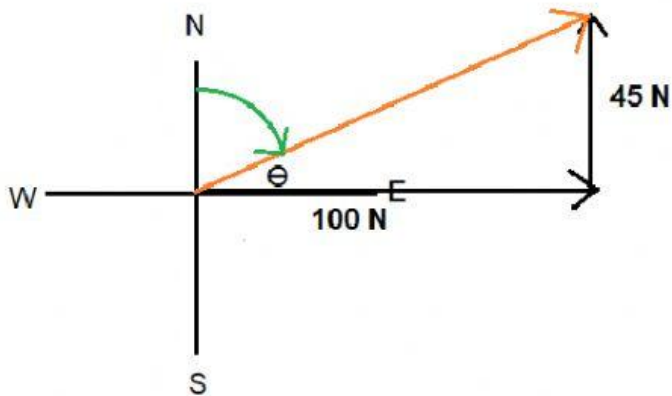


Newton worksheet 4

Remember to draw the Cartesian plane where the 2 tails meet.



To determine the green angle you need to go all the way to the 90° and then subtract θ

$$\text{Bearing} = 90^\circ - 24,23$$

$$= 65,77^\circ$$

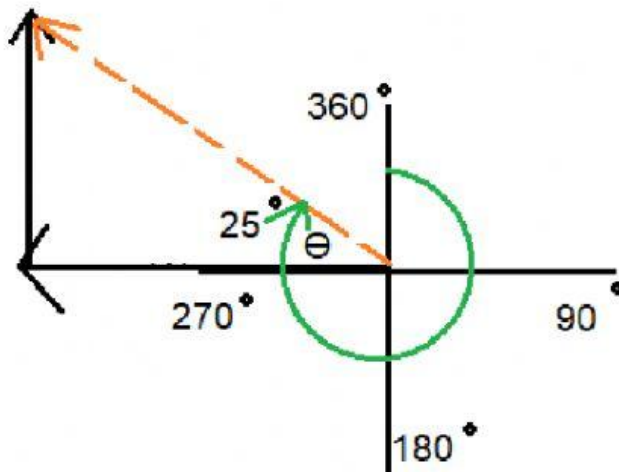
Final answer $F_{\text{net}} = 109,66 \text{ N}$ at a bearing of $65,77^\circ$

Bearing

Bearing is quite a tricky concept

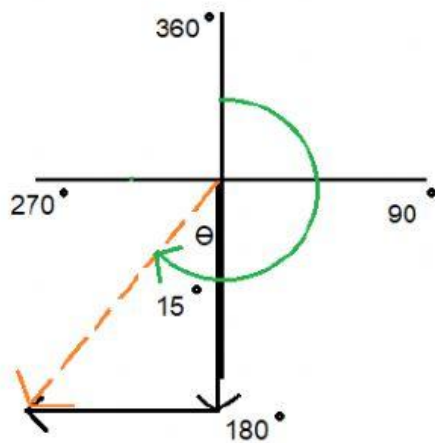
Look at the following examples of just how to calculate the bearing:

1.



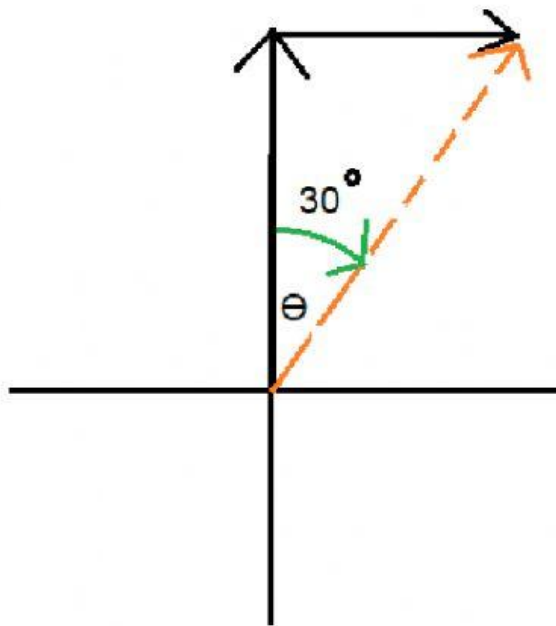
$$\begin{aligned}\text{Bearing} &= \text{---}^\circ + \Theta \\ &= \text{---} + 25 \\ &= \text{---}^\circ\end{aligned}$$

2.



$$\begin{aligned}\text{Bearing} &= \text{---}^\circ + \Theta \\ &= \text{---}^\circ + 15 \\ &= \text{---}^\circ\end{aligned}$$

3.

