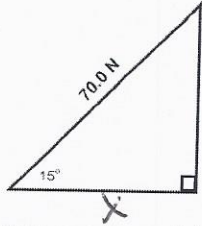


## Work questions

1. A mother is pulling her baby carriage over a distance of 2.0 km with a force of 70.0 N at a 15° angle. What is the work accomplished?

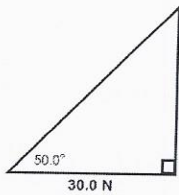


$$W = Fd$$

$$\left( \frac{\cos 15^\circ = x}{70.0} \right) \times 2000$$

$$1.4 \times 10^5 \text{ J}$$

2. How much work is done when a boy pulls a sled over a distance of 20.0 m with an effective force of 30.0 N at a 50.0° angle?



$$W = Fd$$

$$30.0 \times 20.0 = 600 \text{ J}$$

$$6.00 \times 10^2 \text{ J}$$

3. What is the distance travelled if a girl uses 1 500 J of energy with an effective force of 25 N for a walk in the park?

$$d = \frac{W}{F}$$

$$\frac{1500}{25} =$$

$$60 \text{ m or}$$

$$6.0 \times 10^1 \text{ m}$$

4. A girl is pushing a suitcase with an effective force of 100.0 N. If the work applied to the suitcase is 1200 J, over what distance has she been applying this force?

$$d = \frac{W}{F}$$

$$\frac{1200}{100.0} =$$

$$12 \text{ m}$$

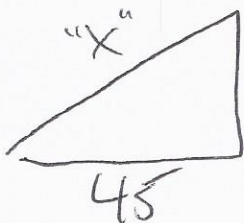
5. A person who is rollerblading applies a force of 45 N over a distance of 125 m. What is the amount of work accomplished?

$$W = Fd$$

$$45 \times 125 =$$

$$5600 \text{ or } 5.6 \times 10^3 \text{ J}$$

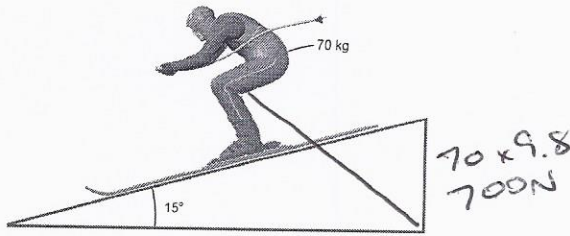
6. What is the force used if the effective force of a woman pulling a sled is 45 N at a 35° angle?



$$\cos 35^\circ = \frac{45}{x}$$

$$55 \text{ N}$$

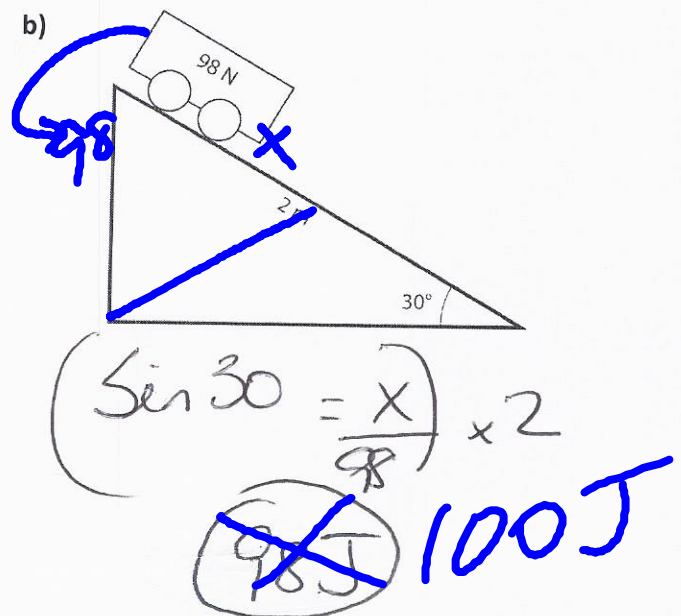
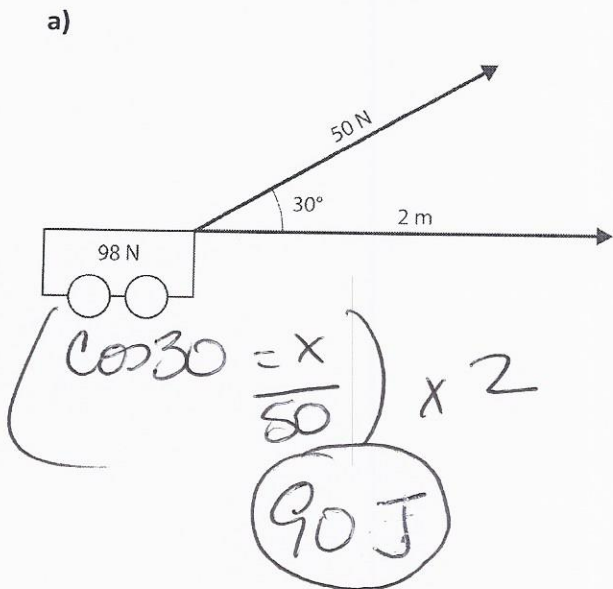
7. How much work does the gravitational force acting on this skier represent if the skier travels 4 m?



$$\left( \sin 15 = \frac{x}{700} \right) \times 4$$

$$= 700 \text{ J}$$

8. If each of the carts illustrated below travels a distance of 2 m, in which situation will the energy gained by the cart be greater? Show your calculations.



