

## Practice Test 1

This test is not totally representative. The actual test will be a couple questions or so longer. Other questions, besides what are found here, might appear on the actual test.

(1) Let  $\vec{A} = (3, -5, 1)$  and  $\vec{B} = (1, 1, -2)$  Find (a)  $\vec{A} - 2\vec{B}$  (b)  $\|\vec{A} - 2\vec{B}\|$  (c) a unit vector pointing in the same direction as  $\vec{A} - 2\vec{B}$  (d) the angle between  $\vec{A} = (3, -5, 1)$  and  $\vec{B} = (1, 1, -2)$  (e) a vector perpendicular to both  $\vec{A} = (3, -5, 1)$  and  $\vec{B} = (1, 1, -2)$  .

(2) An alien youth tosses a ball straight up in the air while on vacation on Planet X. After 2 seconds the ball is traveling up at 6 meters per second. It catches the ball after a total of 10 seconds have elapsed. (a) What is the gravitational acceleration on this planet? (b) What was the initial velocity?

(3) Suppose a particle moves under an acceleration given by  $\vec{a} = (-6t^2, 4t)$  . Find the velocity and position of a particle as a function of time, given that initially it's at (1,2) and is moving at three units per second in the x-direction.

----- (4) A concave mirror has radius of curvature of 10 cm. Suppose an object is located at 20 cm. Where is the image located?

(A) -3.2 cm (B) 4.5 cm (C) 5.4 cm (D) 6.67 cm (E) none of these

----- (5) What is the magnification in problem 4, and is the image erect or inverted?

(A) -0.33 ,erect (B) 0.33, inverted (C) -.33 inverted (D) 0.33 erect (E) none of these

(6) Forces  $F_1=(20,30)$ ,  $F_2=(-10,15)$  , and  $F_3=(25,-25)$  are applied to an object at the origin. What is the magnitude and direction of the resultant force?

(7) An object is 25 cm to the left of a thin convergent lens with  $f=10$ , with a second divergent lens 53n centimeters to the right of the first lens. Where is the final image located?

(8) Convert  $25 \text{ kg/m}^3$  to grams per centimeter cubed.