Vectors & Projectiles Study Guide

Name _____

Period _____

1. A vector is ….. Give examples.

2. A scalar quantity is ….. Give examples.

3. A resultant is …..

4. A projectile is …..

5. An object is thrown horizontally from a cliff. For all points along its trajectory the horizontal component of its motion _____ because _____.
   a. increases; of the acceleration due to gravity
   b. is constant; its acceleration is zero in this direction
   c. increases; its acceleration is zero in this direction
   d. is constant; its acceleration is not equal to zero in this direction

   KEY IDEA: There is no horizontal component of gravity – <u>only vertical</u>. Thus, gravity has no sideways influence on projectiles.

6. A high speed horizontal projectile is fired and a similar object is dropped from the same height:
   a. Which one hits the ground first?
   b. How do their times in air compare?

7. A ball at the top of its trajectory has:
   a. V_y? V_x?
   b. Acceleration?

8. The angle of a projectile that gives it the greatest range?

9. What type of angles will cause a projectile to have the same range?

10. A projectile thrown up at 15 m/s, would have a speed of _____ when caught.

11. Why does a projectile maintain a constant horizontal speed?

12. Projectiles fall at what rate (V_y)?

13. How do you calculate the distance of a uniformly accelerated object?

14. Apply the Pythagorean Theorem.

15. Are satellites considered projectiles? Why or why not?

16. Is the horizontal distance covered by a projectile constant?

17. Is the vertical distance covered by a projectile constant?

18. If St. Louis Cardinals homerun king, Mark McGwire, hit a baseball due west with a speed of 50 m/s, and the ball encountered a wind that blew it north at 5.0 m/s,
    a. Draw a vector diagram showing the vector components and the resultant vector.
    b. Calculate the magnitude and direction of the baseball resultant velocity.

19. Ivan pulls a sled loaded with logs to his cabin in the woods. If Ivan pulls with a force of 800 lbs. in a direction 20^{o} above the horizontal, what are the horizontal and vertical components of the force exerted by Ivan?

20. An arrow is shot horizontally from the top of a mountain 210 m high. The arrow leaves the bow with a horizontal velocity of 64 m/s.
    a. How long does it take for the arrow to reach the ground?
    b. How far from the base of the mountain does the arrow land?
    c. With what vertical speed does the arrow have just before it hits the ground?

21. A rock is thrown horizontally off a cliff and hits the ground in 9.7 seconds. The rock lands horizontal distance of 435 m from the base of the cliff.
    a. How high is the cliff?
    b. With what initial velocity was the rock thrown?