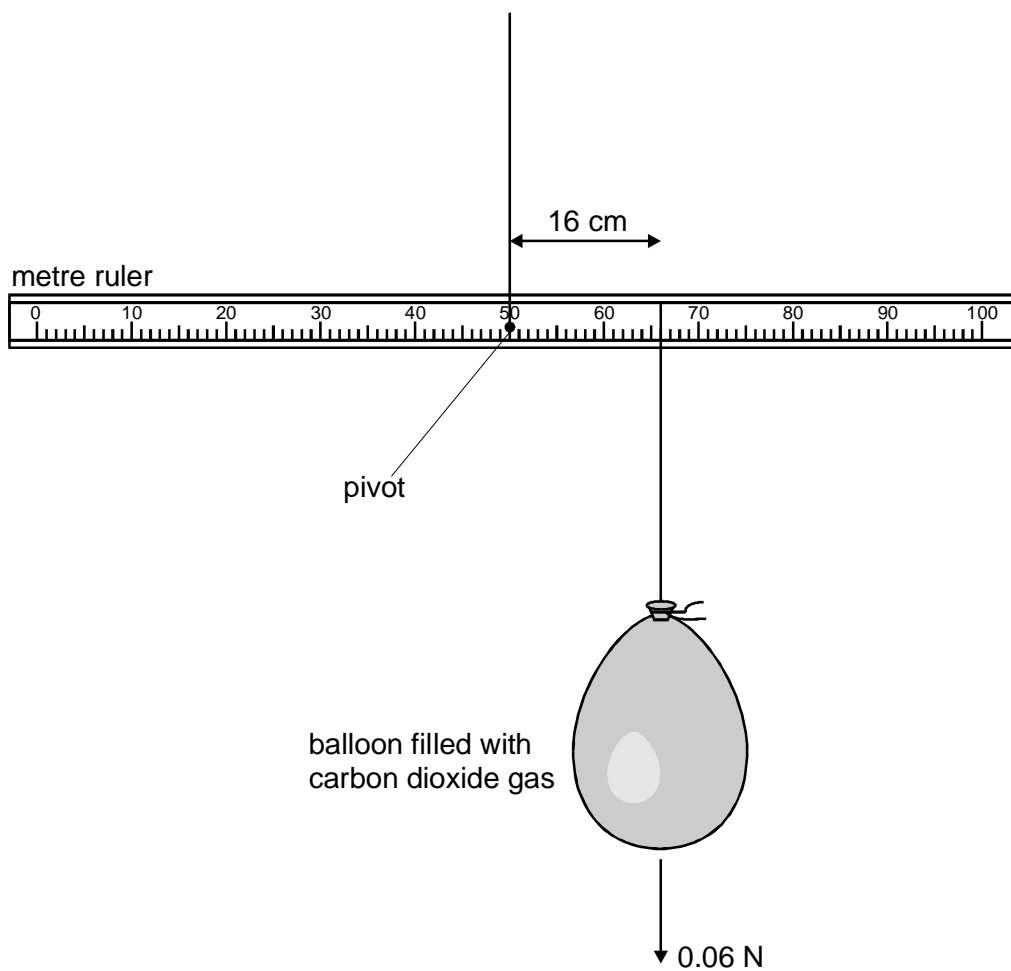
Which distance? .....

Explanation

[3]

5. Alex has a 100 cm ruler pivoted at the centre. She ties a balloon filled with carbon dioxide 16 cm from the pivot, as shown below.

The total weight of the balloon and carbon dioxide is 0.06 N.

