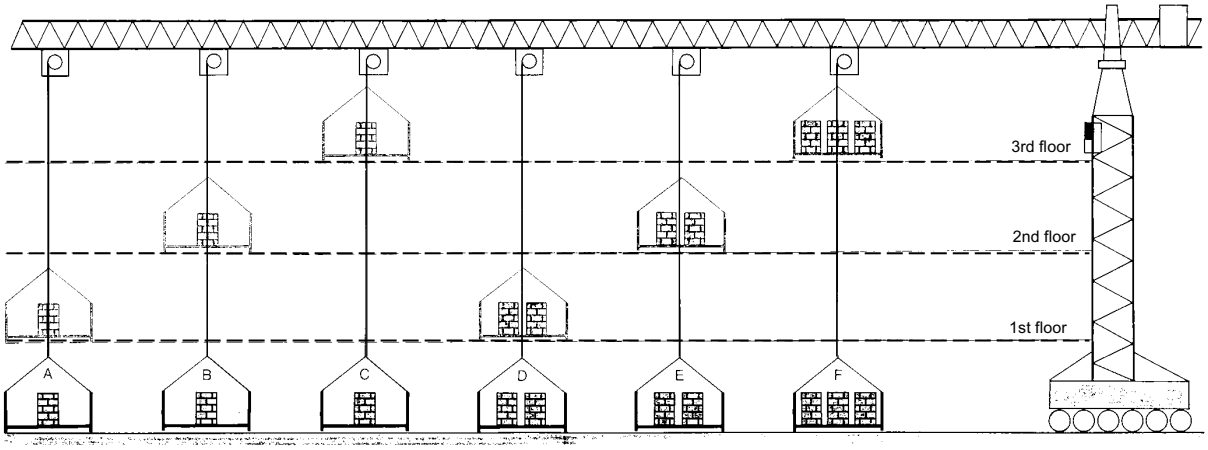
1. A crane is lifting pallets loaded with bricks. One single pallet weighs 6.0 kN, and each floor is 3.0 m high.
   Calculate the work done by the crane for A, B, C, D, E and F.



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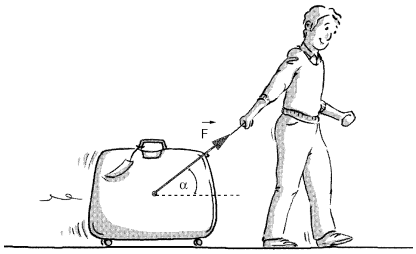
2. Mister Sprüngli is holding a large box of Luxemburgerli (m = 547 g), with his arm extended, at a height of h = 1.15 m over the floor, without moving the box.
   What is the work done on the box by Mr. Sprüngli?

3. A spaceship without propulsion (m = 6.0 t) is moving at constant velocity (v = 10.5 $\frac{km}{s}$) through space. It covers a distance of 2'255 km.
a) What is the work done on the spacecraft?
b) How long does it take to cover the said distance?

4. Fritzli is dragging a suitcase, exerting a constant force of F = 60.0 N, over a distance of s = 5.3 m (see picture). The angle between the force vector and the ground is α = 35 °.
a) What is the component of the force in the direction of motion (parallel to the ground)?
b) What is the work done by Fritzli on the suitcase?



5. What types of work are being described here? Who is doing work on what (or whom)?
a) Heather is pedaling on her bike, getting faster and faster.
b) Ken is picking up his backpack from the ground and putting it on the chair.
c) Amanda is stretching her rubber hair band.
d) Mr Miller is pushing a large table across the floor.

6. Arthur (m = 75.8 kg) is climbing the stairs up to the forth floor (12.0 m high).
   What is the work done by him?

7. Peter stretches a spring (k = 5.00 $\frac{N}{cm}$) by 3.5 cm.
   Determine the work done by Peter on the spring.

8. You're throwing a ball (m = 433 g) at a final velocity of 18 $\frac{km}{h}$.
   What is the work done on the ball?

9. Lindsay is pulling a sled (m = 3.2 kg) at a constant speed of v = 1.02 $\frac{m}{s}$ across a frozen lake (s = 5.00 km).
   What is the frictional work done on the sled by Lindsay? (μ_k = 0.01)

10. Carol is pushing a dart into her toy pistol compressing its spring (k = 2.0 $\frac{N}{cm}$). The work done is 0.25 J.
    Calculate the displacement of the dart (that is, the amount of stretch by which the spring is being compressed).

11. A car (m = 987 kg) is accelerating from 0 to 80.0 $\frac{km}{h}$, exerting a constant force of 2'750 N (assumption: no friction, no air resistance).
a) What is the work done by the motor?
b) What's the distance covered by the car during acceleration?

12. Hillary is pushing her toy car (m = 400.0 g) exerting a constant force thus accelerating it over 1.8 m to a final velocity of 0.50 $\frac{m}{s}$. The coefficient of rolling resistance is C_{rr} = 0.01.
a) What is the work done by Hillary?
b) Determine the force applied by Hillary.

13. A relaxed spring is being compressed by 3.0 cm. The work done on the spring is 0.90 J.
a) What's the spring constant k?
b) Assume the spring is already compressed by 3.0 cm. Now it's being compressed by another 3.0 cm.
   Calculate the work done on the spring.

k: spring constant
μ_k: coefficient of kinetic friction
C_{rr}: coefficient of rolling resistance

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solutions:

1. A) 18 kJ	B) 36 kJ	C) 54 kJ	D) 36 kJ	E) 72 kJ	F) 162 kJ
2. 0					
3. a) 0	b) 3 min 35 s				
4. a) 49 N	b) 260 J				
6. 8.92 kJ					
7. 0.31 J					
8. 5.4 J					
9. 2 kJ					
10. 5.0 cm					
11. a) 244 kJ	b) 88.6 m				
12. a) 0.12 J	b) 0.07 N				
13. a) 20 $\frac{N}{cm}$	b) 2.7 J				