1- A person walks first at a constant speed of 5.00 m/s along a straight line from point *A* to point *B* and then back along the line from *B* to *A* at a constant speed of 3.00 m/s. What is his average speed and average velocity over the entire trip?

a) 1.65 m/s, 0 m/s **b)** 15.21 m/s, 11 m/s **c)** 7.95 m/s, 12 m/s **d)** 5.75 m/s, 2 m/s **e)** 3.75 m/s, 0 m/s

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2- If the minimum distance required to stop a car moving at 15 m/s is 12.5 m, what is the minimum stopping distance for the same car moving at 30 m/s?(assuming the same rate of acceleration).

a) 100 m **b)** 12 m **c)** 25 m **d)** 75 m **e)** 50 m

3- An arrow is shot straight up at 50 m/s. How long will it take to reach its greatest height?

a) 50 s **b)** 25 s **c)** 10 s **d)** 1 s **e)** 5 s

4- A man walks 3.5 m south, then 8.2 m at an angle 30° north of east, and finally 15 m west. What is the magnitude and direction of the resultant displacement?

a) 44. 2 m, 75.6° **b)** 22.3 m, 175.6° **c)** 14. 2 m, 75.6° **d)** 7.9 m, 175.7° **e)** 24. 2 m, 55.6°

5- Given the displacement vectors $\mathbf{A} = (3\,\mathbf{i} - 4\,\mathbf{j} + 4\,\mathbf{k})$ m and $\mathbf{B} = (2\,\mathbf{i} + 3\,\mathbf{j} - 7\,\mathbf{k})$ m, find the magnitude of the vector $\mathbf{D} = 2\mathbf{A} - \mathbf{B}$

a) 28 m **b)** 19 m **c)** 10 m **d)** 5 m **e)** 33 m

☼Circle the right answers for the questions from 1 to 8☼

N.B. Take g (earth gravitational constant) = 10 m/s^2

1- A boy runs 145 m in a direction 20.0° east of north (displacement vector **A**) and then 105 m in a direction 35.0° south of east (displacement vector **B**). Using components, determine the magnitude and direction of the resultant vector **C** for the net displacement.

a) 110, 38° b) 210, 45° c) 78, 15° d) 155, 29° e) 15, 23°

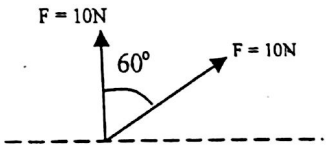
2- If $\mathbf{A} = (6\,\mathbf{i} - 8\,\mathbf{j})$ units, $\mathbf{B} = (-8\,\mathbf{i} + 3\,\mathbf{j})$ units, and $\mathbf{C} = (26\,\mathbf{i} + 19\,\mathbf{j})$ units, determine a and b such that $a\mathbf{A} + b\mathbf{B} + \mathbf{C} = 0$.

a) 14, 15 b) 2, 3 c) 11, 13 d) 6, 8 e) 5, 7

3- A straight track is 1600 m in length. A runner begins at the starting line, runs due east for the full length of the track, turns around, and runs halfway back. The total time for this run is five minutes. What is the runner's average velocity, and what is his average speed?

a) 2.7 m/s, 8 m/s b) 3 m/s, 9 m/s c) 6 m/s, 8 m/s d) 4.4 m/s, 10 m/s e) 1.5 m/s, 5 m/s

Q(6): The $|R|$ and θ_R of the resultant (R) of the two forces are:



a) 29.5N and 60° b) 17.3N and 60° c) 17.3N and 30° d) zero

Q(7): A box is in free fall. If the air drag is the same as its weight, then the acceleration of the box is:

a) $9.8ms^{-2}$ b) $19.6ms^{-2}$ c) zero d) $4.9ms^{-2}$

Q(8): The final velocity of a particle is given as: $v_f = (5-2t)\hat{i}+(-3+3t)\hat{j}$, at t = 2.5 s the magnitude and direction (measured from the positive x axis) of the final velocity respectively are:

a) 4.5 m/s and 90° b) 5.8 m/s and 45° c) 9.2 and 90° d) 3.6 m/s and 45°

Q(9): A projectile is given an initial velocity of 50 m/s making 30° with the positive x axis. The maximum height and maximum range respectively reached by this projectile are:

a) 32 m and 221 m b) 64 m and 221 m c) 32 m and 111 m d) 221 m and 32 m

Q(10): A particle moving in a circular path (radius = 3 m) with a constant velocity of 16 m/s. If it is given a tangential acceleration of 20 m/s^2, then the resultant acceleration on the particle is:

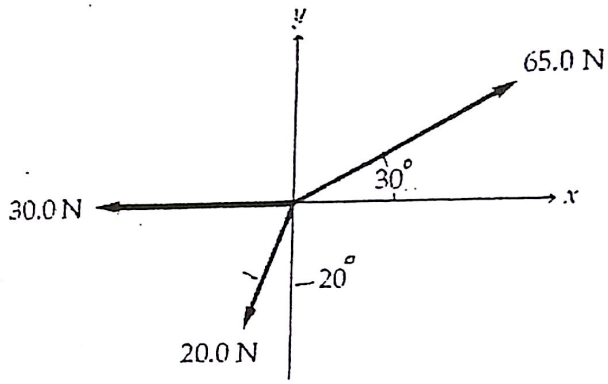
a) $87.6\ ms^{-2}$ b) $85.3\ ms^{-2}$ c) $25.3\ ms^{-2}$ d) $134.3\ ms^{-2}$

Bonus question: For the vectors, $d_1 = -2i+3j$, $d_2 = 2i-3j$, $d_3 = 12i+13j$ and $d_4 = 18i-33j$, find the magnitude and direction of their resultant.

(7) Vector B has x, and y components of 4.00, and 6.00 units, respectively. Calculate the magnitude of B and the angle that B makes with x-axis.

a) 44.33, 67.4° **b)** 19.23, 39.8° **c)** 7.81, 29.2° **d)** 19.23, 41.2° **e)** 7.21, 56.3°

6- The three forces shown act on a particle. What is the direction of the resultant of these three forces?



a) 35° b) 45° c) 65° d) 55° e) 85°

7- Starting from one oasis, a camel walks 25 km in a direction 30° south of west and then walks 30 km toward the north to a second oasis. What distance separates the two oases?

a) 15 km b) 48 km c) 28 km d) 53 km e) 55 km