Three forces F_1, F_2 and F_3 act on a ring that is in equilibrium. Which of these statements is not correct:

○ a. The resultant force of F_1, F_2 and F_3 is equal zero.

○ b. The three forces are in the same plane.

● c. F_3 is the resultant of F_1 and F_2.

○ d. Both a and b are correct.

a. Since Forces F_1, F_2 and F_3 act on a ring, and the ring is in equilibrium, the resultant of all Forces must be zero.

b. we know for a fact all forces are on the same plane.

c. $\sum F_{plane} = 0$

$F_1 + F_2 + F_3 = 0 \longrightarrow (F_1 + F_2) = -F_3$

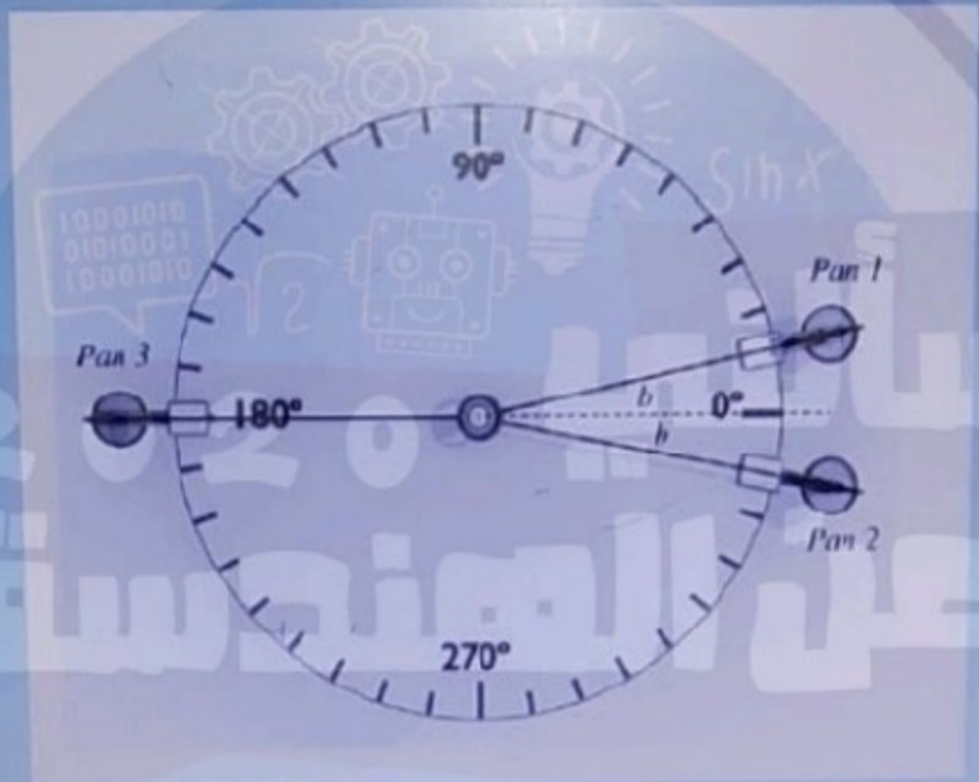
$\longrightarrow$ F_3 is the balance Force :

It is equal in magnitude and opposite in direction to the resultant of the two Forces.

$\longrightarrow$ The statement is not Correct

C

Two equal masses (50 g each) are hanging from pan 1 and pan 2 as shown in the setup. Let angle $b = 10°$. The mass (in g) needed to hang from pan 3 to put the system into equilibrium is:

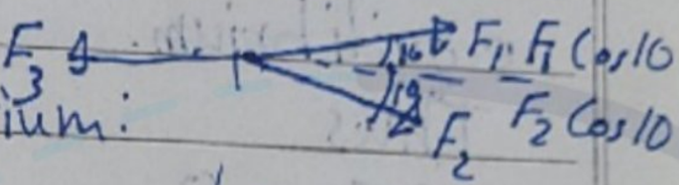


- ○ 49.3
- ○ 8.72
- ○ 100
- ◉ 98.5
- ○ 50

$F_1 = 50g$

$F_2 = 50g$

Since in equilibrium:



$\Sigma F_x = 0$

$\Sigma F_x = F_1 \cos 10 + F_2 \cos 10 - F_3$

$F_3 = (m_{Pan_3})\, g$

$0 = 2(50g \cos 10) - m_3 g$

$m_3 = \frac{2(50)(\cancel{g})\cos 10}{\cancel{g}} = 100 \cos 10$

$\boxed{= 98.5 \text{ grams}}$

* which of the following statements is correct -13

The resultant force of two forces is equal in magnitude and opposite in direction for the third force which makes balance

The resultant force of two forces is equal in magnitude and in the same direction for the third force which makes balance

The resultant force of two forces is not equal in magnitude and opposite in direction for the third force which makes balance

None of the above is write

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To get balance is to achieve equilibrium.

