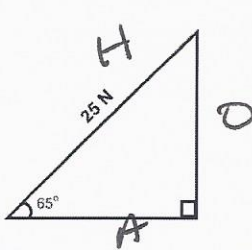


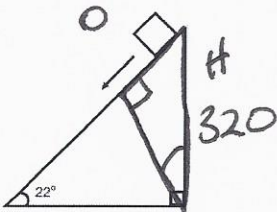
Effective force worksheet

1. A person is pulling a box along the floor with a force of 25 N at an angle of 65° to the horizontal. What is the effective force?



$$\cos 65 = \frac{x}{25} = \textcircled{11\text{N}}$$

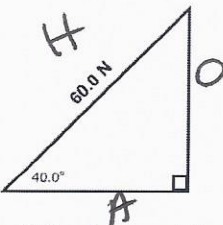
2. What is the magnitude of the effective force of a box weighing 33 kg sliding down an inclined plane at a 22° angle?



$$33 \times 9.8 = 320\text{N}$$

$$\sin 22 = \frac{x}{320} = \textcircled{120\text{N}}$$

3. a- A person is pulling a bag along the floor with a force of 60.0 N at an angle of 40.0° to the horizontal. What is the effective force?



$$\cos 40.0 = \frac{x}{60.0} = \textcircled{46.0\text{N}}$$

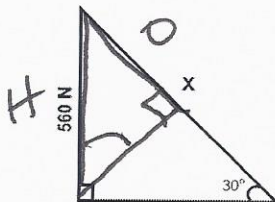
- b- If the bag weighs 7.0 kg, will the perpendicular force be strong enough to lift the bag off the ground?

$$7.0 \times 9.8 = 69\text{N}$$

$$\sin 40.0 = \frac{x}{60.0} = \textcircled{38.6\text{N}}$$

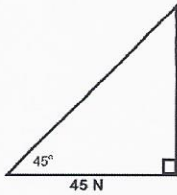
No force too weak.

4. Bob is skiing down a hill, his weight is 560 N and the slope of the ski run is 30.0°. What is the magnitude of the effective force responsible for Bob's descent?



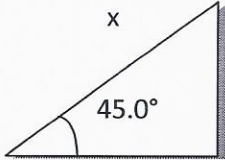
$$\sin 30 = \frac{x}{560} = \textcircled{280\text{N}}$$

5. What is the force used by a man pulling a cart with an effective force of 45 N at a 45° angle?



$$\cos 45 = \frac{45}{x} = \textcircled{64\text{N}}$$

6. What is the force used by a man lifting a cart with an effective force of 62.0 N at a 45.0° angle?

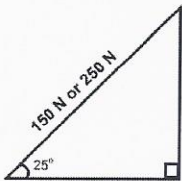


$$\sin 45.0 = \frac{62.0}{x} = \textcircled{87.7\text{N}}$$

7. What is the effective force if a marble weighing 55 N slides down an inclined plane with a 45° angle?

$$\sin 45 = \frac{x}{55} = \textcircled{39\text{N}}$$

8. Explain if each person will be able to lift their luggage weighing 35 kg off the floor if they both are lifting the luggage at a 25°, but person 1 is using 150 N of force and person 2 is using 250 N of force. $35 \times 9.8 = 340\text{ N}$



$$\textcircled{1} \quad \sin 25 = \frac{x}{150} = \textcircled{63\text{N}}$$

$$\textcircled{2} \quad \sin 25 = \frac{x}{250} = \textcircled{110\text{N}}$$

Neither has enough force to lift the bag,

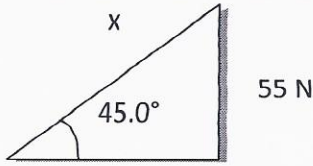
9. a- A toy car is placed on a ramp tilted at a 45° angle. If the weight of the car was 150 N, what is the magnitude of the effective force that makes the car slide down the ramp?

$$\sin 45 = \frac{x}{150} = \textcircled{110\text{N}}$$

- b- How would the magnitude of the force change if the angle was 75°?

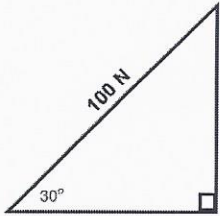
$$\sin 75 = \frac{x}{150} = \textcircled{140\text{N}}$$

10. What is the force used by a man lifting a cart with an effective force of 55 N at a 45.0° angle?



$$\cos 45.0 = \frac{55}{x} = \boxed{78 \text{ N}}$$

11. a- A person is pulling a sled along the snow with a force of 100 N at a 30° angle. What is the effective force?



$$\cos 30 = \frac{x}{100} = \boxed{90 \text{ N}}$$

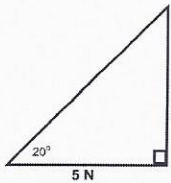
b- If the sled weighs 2 kg, will the perpendicular force be strong enough to lift the sled off the ground?

$$2 \times 9.8 = 20 \text{ N}$$

$$\sin 30 = \frac{x}{100} = \boxed{50 \text{ N}}$$

Yes has enough force to lift 20 N.

12. What is the force used by a woman pulling the garbage if the effective force was 5 N and the angle was 20°?



$$\cos 20 = \frac{5}{x} = \boxed{5 \text{ N}}$$

13. a- A person is dragging her dog on the street for a walk with a force of 120 N at a 45° angle. What is the effective force?

$$\cos 45 = \frac{x}{120} = \boxed{85 \text{ N}}$$

b- If the dog weighs 2 kg, will the perpendicular force be strong enough to lift the dog off the ground?

$$2 \times 9.8 = 20 \text{ N}$$

$$\sin 45 = \frac{x}{120} = \boxed{85 \text{ N}}$$

Yes, has enough force to lift 20 N.

14. A child is playing with a car that weighs 15 N on a plane inclined at an angle of 20.0° . What is the gravitational force makes the car slide down the inclined plan.

$$S 20.0 = \frac{x}{15} = \textcircled{5.1N}$$

15. a- A child is pulling a rope tied to a cart with a force of 30.0 N and at an angle of 25° . What is the effective force?

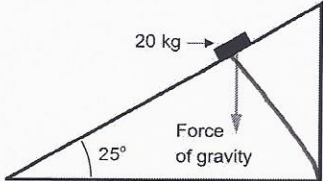
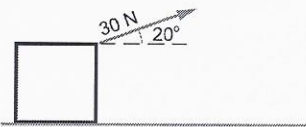
$$C 25 = \frac{x}{30.0} = \textcircled{27N}$$

- b- What is the component perpendicular to the distance travelled?

(lift)

$$S 25 = \frac{x}{30.0} = \textcircled{13N}$$

16. What is the effective force in each of the following situations?

<p>a) The box slides down the inclined plane.</p> 	$20 \times 9.8 = 200N$ $S 25 = \frac{x}{200} = \textcircled{80N}$
<p>b) The box slides along the ground.</p> 	$C 20 = \frac{x}{30} = \textcircled{30N}$

17. The effective force of a man pulling a cart is 75 N. The handle is at a 25° angle. If the maximum force he should apply is 50.0 N, is he using too much force?

$$C 25 = \frac{75}{x} = \textcircled{83N}$$

Yes he is using too much force. 50.0N
max & he is using 83N of force.