**Physics 12: Kinematics Worksheet**

**Oh, for joy, a new physics worksheet!**

1. A baked potato, topped with broccoli and cheddar cheese, is thrown at 11m/s at an angle of 19o above horizontal from the roof of a 7.2m high Wendy’s © restaurant by a disgruntled employee. What is the range of the delicious projectile? What is the final velocity of the projectile?

2. A bullet is fired horizontally at 988m/s. The bullet becomes lodged in a target which is 150m, horizontally from the gun. How far does the bullet fall before striking the target.

3. A car is driving down the highway at 92km/h. The passenger tosses an apple core out the window. Relative to the car the core is thrown straight up at 2.3m/s from the window 61cm above the ground. Find the range of the apple core.

4. From the **v** vs. t graph shown sketch the corresponding **a** vs. t and **d** vs. t graphs.

 **v**

 t

 **a**

 t

 **d**

 t

5. The block starts at rest 53cm from the edge of the table. At the moment it leaves the edge of the table the horizontal force is removed. How far from the edge of the table does the block land? (You need to use some dynamics from last year!)

μ=0.25

 4.0kg

15N

92cm

53cm

6. A projectile is launched at 28.0o above horizontal over level ground. The projectile travels 16.0m horizontally before landing.

a. What is the initial speed of the projectile?

b. What is the maximum height reached by the projectile?

c. What is the speed at maximum height?

ANSWERS:

1. 17m, 16m/s @ 5.0x10o below horizontal 2. 0.11m 3. 17m 5. 0.51m 6a. 13.8m/s b. 2.14m c. 12.1m/s

7. Which of the following is not a possible magnitude for the sum of two vectors, A=6.0m and B=14m?

 a. 6.0m

 b. 8.0m

 c. 14m

 d. 18m

 e. 20m

8. Car 1 is traveling west. Car 2 is traveling south. What is the direction of the velocity of Car 1 relative to Car 2?

 a. north-east

b. north-west

c. south-east

d. south-west

9. A ball is dropped from the top of a 14m high roof-top. At the exact same instant a potato is shot vertically up ward from the ground at 14m/s. How high from the ground are the projectiles as they collide?

10. When a projectile reaches maximum height, what is **always** true?

 a. Its velocity is zero.

 b. Its vertical velocity is zero.

 c. Its acceleration is zero.

 d. Its vertical acceleration is zero.

11. Which statement is true?

 a. slope of a velocity time graph is displacement.

 b. area bound by a velocity time graph is acceleration

 c. slope of a velocity time graph is acceleration

 d. slope of a position time graph is acceleration

12. A projectile is fired at 30.0m/s at 60.0o above horizontal. At maximum height its speed is:

 a. 0m/s

 b. 10m/s

 c. 12m/s

 d. 15m/s

 e. 30m/s

13. A car changes its velocity from South to East. What is the direction of acceleration?

A. B. C. D.

14. An object is dropped from rest and allowed to fall for time t1. The object reaches a velocity of **v1**. What velocity will an object dropped from rest reach if allowed to fall for time 3t1?

 A. 3**v1**

B. 6**v1**

C. 9**v1**

 D. 12**v1**

15. An object is dropped from rest and allowed to fall for a distance d1. The object reaches a velocity of **v1**. What velocity will an object dropped from rest reach if allowed to fall for a distance 9d1?

 A. 3**v1**

B. 6**v1**

C. 9**v1**

 D. 12**v1**

 E. 18**v1**