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# > Coursebook answers

## Chapter 1

### Exam-style questions

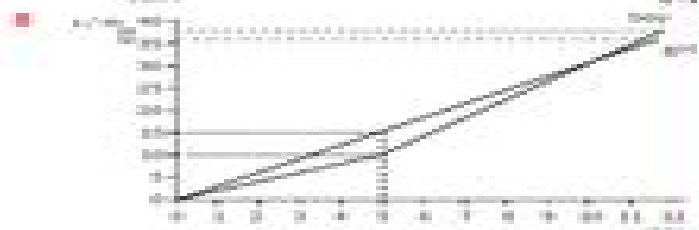
1. **A** [1]
2. **C** [1]
3. **a** distance = speed  $\times$  time  

$$= \frac{120 \times 2.4}{60}$$
 [1]  
 $= 4.8 \text{ km}$  [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 =  $0.5 \times$  circumference then, displacement = diameter of track  
 $=$  circumference  

$$= \frac{4000\pi}{\pi} = 4000 \text{ m}$$
 [1]
4. **a** By Pythagoras' theorem, distance<sup>2</sup> =  $300^2 + 300^2 \text{ m}^2$  [1]  
 $= \sqrt{180000} = 424.26$  [1]
- b** angle at B =  $\tan^{-1} \left( \frac{300}{300} \right)$  [1]  
 displacement = 400 m, at an angle  $45^\circ$  W of N or a bearing of  $315^\circ$  [1]
- c** velocity =  $\frac{400}{10}$  [1]  
 $= 40.7 \text{ m s}^{-1}$  [1]  
 at an angle  $45^\circ$  W of N [1]
5. **a** distance the 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]  
 $= 15.200 \text{ km}$  [1]  
 at an angle =  $\tan^{-1} \left( \frac{2.2}{15} \right)$  [1]  
 $= 8^\circ$  E of N or a bearing of  $008^\circ$  [1]
- c** time for 2.2 km at  $2.0 \text{ m s}^{-1} = \frac{2200}{2}$  [1]  
 $= 1100 \text{ s}$  [1]  
 total time =  $1100 + 600 = 1700 \text{ s}$  [1]
- d** average speed =  $\frac{\text{distance}}{\text{time}}$  [1]  
 $= \frac{17200}{1700}$  [1]  
 $= 10.1 \text{ m s}^{-1}$  [1]
- e** average velocity =  $\frac{\text{displacement}}{\text{time}}$  [1]  
 $= \frac{15200}{1700}$  [1]  
 $= 8.9 \text{ m s}^{-1}$  [1]
- f** resultant velocity =  $\sqrt{1.6^2 + 2.4^2}$  [1]  
 $= 2.8 \text{ m s}^{-1}$  [1]  
 at an angle of  $\tan^{-1} \left( \frac{1.6}{2.4} \right)$  [1]  
 $= 33^\circ$  E of N or a bearing of  $033^\circ$  [1]

7. **a** Distance is a (particular) direction [1]  
**b** When a ball returns to his original position at the start, (total) distance from original position zero [1]



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**PT Brinkman**



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