

Name: _____

True False questions. Circle the best answer. (1 mark each)

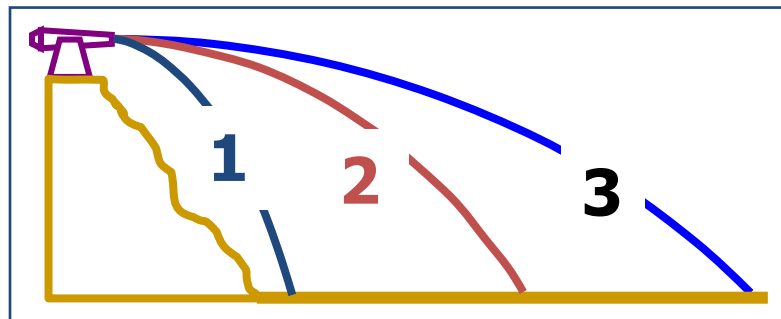
- 1) Adding 2 vectors **cannot** give you a resultant vector with a magnitude of 0.
a) True **b) False**
- 2) A ball in 2D projectile motion will have zero (0m/s) velocity at its maximum height
a) True **b) False**
- 3) As you are rowing your boat directly across the river at 2m/s, a current is pushing your boat west. Your travel time was 10s to cross the river. If there was no current, you would take more than 10s to cross the river rowing at 2m/s.
a) True **b) False**
- 4) A cart is being pulled along a horizontal track by an external force (a weight hanging over the table edge) **and accelerating**. It fires a ball vertically straight out of the cannon as it moves. After it is fired, it falls in the cart.
a) True **b) False**
- 5) Only the horizontal velocity component of your projectile affects the range of its motion in 2D.
a) True b) False

Multiple choice questions. Circle the best answer. (1 mark each)

- 6) You drop a rock off a bridge. When the rock has fallen 4 m, you drop a second rock. As the two rocks continue to fall, what happens to their distance of separation?
a) Their distance apart increases as they fall
b) Their distance apart stays constant
c) Their distance apart decreases as they fall
d) Not enough info
- 7) A small cart is rolling at constant velocity on a flat track. It fires a ball straight up into the air as it moves. After it is fired, it falls right back at the cart. Why?
a) No air resistance
b) The ball's x-component of its initial velocity is the same as the moving cart
c) Gravity is acting on the ball
d) A and B
e) All of the above
- 8) From the *same* height (and at the *same* time), one ball is dropped and another ball is fired horizontally. Which one will hit the ground first?
a) The "dropped" ball
b) The "fired" ball
c) They both hit at the same time
d) It depends on how hard the ball was fired
e) It depends on the initial height

9) For a cannon on the Moon where $g = 1.6 \text{ m/s}^2$, the cannonball would follow path 2. Instead, if the same cannon were on Earth, which path would the cannonball take in the same situation?

- a) 1** b) 2 c) 3



- 10) You fire an arrow with $v_0 = 100 \text{ m/s}$ at 50° up from the horizontal (ground). The final velocity of the arrow before it hits the ground again is:
a) 100m/s at a 50° angle right from the vertical **b) 100m/s at a 50° angle down from the horizontal**
c) 100m/s at a 40° angle down from the vertical d) 100m/s at a 40° angle down from the horizontal

Written section. Please show all your work.

11) You can row your canoe at 9.2m/s in still water. The current of the river flows south at 4.2m/s . If the width of the river is 50m , find:

a) In which direction should you row your canoe if you want your canoe to move directly west across the river from where you started? (3 marks)

b) How long does it take to get to the other side in a)? (2 marks)

a) 27° @ North of West (OR)
 63° @ West of North

b) 6.1s

12) A plane drops a package at h above the ground. If it took 12s for the package to hit the ground, find:

a) The height of the plane above the ground (3 marks)

b) If $D = 350\text{m}$, what velocity is the plane flying at? (2 marks)

a) 710m

b) 29 m/s
(not realistic... opps)