Thus

$\Sigma F = 0$

lets say we have 3 arbitary forces, F_1, F_2, and F_3 all acting on the body.

$\Sigma F = F_1 + F_2 + F_3$

Since equilibrium:

$0 = F_1 + F_2 + F_3$

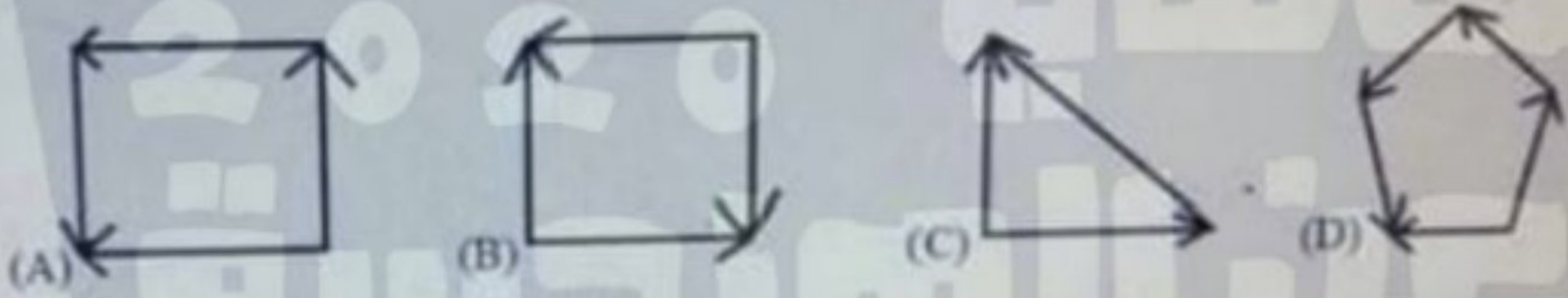
$-F_3 = F_1 + F_2$

We conclude that the third force MUST be equal to ~~to~~ magnitude of the resultant of the two forces and in opposite direction. to the ~~resultant~~

$\boxed{\text{Option A}}$

In the force table experiment, the ring was under equilibrium after applying -12 more than one force. Then the applied forces were represented geometrically.

* ?Which of the following may represent the right situation



- A (selected)
- B
- C
- D

Ring in equilibrium means that sum of forces is zero.

$\Sigma F = 0$

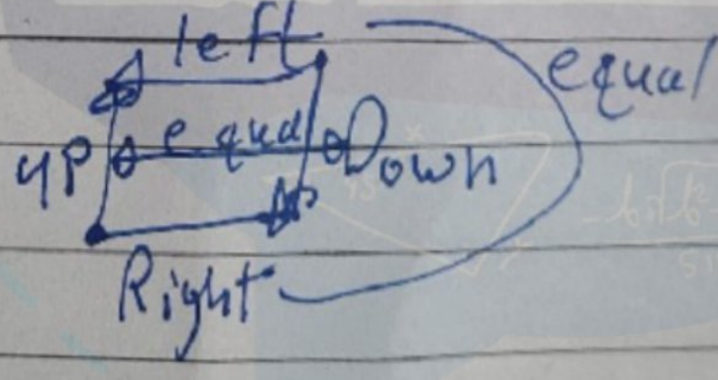
Also

$\Sigma F_x = 0$ AND $\Sigma F_y = 0$

For this to be true geometrically the total length of "ups" $F_y = +$ must equal total length of "down" $F_y = -$. Same thing for "left" and "right".

