

Name: \_\_\_\_\_

ES 105 – Homework #2 (10 pts)

1) A 10-kg brick and a 1-kg book are dropped in a vacuum. The force of gravity on the 10-kg brick is

A) the same as the force on the 1-kg book.

B) 10 times as much as the force on the 1-kg book.

C) zero.

2) A car accelerates from rest at 2 m/s/s. What is its speed 4 s after the car starts moving?

Answer: \_\_\_\_\_

3) It takes 6 s for a stone to fall to the bottom of a mine shaft. How deep is the shaft (assume no air resistance)?

Answer: \_\_\_\_\_

4) A girl pulls on a 10-kg wagon with a constant force of 30 N. What is the wagon's acceleration in meters per second per second?

Answer: \_\_\_\_\_

5) An archer shoots an arrow. Consider the action force to be the bowstring against the arrow. The reaction to this force is the

A) weight of the arrow.

B) air resistance against the bow.

C) friction of the ground against the archer's feet.

D) grip of the archer's hand on the bow.

E) arrow's push against the bowstring.

6) A baseball player bats a ball with a force of 1000 N. The ball exerts a reaction force against the bat of

A) less than 1000 N.

B) more than 1000 N.

C) 1000 N.

**More on Back!**

CONCEPTUAL **Physical Science** PRACTICE SHEET

Chapter 2: Newton's Laws of Motion

Bronco and Newton's Second Law

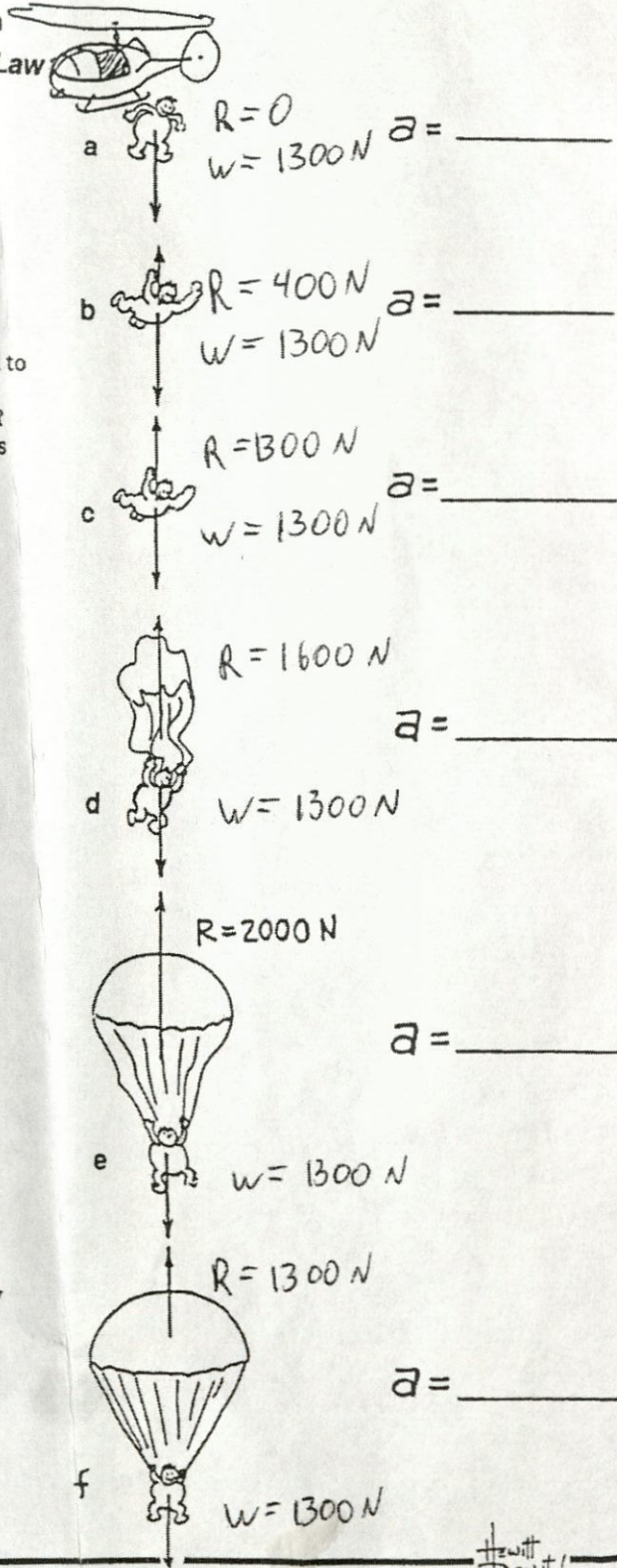
Bronco skydives and parachutes from a stationary helicopter. Various stages of fall are shown in positions *a* through *f*. Using Newton's 2nd law,

$$a = \frac{F_{NET}}{m} = \frac{W - R}{m}$$

find Bronco's acceleration at each position (answer in the blanks to the right). You need to know that Bronco's mass *m* is 30 kg so his weight is a constant 300 N. Air resistance *R* varies with speed and cross-sectional area as shown.

Circle the correct answers.

- When Bronco's speed is least, his acceleration is  
(least) (most).
- In which position(s) does Bronco experience a downward acceleration?  
(a) (b) (c) (d) (e) (f)
- In which position(s) does Bronco experience an upward acceleration?  
(a) (b) (c) (d) (e) (f)
- When Bronco experiences an upward acceleration, his velocity is  
(still downward) (upward also).
- In which position(s) is Bronco's velocity constant?  
(a) (b) (c) (d) (e) (f)
- In which position(s) does Bronco experience terminal velocity?  
(a) (b) (c) (d) (e) (f)
- In which position(s) is terminal velocity greatest?  
(a) (b) (c) (d) (e) (f)
- If Bronco were heavier, his terminal velocity would be  
(greater) (less) (the same).



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