9. a- 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?



$$\cos 25 = \frac{75}{x}$$

$$83 \text{ N}$$

yes too much

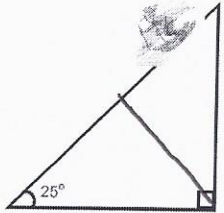
- b- Using the results above, what is the work accomplished by the man if he is pulling the cart for 10 m?

$$W = Fd \quad 75 \times 10 = 800 \text{ J}$$

10. What is the force applied if a boy does 7 009 J of work while walking up a hill for 705 m?

$$F = \frac{W}{d} \quad \frac{7009}{705} = 9.94 \text{ N}$$

11. How much work is done if a skier with a mass of 90.0 kg is skiing down a hill at a 25° angle for 35 km?



90.0 x 9.8  
882 N

$$\left( \frac{\sin 25 = x}{882} \right) \times 35000$$

$$1.3 \times 10^6 \text{ J}$$

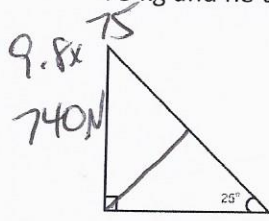
12. You are pushing your lawnmower for 3.0 m with an effective force of 35 N. What is the work accomplished?

$$W = Fd \quad 35 \times 3.0 = 110 \text{ J}$$

13. What is the distance travelled if a boy uses 700 070 J of energy with an effective force of 100.0 N for a jog?

$$d = \frac{W}{F} \quad \frac{700\ 070}{100.0} = 7000.7 \text{ m}$$

14. How much work does the gravitational force acting on a skier represent if the skier's mass is 75 kg and he travels 7.0 km down a hill at a 25° angle?



9.8 x 75  
740 N

$$\left( \frac{\sin 25 = x}{740} \right) \times 7000$$

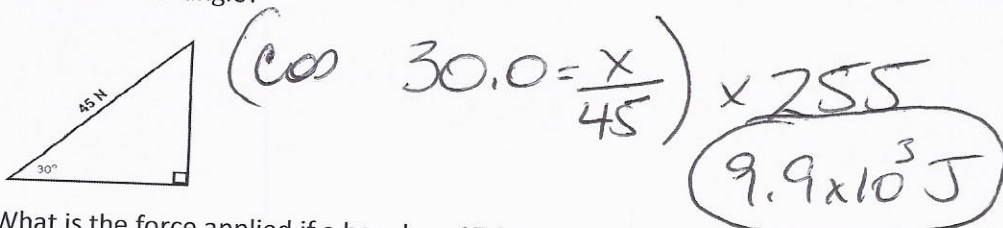
$$2.2 \times 10^6 \text{ J}$$

15. What is the distance travelled if a girl uses 9 000 J of energy with an effective force of 70 N for a walk in the park?

$$d = \frac{W}{F} \quad \frac{9000}{70} = 100 \text{ m}$$



16. How much work is done when a man pulls his luggage at the airport for 255 m with a force of 45 N at a 30.0° angle?

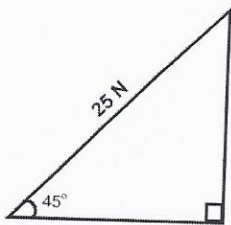


17. What is the force applied if a boy does 15 000 J of work while skating for 300.0 m?

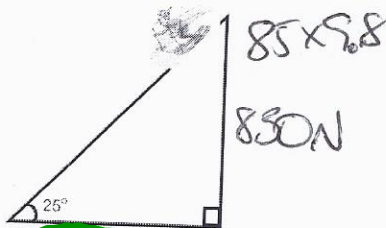
$F = W/d$        $\frac{15000}{300.0} = 50 \text{ or } 5.0 \times 10^1 \text{ N}$

18. Which person does more work?

- a- A boy pulls his sister on a sled at a 45° angle for 105 m with a force of 25 N.
- b- A man skiing down a hill at a 25° angle for 35 km with a mass of 85 kg.
- c- A girl walks 2.0 km with an effective force of 25 N.



A



B

(A)

$(\cos 45 = \frac{X}{25}) \times 105$

$1900 \text{ J or } 1.9 \times 10^3 \text{ J}$

(B)

$(\sin 25 = \frac{X}{830}) \times 35000$

$1.2 \times 10^7 \text{ J}$

(C)

$25 \times 2000$

$5.0 \times 10^4 \text{ J}$

19. Which are examples of work:

- (a) A man lifts a box
- b- You sit and watch TV
- (c) You jog every morning