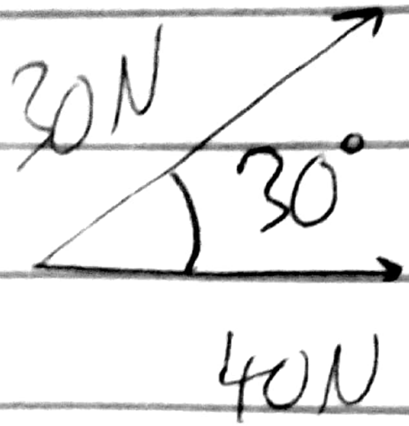
This only occurs in figure b.

$\boxed{B}$



* :The resultant force of 30N and 40N forces with angle of 30 degree is

- 20.5
- 15.1
- 29.8
- 34.6



$$|\bar{R}| = \sqrt{30^2 + 40^2 - 2 \times 40 \times 30 \times \cos 30}$$
$$= 20.5$$

The magnitude of the third mass (m) in grams used to balance these two masses on the force table is approximately:

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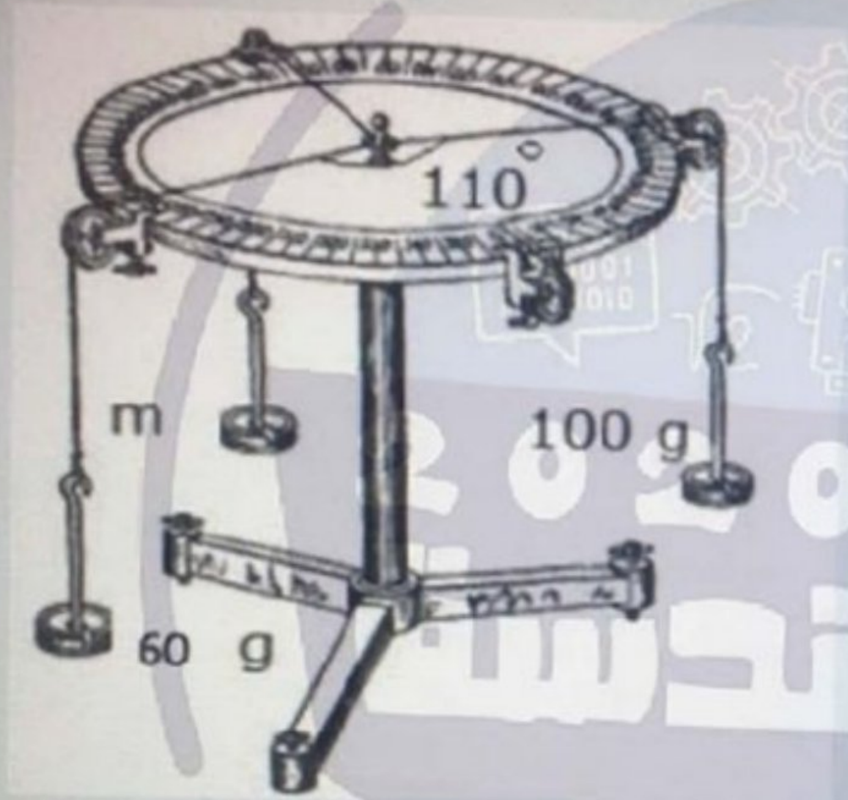
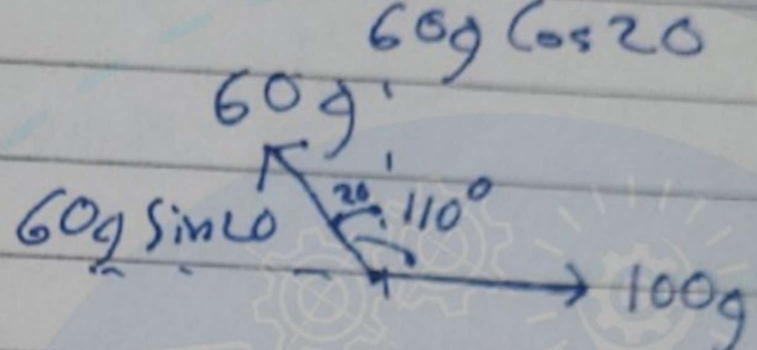


