

# NZTF Test Review

Show your work!

Name \_\_\_\_\_

Date \_\_\_\_\_ Pd \_\_\_\_\_

For questions 1-7, draw a labeled force diagram for the situation and then identify which direction the total force is pointing (up, down, right, left).

1. You are shooting to the top of Power Tower while increasing speed:

Direction of  $\Sigma F$ : \_\_\_\_\_

2. You are still moving up on Power Tower but nearing the top and slowing down:

Direction of  $\Sigma F$ : \_\_\_\_\_

3. An ice skater is coasting to the right but friction is slowing her down:

Direction of  $\Sigma F$ : \_\_\_\_\_

4. Your teacher drops a marker. As the marker falls to the floor:

Direction of  $\Sigma F$ : \_\_\_\_\_

5. You are traveling 55MPH on the highway with your car on cruise control:

Direction of  $\Sigma F$ : \_\_\_\_\_

6. Power Tower drops you from the top:

Direction of  $\Sigma F$ : \_\_\_\_\_

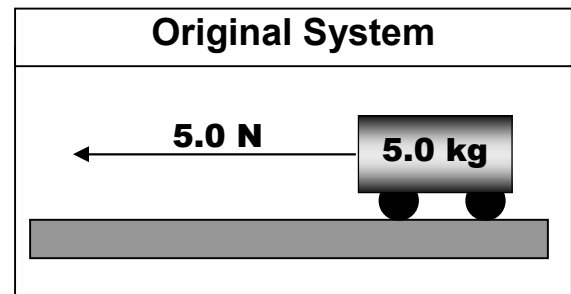
7. You are on your way down on Power Tower and slowing to a stop:

Direction of  $\Sigma F$ : \_\_\_\_\_

8. From a stoplight, a 30 kg person accelerates at  $5 \text{ m/s}^2$  in their Chevy Camaro. The total force,  $\Sigma F$ , on the person is:
9. A 500kg donkey is riding in the elevator of a downtown Minneapolis office building. I really don't know why. The elevator accelerates upward at  $1.5 \text{ m/s}^2$ .
- What is the force due to gravity on the donkey? \_\_\_\_\_
  - What is the force normal,  $F_N$ , on the donkey? \_\_\_\_\_
10. a) Changing the total force by a factor of two will change the acceleration by a factor of \_\_\_\_\_. Total force is \_\_\_\_\_ proportional to acceleration.
- b) Changing the mass by a factor of two will change the acceleration by a factor of \_\_\_\_\_. Mass is \_\_\_\_\_ proportional to acceleration.
11. You are standing on a bathroom scale in an elevator. Describe two situations in the elevator that would cause the reading on the scale to be less than your usual mass, making you feel lighter.

For questions 12-15, consider the cart on a track shown to the right. Determine what the following changes to the system would do to the acceleration.

Answer with "increase", "decrease", "remains the same", or "cannot be determined".



12. The mass of the cart is changed to 10kg. \_\_\_\_\_
13. The pulling force is changed to 10N. \_\_\_\_\_
14. The mass changes to 10kg and the pulling force is changed to 10N. \_\_\_\_\_
15. The mass is changed to 2.5kg and the pulling force changes to 10N. \_\_\_\_\_

16. A 30 kg child runs from left to right, dives, and then coasts across a Slip'n Slide™.

The coefficient of friction between the child and slide is 0.25.

- Draw a labeled force diagram
- Draw a vector addition diagram
- Calculate and label  $F_g$ ,  $F_N$ , and  $F_f$
- Determine total force on the child ( $\Sigma F$ )
- Determine the child's acceleration



(Attach additional paper if needed to show work for this question.)