Grade 8 Mathematics Worksheet

Measuring temperature and speed

Questions:

1. Your school takes you on a tour of America as part of a science project. In America they measure the temperature in degrees Fahrenheit and the distance is measured in miles.

   a) You know that $\frac{3}{5}$ of a mile is more or less one kilometre. If Washington DC is 227 miles from New York city, how far is this in kilometres?

   b) You Google the temperature and get the following conversion formula from Celsius to Fahrenheit:

   $$°F = (°C \times \tfrac{9}{5}) + 32$$

   Use this formula to find the Fahrenheit temperature of 35°C.

   c) If the newspaper in South Africa shows that in New York city the temperature is 12°F, what is the Celcius equivalent?

   d) Which temperature is the coldest; $-28°F$ or $-28°C$. Show all your working

2. Peter drives 585 km in 5 hours. He left home at 8am this morning and still has R 842 km to go to reach his destination.

   a) What is his average speed for the first 5 hours?

   b) At what time will he reach his destination if the average speed stays the same for the rest of the journey?

Solution

1. a) $227\,miles \div \frac{3}{5}\,miles/km = \frac{227 \times 5}{3}\,km = 378,33km$

    b) $^\circ F = (^\circ C \times \frac{9}{5}) + 32\big|_{C=35} = 35 \times \frac{9}{5} + 32 = 63 + 32 = 96^\circ$

    c) $^\circ F = (^\circ C \times \frac{9}{5}) + 32\big|_{F-12}$

    $\therefore 13 = C \times \frac{9}{5} + 32$

    $\therefore c \times \frac{9}{5} = 13 - 32$

    $\therefore C = -19 \times \frac{5}{9} = -10,6^\circ$

    d) We must convert the two rates to the same scale:
    $^\circ F = (-28 \times \frac{9}{5}) + 32 = -18,4^\circ$

    Based on this calculation it is clear that $-28^\circ F$ is colder than $-28^\circ C$

2. a) If he drove a total of 585 km in 5 hrs, his average speed would have been:

    $\text{Average speed} = \frac{\text{Total distance}}{\text{Total time}} = \frac{585}{5}\,km/h = 117km/h$

    b) $\text{Total time} = \frac{\text{Total distance}}{\text{Average speed}} = \frac{842}{117} = 7,195681197$

    Now minutes = $0,195681197 \times 60 = 11,79... = 12$ min

    He will reach his destination at 8 am + 7 hours 12 minutes = 3:12 pm.

The context for this problem is conversion between rates used in South Africa, and those used in the United States.

Using the formulas for Speed, Distance and Time is an important part of the process. Working with instantaneous speed, and average speed, and understanding what the difference is in the two calculations.