Speed vs Velocity

Two cars at the same 60 km/h can have different velocities. Speed tells how fast; velocity also tells which way.

Name: Date: Score: ____ / 19

A. Fill in the blanks

1. Speed = distance ÷ ____.

2. Velocity = ____ ÷ time.

3. The SI unit of speed and velocity is ____.

4. 1 km/h = ____ m/s.

B. True or False

5. Two cars at 60 km/h in opposite directions have the same velocity. True / False

6. An object moving in a circle at constant speed has a changing velocity. True / False

7. Speed is a vector quantity. True / False

8. 72 km/h equals 20 m/s. True / False

C. Assertion and reason

9. Assertion (A): A body moving with constant speed can have a changing velocity.
Reason (R): Velocity depends on direction as well as speed.

(a) Both A and R are true, and R explains A
(b) Both A and R are true, but R does not explain A
(c) A is true, R is false
(d) A is false, R is true

Answer: _____

10. Assertion (A): Speed can be negative.
Reason (R): Velocity can be negative.

(a) Both A and R are true, and R explains A
(b) Both A and R are true, but R does not explain A
(c) A is true, R is false
(d) A is false, R is true

Answer: _____

D. Choose the correct option

11. Which has direction?

(a) speed
(b) distance
(c) velocity
(d) time

Answer: _____

12. 36 km/h in m/s is:

(a) 10
(b) 20
(c) 36
(d) 3.6

Answer: _____

13. A car goes round a circular track at a steady 40 km/h. Its velocity is:

(a) constant
(b) zero
(c) changing
(d) 40 km/h north

Answer: _____

14. Speed and velocity have the same magnitude when motion is:

(a) circular
(b) in a straight line, one direction
(c) back and forth
(d) random

Answer: _____

E. Numerical problems

15. A car covers 180 km in 2.5 h. Find its speed in km/h and m/s.

16. A runner goes 100 m north in 12.5 s. Find speed and velocity.

F. Short answer questions

17. Distinguish speed and velocity with one example.

18. Convert 90 km/h into m/s and 15 m/s into km/h.

G. Match the columns

19. Match each item in Column A with the correct item in Column B.

Column A	Column B	Your answer
1. Distance ÷ time	(a) Velocity	1 → ____
2. Displacement ÷ time	(b) Speed	2 → ____
3. km/h to m/s factor	(c) Changing velocity	3 → ____
4. Constant speed on a circle	(d) 5/18	4 → ____

Detailed solutions

1. time

2. displacement

3. m/s

4. 5/18

5. False. Same speed, but opposite directions mean different velocities.

6. True. Its direction keeps changing.

7. False. Speed has no direction; it is a scalar.

8. True. 72 × 5/18 = 20.

9. (a) Circular motion is the example; R explains it.

10. (d) A is false (speed has no direction); R is true.

11. (c) velocity. Velocity is a vector.

12. (a) 10. 36 × 5/18 = 10.

13. (c) changing. Direction changes continuously.

14. (b) in a straight line, one direction. Then distance = displacement.

15. Speed = 180 ÷ 2.5 = 72 km/h; 72 × 5/18 = 20 m/s. **Answer: 72 km/h = 20 m/s**

16. Speed = 100 ÷ 12.5 = 8 m/s; Velocity = 8 m/s towards the north (same magnitude, with direction). **Answer: 8 m/s; 8 m/s north**

17. Speed = distance/time, no direction (scalar). Velocity = displacement/time, with direction (vector). Example: 50 km/h is a speed; 50 km/h east is a velocity.

18. 90 × 5/18 = 25 m/s. 15 × 18/5 = 54 km/h.

19. 1 → (b), 2 → (a), 3 → (d), 4 → (c). Velocity changes whenever speed or direction changes.