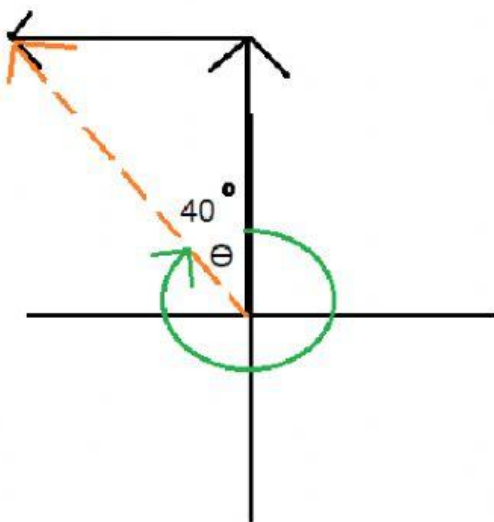


Bearing = Θ

(since the green angle is literally measured clockwise from the north)

= 30°

4.



Bearing = $_____\circ - \Theta$

= $_____\circ - 40$

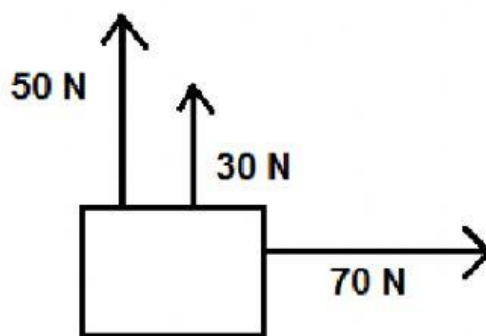
= $_____\circ$

Exercise 4:

- ✓ Ensure that you include the direction whenever you answer force, since it is a vector
- ✓ Don't leave any spaces between the values and the unit
- ✓ Round each answer below off to 2 decimal places
- ✓ Use the terms upwards, downwards, left and right where appropriate
- ✓ Leave out the degrees symbol when answering for the angles

Determine the magnitude and direction of the net (resultant) force of the following:

1. Jordan and David each pull a crate up with force of 50 N and 30 N respectively at a bearing of 0° , Ally then pulls the crate to the right with a force of 70 N at a 90° bearing.



$F_x =$ _____

Answer value and unit Direction

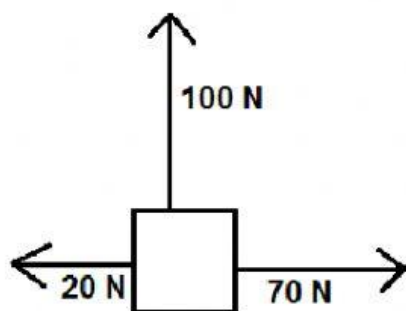
$F_{y\text{net}} =$ _____

$F_{\text{net}} =$ _____

$\theta =$ _____ $^\circ$

Bearing = _____ $^\circ$

2.



$$F_{xnet} = \underline{\hspace{2cm}} \underline{\hspace{2cm}}$$

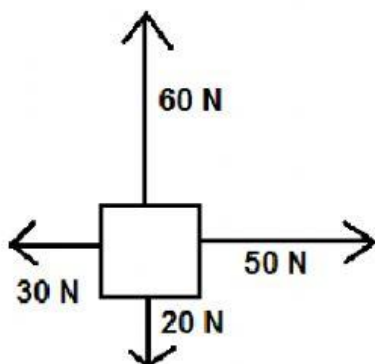
$$F_y = \underline{\hspace{2cm}} \underline{\hspace{2cm}}$$

$$F_{net} = \underline{\hspace{2cm}}$$

$$\Theta = \underline{\hspace{2cm}}^\circ$$

$$\text{Bearing} = \underline{\hspace{2cm}}^\circ$$

3. Keziah exerts a force of 60 N north, Siphokazi exerts a force of 20 N south. Tom and Jared then exert a force of 50 N east and 30 N west respectively on the box.



