DOUBLE TUTORIAL 4

First Hour

Question 1. One cup of flour is equal to about $125\,g$ of flour. How much flour is in 2.5 cups? Round the answer to integer.

Question 2. Highway speed limits in USA can range from an urban low of $35\,mph$ to a rural high of $85\,mph$. One mph (mile per hour) is approximately $1.6\,km/h$. Convert the speed limits, $35\,mph$ and $85\,mph$, into km/h.

Question 3. The circumference of the circle C_1 is $c_1 = 3.5\,cm$. The radius of the circle C_2 is four times larger than the radius of the circle C_1 r_1, i.e. $r_2 = 4r_1$. Find the circumference of the circle C_2.

Question 4. Given two similar triangles, ABC and $A'B'C'$ with

$$\frac{A'B'}{AB} = \frac{A'C'}{AC} = \frac{B'C'}{BC}.$$

(a) Explain what does it mean that two triangles are similar.

(b) Evaluate the length of the side $B'C'$ if $AC = 5\,cm$, $A'C' = 55\,cm$ and $BC = 7\,cm$.

(c) Evaluate the constant of proportionality.

Question 5. On a trial production run, 50 parts were produced in 24 hours. At the same rate, how long should it take to produce 20000 parts? Express the answer first in hours, then in days and hours.

Question 6. Is it true or false?

(a) Any two circles are similar to each other.

(b) Any two triangles are similar to each other.

(c) Any two squares are similar to each other.

(d) If you walk a distance d twice faster, you need twice more time.

(e) If you walk a distance d twice faster, you need twice less time.

(f) If you walk twice faster, you will travel the twice distance in the same time.

Question 7. You are preparing an injection of morphine. The order reads 60 mg. The stock morphine is 18 mg per 5 mL. How many mL will you need to draw up? Round your answer to the nearest mL.

Question 8. To determine the number of deer in a forest, a forest ranger tags 265 and releases them back into the forest. Later, 880 deer are caught, out of which 105 of them are tagged. Estimate how many deer are in the forest. Round your answer to the nearest deer.

Second Hour

For following exercises use the formula

$$\frac{\textbf{percentage}}{100\%} = \frac{\textbf{partial amount}}{\textbf{total amount.}}$$

Question 1.

What is $12\frac{1}{2}\%$ of 120?

Question 2.

A copper compound contains 80% copper by weight. How much copper is there in a 1.95 gram sample of the compound?

Question 3.

In a class of 32 students, 30 passed the exam. What is percent of the student passed the exam in the class?

Question 4.

30 is 15% of what number?

Question 5.

If the present length of a brass rod is $1.46\,m$, what will its length be after 0.3% expansion caused by heating?

Question 6.

Harry bought a new bike for $180, which includes 10% GST. How much money was spent on the GST?

Question 7. Write down the numbers in scientific notation. Which of these numbers is the smallest? The largest?

(a) 0.00000000001,

(b) 35, 000, 000,

(c) 78, 950,

(d) 0.00467,

(e) 0.000000000011.

Question 8.

(a) How many centimetres are in one kilometre?

(b) How many kilometres are in 450 metres?

(c) The formula converting Celsius into Fahrenheit is $F = \frac{9}{5}C + 32$, where F is a temperature in degrees Fahrenheit, and C is a temperature in degrees Celsius. Convert $180^0 C$ into $^0 F$.

(d) It is necessary to travel 11km per second to escape the earth's gravity (escape velocity). Convert the velocity into km/h.

Question 9.

(a) How many square metres are in one square kilometre?

(b) How many square kilometres are in $500\, m^2$?

Question 10. Given that dm^3 of water is equal to one litre, and that $1\, dm = 10\, cm$, evaluate

(a) How many litres of water are in one cubic metre?

(b) How many litres of water are in the swimming pool with the dimensions $5\, m \times 25\, m \times 1.80\, m$.