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Review up to Simple Machines

1) A box is being slid across a surface where the coefficient of friction (μ) is 0.35. The force of friction is 343 N. What is the mass of the box?

2) A mass of 400 g is hung from a spring that has a constant of 90 N/m. What is the elongation of the spring? In other words, how far does the spring stretch? Give your answer in centimeters (cm).

3) A planet has a mass of 8×10^{23} kg. The radius of the planet is 3×10^6 m. What is the force of attraction (also known as weight) for a 70 kg person who is standing on the surface of the planet?

What is the acceleration due to gravity on this planet?

Answers: 1) 100 kg 2) 4.36 cm 3) 415 N 5.93 m/s²

4) A net force of 60 N acts on an object for 10 s. The initial speed of the object was 3 m/s. After the 10 s, the speed of the object was 15 m/s. What was the mass of the object?

5) A boulder with a mass of 4000 kg is moving at 30 m/s when it hits a 1000 kg automobile moving at 20 m/s. After the collision, the boulder slows down to 10 m/s. What is the new speed of the automobile?

6) A projectile is fired from the ground at an angle. It reaches a maximum height of 130 m. The horizontal component of its velocity is 200 m/s. What is the range of the projectile?

Answers: 4) 50 kg 5) 100 m/s 6) 2080 m

7) A person pushed a 70 kg object 5 m up a ramp. The MA is 3 and the IMA is 4. What was the force of effort supplied by the person?

What was the height that the object was raised?

What was the work output?

What was the work input?

What was the efficiency?

8) A car is travelling at 50 m/s for 2 hours. How far did it go?

Answers: 7) 229 N 1.25 m 857.5 J 1145 J 74.9 % 8) 360,000 m

9) A 60 kg snowboarder starts from rest at the top of a 200 m high mountain. How fast are they going when they reach ground level?

10) A person carries a 50 N television up a staircase that is 4 m in the horizontal direction and 3 m in the vertical direction. How much work did the person do on the television set?

If this took place in 30 s, how much power did the person generate?

11) A person accelerated from rest at 2 m/s^2 for 4 s. How far did they go?

Answers: 9) 62.6 m/s 10) 150 J 5 W 11) 16 m

