**Two displacement vectors have magnitudes of 5.0 m and 7.0 m, respectively. If these two vectors are added together, the magnitude of the sum**

**A) is equal to 2.0 m. B) is equal to 8.6 m.**

**C) is equal to 12 m. D) could be as small as 2.0 m or as large as 12 m.**

 **If a vector (A) has components Ax < 0, and Ay < 0, then the angle that this vector makes with the positive x-axis must be in the range**

**A) 90° to 180°**

**B) 270° to 360°**

**C) 0° to 90°**

**D) 180° to 270°**

**E) cannot be determined without additional information**

 **Two vectors, of magnitudes 20 mm and 50 mm, are added together. Which one of the following is a possible value for the magnitude of the resultant?**

**A) 40 mm B) 10 mm C) 20 mm D) 80 mm**

 **The magnitude of a vector can never be less than the magnitude of any of its components.**

**A) True B) False**

 **James and John dive from an overhang into the lake below. James simply drops straight down from the edge. John takes a running start and jumps with an initial horizontal velocity of 25 m/s. If there is no air resistance, when they reach the lake below**

**A) the splashdown speed of James is larger than that of John.**

**B) they will both have the same splashdown speed.**

**C) the splashdown speed of John is larger than that of James.**

**D) the splashdown speed of James must be 9.8 m/s larger than that of John.**

**E) the splashdown speed of John must be 25 m/s larger than that of James.**

 **In an air-free chamber, a pebble is thrown horizontally, and at the same instant a second pebble is dropped from the same height. Compare the times of fall of the two pebbles.**

**A) The dropped pebble hits first.**

**B) They hit at the same time.**

**C) The thrown pebble hits first.**

**D) We cannot tell without knowing which pebble is heavier.**

**For general projectile motion with no air resistance, the horizontal component of a projectile's acceleration**

**A) is always zero.**

**B) first decreases and then increases.**

**C) continuously increases.**

**D) continuously decreases.**

**E) remains a non-zero constant.**

 **When rolled down a mountainside at 7.0 m/s, the horizontal component of its velocity vector was 1.8 m/s. What was the angle of the mountain surface above the horizontal?**

**A) 57 ° B) 15° C) 75° D) 33°**

 **A boy jumps with a velocity of magnitude 20.0 m/s at an angle of 25.0° above the horizontal. What is the horizontal component of the boy's velocity?**

**A) 12.6 m/s B) 9.33 m/s C) 18.1 m/s D) 8.45 m/s E) 15.6 m/s**

**A car travels 20 km west and then 20 km south. What is the magnitude of its displacement vector?**

**A) 28 km B) 40 km C) 20 km D) 0 km**

 **Vector (A) has a magnitude of 6.0 m and points 30° north of east. Vector (B) has a magnitude of 4.0 m and points 30° west of north. The resultant vector (A)+ vector(B) is given by**

**A) 9.8 m at an angle of 64° east of north.**

**B) 3.3 m at an angle of 64° east of north.**

**C) 3.3 m at an angle of 26° north of east.**

**D) 9.8 m at an angle of 26° north of east.**

**E) 7.2 m at an angle of 26° east of north.**

 **Vector (A) has a magnitude of 6.0 m and points 30° south of east. Vector (B) has a magnitude of 4.0 m and points 30° west of south. The resultant vector (A) + (B) is given by**

**A) 7.2 m at an angle of 64° south of east.**

**B) 3.3 m at an angle of 64° south of east.**

**C) 9.8 m at an angle of 64° south of east.**

**D) 3.3 m at an angle of 26° south of east.**

**E) 9.8 m at an angle of 26° south of east.**

**A girl throws a rock horizontally, with a velocity of 10 m/s, from a bridge. It falls 20 m to the water below. How far does the rock travel horizontally before striking the water, assuming negligible air resistance?**

**A) 16 m B) 14 m C) 20 m D) 24 m**

**A cat leaps to try to catch a bird. If the cat's jump was at 60° off the ground and its initial velocity was 2.74 m/s, what is the highest point of its trajectory, neglecting air resistance?**

**A) 10.96 m B) 0.58 m C) 0.29 m D) 0.19 m**

**A hockey puck slides off the edge of a horizontal platform with an initial velocity of 28.0 m/s horizontally in a city where the acceleration due to gravity is 9.81 m/s2. The puck experiences no significant air resistance as it falls. The height of the platform above the ground is 2.00 m. What is the angle below the horizontal of the velocity of the puck just before it hits the ground?**

**A) 12.6° B) 31.8° C) 72.6° D) 77.2° E) 12.8°**

 **A projectile is fired from ground level with a speed of 150 m/s at an angle 30° above the horizontal on an airless planet where g = 10.0 m/s2. What is the horizontal component of its velocity after 4.0 s?**

**A) 38 m/s B) 35 m/s C) 75 m/s D) 150 m/s E) 130 m/s**

**A child is trying to throw a ball over a fence. She gives the ball an initial speed of 8.0 m/s at an angle of 40° above the horizontal. The ball leaves her hand 1.0 m above the ground and the fence is 2.0 m high. The ball just clears the fence while still traveling upwards and experiences no significant air resistance. How far is the child from the fence?**

**A) 3.8 m B) 0.73 m C) 7.5 m D) 1.6 m E) 2.7 m**

**2) D**

**3) D**

**4) A**

**5) A**

**6) C**

**7) B**

**8) A**

**9) C**

**10) C**

**11) A**

**12) E**

**13) A**

**14) C**

**15) C**

**16) A**

**17) E**

**18) D**