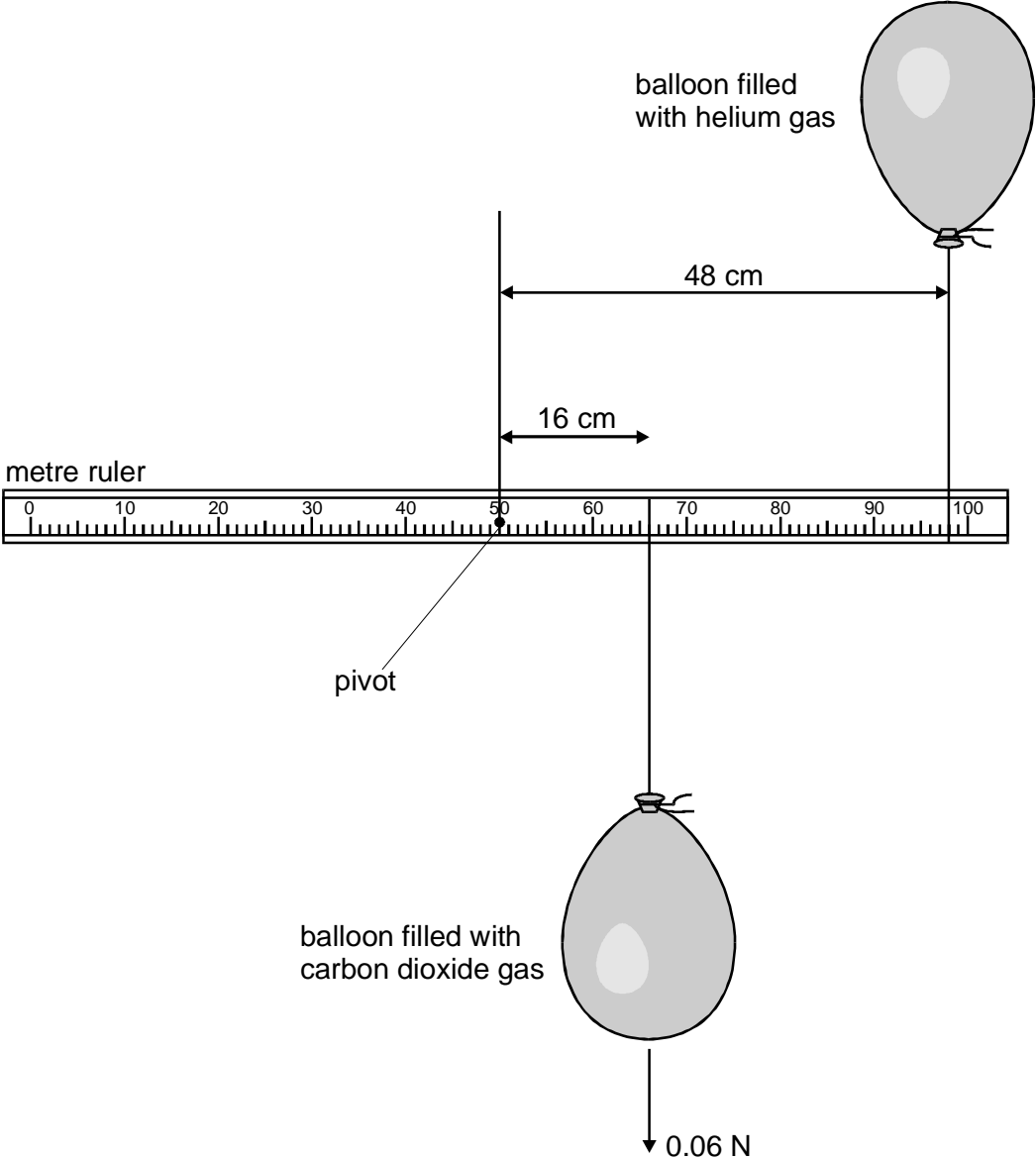


- (a) The ruler becomes unbalanced.  
Calculate the turning moment the balloon produces about the pivot on the ruler.  
Give the unit.

.....  
.....

2 marks

- (b) Alex ties another similar balloon, filled with helium, 48 cm from the pivot.  
The helium balloon exerts an upward force on the ruler.  
The ruler is balanced as shown below.



- (i) When the ruler is balanced, what turning moment must the helium balloon

produce about the pivot?