$$F_{xnet} = \underline{\hspace{2cm}} \underline{\hspace{2cm}}$$

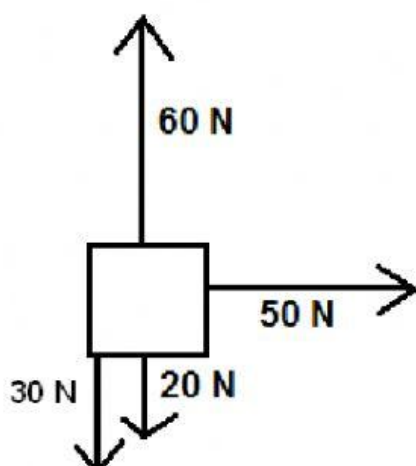
$$F_{ynet} = \underline{\hspace{2cm}} \underline{\hspace{2cm}}$$

$$F_{net} = \underline{\hspace{2cm}}$$

$$\Theta = \underline{\hspace{2cm}}^\circ$$

$$\text{Bearing} = \underline{\hspace{2cm}}^\circ$$

4.



$$F_x = \underline{\hspace{2cm}}$$

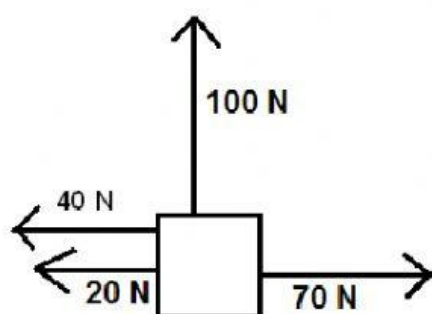
$$F_{y\text{net}} = \underline{\hspace{2cm}}$$

$$F_{\text{net}} = \underline{\hspace{2cm}}$$

$$\Theta = \underline{\hspace{2cm}}^\circ$$

$$\text{Bearing} = \underline{\hspace{2cm}}^\circ$$

5.



$$F_{x\text{net}} = \underline{\hspace{2cm}}$$

$$F_y = \underline{\hspace{2cm}}$$

$$F_{\text{net}} = \underline{\hspace{2cm}}$$

$$\Theta = \underline{\hspace{2cm}}$$

$$\text{Bearing} = \underline{\hspace{2cm}}$$

6. Danielle exerts a force of 50 N on a box to the right and Markus exerts a force of 30 N to the left. Joshua and James then exerts a force of 40 N each on the box in a downwards direction. Calculate the net force on the box.

$$F_{xnet} = \underline{\hspace{2cm}} \quad \underline{\hspace{2cm}}$$

$$F_y = \underline{\hspace{2cm}} \quad \underline{\hspace{2cm}}$$

$$F_{net} = \underline{\hspace{2cm}}$$

$$\Theta = \underline{\hspace{2cm}}^\circ$$

$$\text{Bearing} = \underline{\hspace{2cm}}^\circ$$

7. If Banele exerts a force of 100 N to the west on a trolley and Tyler exerts a force of 140N to the East on the trolley, while Shanique pulls the trolley with a force of 20 N north.

$$F_{xnet} = \underline{\hspace{2cm}} \quad \underline{\hspace{2cm}}$$

$$F_y = \underline{\hspace{2cm}} \quad \underline{\hspace{2cm}}$$

$$F_{net} = \underline{\hspace{2cm}}$$

$$\Theta = \underline{\hspace{2cm}}^\circ$$

$$\text{Bearing} = \underline{\hspace{2cm}}^\circ$$

If the question uses directions like east and west, then use the same for your answer.

8. If Carol exerts a 5 N force upwards and Maxine exerts a 4 N force on a box to the right, calculate the net force on the box

$$F_x = \underline{\hspace{2cm}} \quad \underline{\hspace{2cm}}$$

$$F_y = \underline{\hspace{2cm}} \quad \underline{\hspace{2cm}}$$

$$F_{net} = \underline{\hspace{2cm}}$$

$$\Theta = \underline{\hspace{2cm}}^\circ$$

$$\text{Bearing} = \underline{\hspace{2cm}}^\circ$$

9. Retha picks up a 2 kg bag with a force of 70 N. The weight (gravitational force) on the bag is 19,6 N. Calculate the net force on the bag

$F_{\text{net}} = \underline{\hspace{2cm}} \quad \underline{\hspace{2cm}}$

10. Snalo picks up a bag with a mass of 4kg with a force of 80N

$F_{\text{net}} = \underline{\hspace{2cm}} \quad \underline{\hspace{2cm}}$

11. James exerts a force of 1000 N to pick up a box with a mass of 60 kg.

$F_{\text{net}} = \underline{\hspace{2cm}} \quad \underline{\hspace{2cm}}$