- a. 180
- b. None of the above
- c. 148
- d. 97.4
- e. 104.5

$\Sigma F_x = 100g - 60g \sin 20 = 794.8$

$\Sigma F_y = 60g \cos 20 = 563$



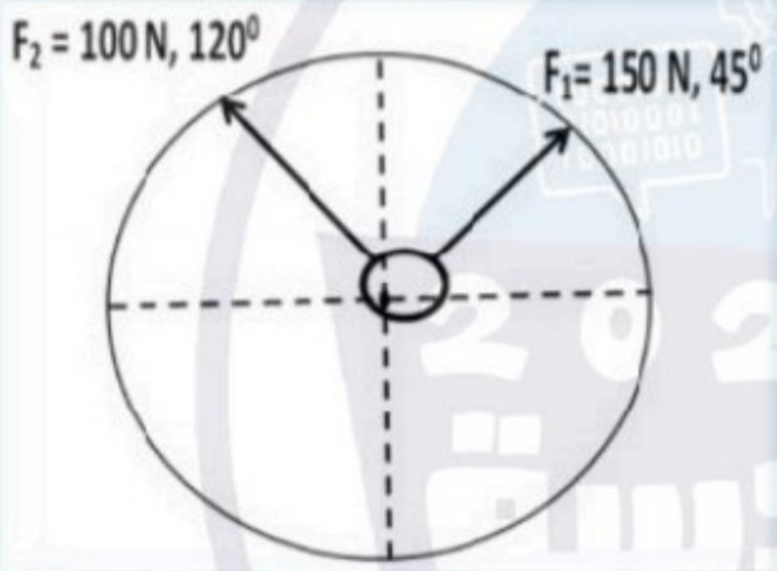
$F_{res} = \sqrt{794.8^2 + 563^2} = 974$

$F = ma$

$974 = mg$

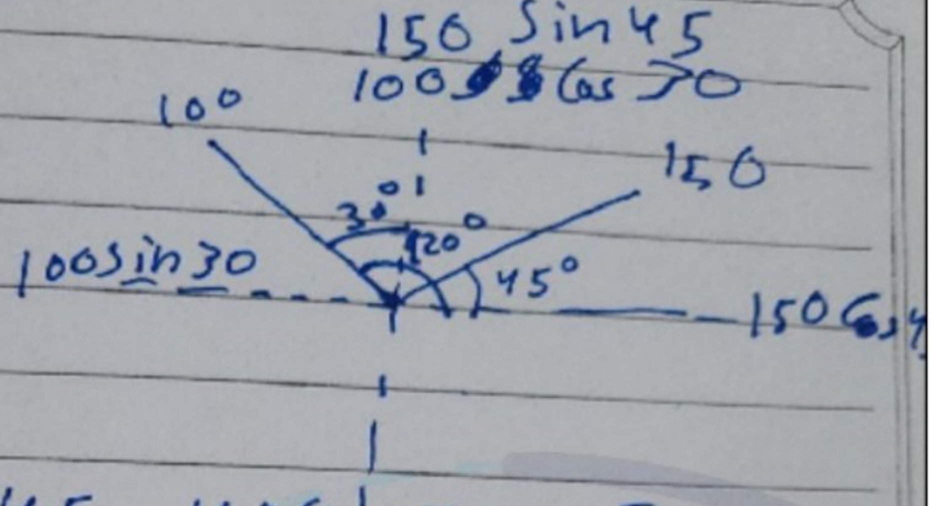
$m = 97.4$ grams

The adjacent figure shows a force table where two forces act on the ring at the middle. The magnitude and ange of the balance force that returns the ring to the equilibrium position are:



- ○ a. 190 N, 74 °
- ○ b. 201 N, 74 °
- ◉ c. 201 N, 254°
- ○ d. 250 N 165°
- ○ e. 190 N, 254°

Clear my choice



$\Sigma F_x = 150 \cos 45 - 100 \sin 30 = 56.1$

$\Sigma F_y = 150 \sin 45 + 100 \cos 30 = 192.7$

$F_{res} = \sqrt{56.1^2 + 192.7^2} = 200.7 \approx 201$

Since ΣF_x and ΣF_y are positive, F_{res} is in the first quadrant $0 \leq \theta \leq 90$ and since $F_{balance}$ must be $180°$ to F_{res}, F_{bal} must be in third quadrant, thus $180 \leq \theta \leq 270$, Leaving us with option

$\boxed{C}$ 201N, 254°

You can can calculate angle by: $\theta = 180° + \tan^{-1}\left(\frac{192.7}{56.1}\right) = 254°$