Name: _____

WORKSHEET

Vector applications

1 A cyclist starting from rest reaches a speed of 32 km/h with direction N53°W. Find the change in velocity.

2 An object has forces of 140 N at S23°E and 290N at S51° W acting on it. Find the resultant force acting on the object.

3 A car approaches an intersection with velocity 20 km/h north-west. After leaving the intersection the car has a velocity of 20 km/h north-east. Find the change in velocity.

4 A person swimming directly across a 330 m wide river experiences a current which takes them 210 m downstream. What is their final displacement relative to their starting position?

5 A car driving at 100 km/h along a straight stretch of road slows down to 60 km/h as it approaches a town. Find the change in velocity.

6 A motorbike with velocity 60 km/h at S14°W takes a corner and leaves with velocity 75 km/h at S26°W. Find the change in velocity.

7 A cricket ball has a speed of 125 km/h before hitting the surface of a bat. Given that the direction of the ball is perpendicular to the surface of the bat and the ball has a speed of 120 km/h after being struck, what is the change in velocity experienced by the cricket ball?

8 A boat changes velocity from 32 knots at N62°W to 13 knots at N8°E. Find the change in velocity.

9 A tennis ball is dropping vertically through the air with velocity 5 km/h at the moment it gets struck by a racquet. If the racquet gives the ball an additional velocity of 134 km/h at 5° below horizontal, find the resultant speed and direction of the tennis ball immediately after being struck.

10 A basketball is pushed toward the floor with a speed of 38 km/h and at an angle of 35° to the ground. If the ball has a velocity of 31 km/h at 30° to the ground after bouncing, find the magnitude of the change in velocity.

11 Jim is paddling a kayak to an island 1.3 km away. There is a cross current which will push him sideways by 0.6 km during the trip. Determine the direction Jim should head if he is to arrive directly opposite from where he starts.

12 A hiker initially has a displacement of 215 m at N49°W. If at the end of the day they have a displacement of 1195 m at S18°E, what is the change in their displacement?

Answers

1 32 km/h, N53°W

2 355.1 N, S28.7°W

3 28.3 km/h east

4 391.2 m at 57.5° to the river bank from which they started

5 40 km/h opposite to direction of travel

6 20.5 km/h, S63.4°W

7 245 km/h in the direction the ball was hit

8 30.1 knots, S85.9°E

9 134.5 km/h at 7.1° below horizontal

10 37.5 km/h

11 Into the current at an angle of 65.2° to the shoreline from which he started

12 1383.7 m, S22.6°E