



Exam-style questions and sample answers have been written by the authors. In examinations, the way marks are awarded may be different.

> Coursebook answers

Chapter 1

Exam-style questions

1 **A** [1]

2 **C** [1]

3 **a** distance = speed $\times$ time
 $= \frac{120 \times 2.0}{60}$ [1]
 $= 4.0 \text{ km}$ [1]

b The car's direction of motion keeps changing. Hence, its velocity keeps changing. In the course of one lap, its displacement is zero, so its average velocity is zero. [1]

c distance travelled in 1 minute =
 $0.5 \times \text{circumference}$ but, displacement =
diameter of track [1]
 $= \frac{\text{circumference}}{\pi}$
 $= \frac{4000 \text{ m}}{\pi} = 1270 \text{ m}$ [1]

4 **a** By Pythagoras' theorem, distance²
 $= 600^2 + 800^2 \text{ m}^2$ [1]
 $= \sqrt{1000000} = 1000 \text{ m}$ [1]

b angle at B = $\tan^{-1} \left(\frac{600}{800} \right)$ [1]
displacement = 1000 m at an angle 53° W
of N or a bearing of 307° [1]

c velocity = $\frac{1000}{60}$ [1]
 $= 16.7 \text{ m s}^{-1}$ [1]
at an angle 53° W of N [1]

5 **a** distance in car = $0.25 \times 60 = 15 \text{ km}$ [1]
total distance = $2.2 + 15 = 17.2 \text{ km}$ [1]

b By Pythagoras' theorem, displacement =
 $\sqrt{2.2^2 + 15^2}$ [1]
 $= 15.200 \text{ m}$ [1]
at an angle = $\tan^{-1} \left(\frac{2.2}{15} \right)$ [1]
 $= 8^\circ \text{ E of N}$ or a bearing of 008° [1]

c time for 2.2 km at $2.0 \text{ m s}^{-1} = \frac{2200}{2}$ [1]
 $= 1100 \text{ s}$ [1]
total time = $1100 + 900 = 2000 \text{ s}$ [1]

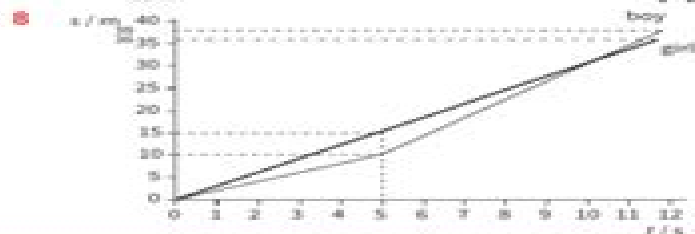
d average speed = $\frac{\text{distance}}{\text{time}}$ [1]
 $= \frac{17200}{2000}$ [1]
 $= 8.6 \text{ m s}^{-1}$ [1]

e average velocity = $\frac{\text{displacement}}{\text{time}}$ [1]
 $= \frac{15200}{2000}$ [1]
 $= 7.6 \text{ m s}^{-1}$ [1]

6 resultant velocity = $\sqrt{1.0^2 + 2.40^2}$ [1]
 $= 2.6 \text{ m s}^{-1}$ [1]
at an angle of $\tan^{-1} \left(\frac{1.0}{2.4} \right)$ [1]
 $= 23^\circ \text{ E of N}$ or a bearing of 023° [1]

7 **a** Distance in a (particular) direction [1]

b When athlete returns to his original position or the start [1]
(direct) distance from original position [1]
zero [1]



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RJ Shavelson



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