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1 mark

(ii) Calculate the upward force exerted by the helium balloon on the ruler.

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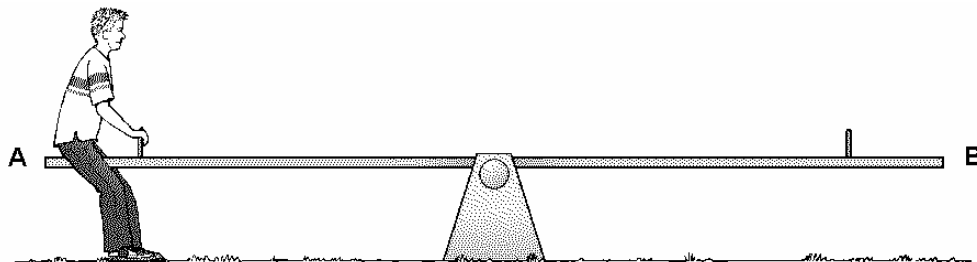
1 mark

Maximum 4 marks

6. Five people take it in turns to sit on a see-saw. The table gives the weight of each person.

person	weight, in N
Jack	510
Ellie	540
Rosie	490
Maggy	540
Andy	560

(a) Andy sits at one end, but there is nobody on the other end.



Andy sits on the see-saw.  
In which direction does his end of the see-saw move?

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1 mark

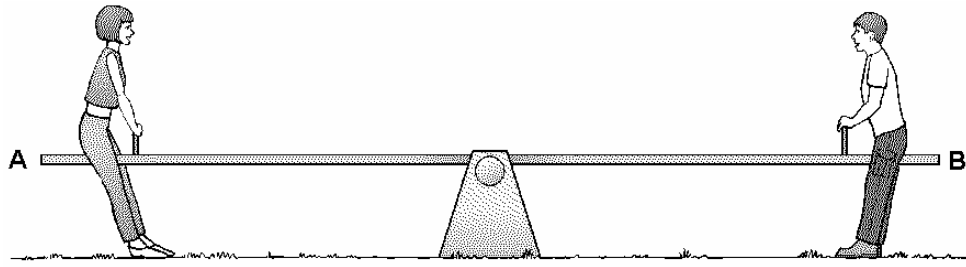
(b) Which **two** people in the table above could make the see-saw balance?

.....and.....

1 mark

Use information in the table to help you answer parts (c) and (d).

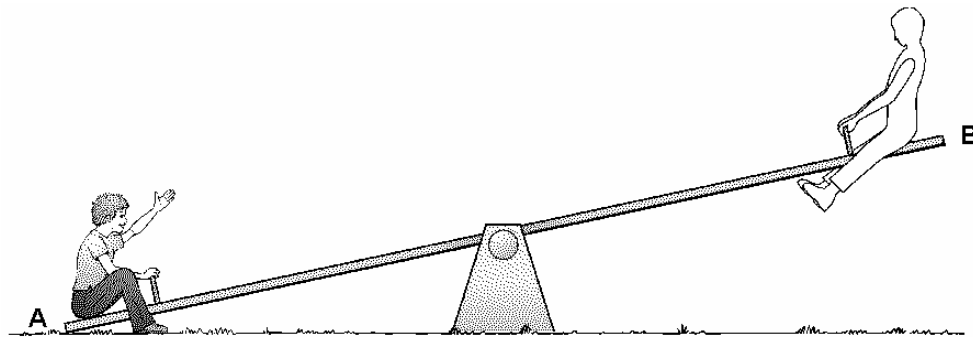
(c) Rosie sits on end A, and Jack sits on end B.



They lift their feet.  
What happens to each end of the see-saw?  
Write **up** or **down** in the boxes under Rosie and Jack.

1 mark

(d) Ellie sits on end A, and another of the group sits on end B.  
Ellie's end stays down.



Who could be on end B?

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1 mark

Maximum 4 marks