Name _____ Date _____

| 131 | A Final Review |
|---|---|

1) A 400 N force is applied to a 35 kg box to push it across a floor. A 180 N force of friction works against the motion. What is the acceleration of the box?

2) What was the initial velocity of a car that travelled 150 m after accelerating at 4 $m/s^2$ for 5 s?

3) A projectile was fired horizontally from a platform. The range for the projectile was 150 m. The projectile was in the air for 3.5 s.
a) How high was the platform?
b) What was the initial speed of the projectile? Hint: the initial speed was in the horizontal direction only

4) A force of 500 N is applied to a 30 kg mass where $u$ = 0.35. What is the net force acting on the box?

5) A projectile was fired from the ground at an angle. The horizontal component of the velocity was 70 m/s. The range was 350 m. What was the maximum height of the projectile?

6) A person walks 700 m to the north. The person then walks 850 m to the west. Draw a head to tail diagram. Calculate their resultant displacement. In other words, how far are they from their starting point?

7) A force was applied to a 10 kg object. The object started at rest. After 3 s, its speed was 15 m/s. The coefficient of friction ($u$) for the object and its surface was 0.2. What was the size of the applied force?

8) What is the force of attraction between a 30 kg object and a 50 kg object if they are 3 m apart?

9) A 75 kg object moving at 20 m/s is accelerated to 35 m/s in a time of 8 s. What force was applied?

10) A model plane has a force of 150 N applied to it for 5 s. Its velocity changes from 10 m/s to 20 m/s. Assuming the mass doesn't change what was the mass of the model plane?

Answers: 1) 6.3 $m/s^2$ 2) 20 m/s 3a) 60 m b) 42.9 m/s 4) 397.1 N 5) 30.6 m 6) 1101 m 7) 70 N

8) $1.11 \times 10^{-8}$ N 9) 140.6 N 10) 75 kg

11) Fill in the chart below. Assume the constant does not change.

| mass (g) | mass (kg) | elongation (cm) | elongation (m) | weight (N) | constant (N/m) |
|---|---|---|---|---|---|
| 100 | | 1.96 | | | |
| | | | | 2 | |
| | | 10 | | | |

12) A person carries a 40 kg air conditioner up a staircase that is 5 m in the horizontal direction and 3 m in the vertical. How much work did the person do on the air conditioner?

If it took 45 s for the person to walk up the stairs with the air conditioner, how much power did they generate in this effort?

What was their power in horsepower? (1 hP = 746 Watts)

13) A 25 kg child was going down a large slide at the fair. The height of the slide was 30 m. What is the child's potential energy at the top of the ride?

What was the child's total energy at the top of the slide?

What was the child' total energy at the bottom of the slide?

What was the child's speed at the bottom of the slide?

14) A 70 kg astronaut is on a planet that has a mass of $7 \times 10^{25}$ kg. The planet has a radius of $5 \times 10^{7}$ m. What is the weight (also known as force of attraction) of the astronaut?

What is the acceleration due to gravity on this planet?

15) A 10 kg ball moving at 15 m/s hits a 25 kg ball moving at 20 m/s. If the 10 kg ball comes to a rest, what is the speed of the 25 kg ball?

16) A 10 kg ball moving at 8 m/s hits a 5 kg ball moving at 20 m/s. Afterwards, they stick together. What is their speed?

Answers: 11) Check with wiki or teacher. 12) 1176 J 26.1 W 0.035 hP 13) 7350 J 7350 J 7350 J 24.2 m/s 14) 131 N 1.9 $m/s^2$ 15) 26 m/s 16) 12m/s