

Solve each of the following problems using the same formulas as before being careful to include a direction on all vector quantities.

ANSWERS

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| 1. A plane flying a triangular pattern flies 150 km[N], then 400 km[E]. | | |
| (a) What is the total displacement of the plane after these two legs? | 1.(a) | 427 km[N69°E] |
| (b) What third displacement would complete the trip back to the starting point? | 1.(b) | 427 km[S69°W] |
| 2. A fishing boat leaves port at 04:30 h in search of the day's catch. The boat travels 4.50 km[E], then 2.50 km[S], and finally 1.50 km[W] before discovering a large school of fish on the sonar screen at 06:30 h. | | |
| (a) Calculate the boat's average speed. | 2.(a) | 4.25 km/h |
| (b) Calculate the boat's average velocity. | 2.(b) | 1.95 km/h[S50°E] |
| 3. A ball rolling with an initial velocity of 40 m/s[W] undergoes an acceleration of 5.0 m/s ² [N] for a period of 6.0 seconds. | | |
| (a) What is the final velocity of the ball? | 3.(a) | 50 m/s[W37°N] |
| (b) What is the displacement of the ball in the 6.0 s? | 3.(b) | 260 m[W21°N] |
| 4. A pool ball rolling at 10 m/s[W] strikes a cushion and rebounds with a velocity of 10 m/s[S]. What is the change in velocity of the pool ball? (Hint: $\Delta\vec{v} = \vec{v}_2 - \vec{v}_1$) | 4. | 14 m/s[SE] |
| 5. A car travelling at 15 m/s[N] executes a gradual turn, so that it then moves at 18 m/s[E]. What is the car's change in velocity? | 5. | 23 m/s[E40°S] |
| 6. A car, moving initially at 32 km/h[N], turns a corner and continues at 32 km/h[W]. The turn takes 3.0 s to complete. Find | | |
| (a) the change in velocity. | 6.(a) | 45 km/h[SW] |
| (b) the average acceleration during the turn. | 6.(b) | 15 km/h/s[SW] |
| 7. An airplane flying at a constant speed of 1000 km/h executes a slow, level turn that changes its direction from west to east. If the turn takes 80 s, calculate the plane's average acceleration. | 7. | 25 km/h/s[E] |
| 8. Ken and Bill are together. Ken walks 10 m[N] and then 15 m[W]. Bill walks 25 m[E] and then 30 m[S]. What is the displacement from Ken to Bill? | 8. | 57 m[SE] |
| 9. Jim is 100 m[S] of Paul. Paul begins to walk East at 2.00 m/s the same time that Jim begins to walk West at 3.00 m/s. What is the displacement of Jim from Paul 20.0 seconds later? | 9. | 141 m[SW] |
| 10. Mary walks West at 2.00 m/s for 15.0 seconds, then North at 3.00 m/s for 20.0 seconds, and then East at 4.00 m/s for 30.0 seconds. What is her displacement? | 10. | 108 m[N56°E] |