Speed, Distance and Time

Level 1 – 2

1. A car travels at an average speed of 50 km/h. Calculate how far it travels in:

   a) 1 hour   …………………………………………………………………………

   b) 5 hours   …………………………………………………………………………

   c) 30 minutes   …………………………………………………………………………

2. A train travels 100 km in 2 hours. Calculate its average speed.

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3. A person walks at an average speed of 4 km/h. Calculate the time taken to walk:

   a) 4 km   …………………………………………………………………………

   b) 12 km   …………………………………………………………………………

   c) 2 km   …………………………………………………………………………

4. Sound travels (in air) at approximately 340 m/s. A gun is fired and a person standing far away hears it two seconds later. How far away is the person standing?

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5. How long will it take a bullet travelling at 1500 m/s to reach a target 75 metres away?

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6. A car travels at an average speed of 60 km/h for 2 hours and an average speed of 45 km/h for three hours. Calculate the average speed of the journey.

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7. Car A leaves London at 10:00 am and drives to Manchester which is 320 km away at an average speed of 80 km/h. Car B leaves 20 minutes later and drives to Manchester at an average speed of 100 km/h. Which car arrives first and at what time does it arrive?

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8. Light travels through space at approximately 3×10^8 m/s. The distance between the sun and the earth is approximately 150 million km. Calculate how long it takes light to reach the earth from the sun.

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9. A tortoise walks at 7 cm/s. Calculate how long it will take the tortoise to walk 1 km.

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10. A light year represents the distance that light travels through space in one year.

    a) Determine a light year in km.

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    b) Peter looks at a star in the sky. He researches and finds that it is 5,000 light years away. How many years ago did the light from the star that Peter is currently looking at leave the star?

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    Level 5 – 6

11. A horizontal escalator moves at 2 m/s. A person walks along the escalator at 4 m/s (relative to the escalator).

    a) How long will it take the person to *travel* 60 m?

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    b) How far will the person have *walked* during this time?

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12. Perform the following conversions:

a) 10 m/s to km/h

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b) 120 km/h to m/s

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b) 350 cm/s to km/h

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13. Calculate how long it takes a train travelling at 200 km/h to travel 20 m.

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14. One inch is equal to 25.4 mm, 12 inches equals one foot, three feet equals one yard, 1760 yards equals one mile. In the UK (and the US) car speed is measured using miles per hour (mph). The speed limit on the motorway (highway) is 70 mph. Convert this into km/h using the information given in this question. Compare this to the speed limit on the motorway in Japan. Is there a big difference?

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15. A man is walking through the airport at a speed of 5 km/h. He steps on to a travellator (a horizontal escalator) and continues walking at the same walking speed. The travellator is moving at a speed of 2 km/h and has a length of 140 m.

a) Determine the speed of the man when he is on the travellator.

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b) Determine the total distance the man *walks* in metres during his journey on the travellator.

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Level 7 – 8

16. Light travels (through air) at approximately 300,000,000 m/s. Sound travels (through air) at approximately 340 m/s. A common method used to determine how far away a flash of lightning is is to count the number of seconds between seeing the flash of lightning and hearing the thunder, and then dividing this number by three. The result is the approximate distance from you to the lightning in km. Explain why this method works.

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17. Earthquakes produce two different types of waves: longitudinal waves and transverse waves. In a particular earthquake the longitudinal waves travel at 4 km/s and the transverse waves travel at 1 km/s. An observer feels the longitudinal waves five seconds before feeling the transverse waves. How far away is the observer from the epicenter?

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18. At 12:00 pm car A is travelling at a speed of 100 km/h. Car B is 5 km in front of car A travelling at a speed of 80 km/h.

    a) At what time will the cars meet?

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    b) How far will car A have travelled (since 12:00 pm) when they meet?

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19. At 1:30 pm train leaves Chicago and travels towards New York, 1200 km away, at an average speed of 150 km/h. At the same time a train leaves New York and travels towards Chicago at an average speed of 120 km/h. When and where will they meet?

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