

868



TUTORS

Preparation for

High School Mathematics

Measurement

(Speed, Distance, Time)

Solutions

Math



Instructions and Tips:

- ✓ **You have 60 minutes to complete this worksheet**
- ✓ **This worksheet consists of 5 questions**
- ✓ **Write answers in the spaces provided**
- ✓ **All working must be clearly shown**
- ✓ **Give answers to 2 decimal places**



Student Name: _____

Student ID: _____

Date: __ / __ / ____

Total Score:

Highest Score:

Tutor's Comments:

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Question 1

A sprinter from St. Kitts and Nevis enters a regional 100 m race. The sprinter covers a distance of 100 m in 9.87 seconds.



(a) Calculate his average speed for the race.

$$\text{Average speed} = \frac{\text{Total Distance}}{\text{Total Time}} = \frac{100 \text{ m}}{9.87 \text{ seconds}}$$

$$\text{Average speed} = \boxed{10.13 \text{ m/s (to 2 decimal places)}}$$

(2 marks)

(b) What should his average speed be to complete the 100 m in 9.59 seconds?

$$\text{Average speed}_{\text{required}} = \frac{100 \text{ m}}{9.59 \text{ s}} = \boxed{10.43 \text{ m/s (to 2 decimal places)}}$$

(2 marks)

(c) The sprinter's average speed for a 200 m race is 10.21 m/s. Calculate the time he takes to cover 200 m.

$$\text{Average speed} = \frac{\text{Total Distance}}{\text{Total Time}} \quad \text{Time} \times \text{Average Speed} = \text{Total Distance}$$

$$\text{Time} = \frac{\text{Total Distance}}{\text{Average Speed}} \quad \text{Time} = \frac{200 \text{ m}}{10.21 \text{ m/s}} \quad \text{Time} = \boxed{19.59 \text{ seconds (to 2 decimal places)}}$$

(2 marks)

Question 2

A pickup truck travels at 65 kilometres per hour on a highway in Trinidad.



(a) Calculate the time taken, in minutes, to cover 30 km at this constant speed.

$$\text{Average speed} = \frac{\text{Total Distance}}{\text{Total Time}}$$

$$\text{Time} = \frac{\text{Total Distance}}{\text{Average Speed}} = \frac{30 \text{ km}}{65 \text{ km/h}}$$

$$\text{Time} = 0.461538462 \text{ hour}$$

$$1 \text{ hour} = 60 \text{ minutes} \quad 0.461538462 \text{ hour} = 60 \text{ minutes} \times 0.461538462 = \boxed{27.69 \text{ minutes (to 2 dp)}}$$

(1 mark)

(b) Calculate the time taken, in minutes, to cover 30 km at a constant speed of 80 km/h.

$$\text{Average speed} = \frac{\text{Total Distance}}{\text{Total Time}}$$

$$\text{Time} = \frac{\text{Total Distance}}{\text{Average Speed}} = \frac{30 \text{ km}}{80 \text{ km/h}}$$

$$\text{Time} = 0.375 \text{ hour}$$

$$1 \text{ hour} = 60 \text{ minutes} \quad 0.375 \text{ hour} = 60 \text{ minutes} \times 0.375 = \boxed{22.5 \text{ minutes (to 2 dp)}}$$

(2 marks)

(c) How much time is saved by travelling at 80 km/h instead of 65 km/h over a distance of 30 km?

$$\text{Time saved} = \text{Time taken at 65 km/h} - \text{Time taken at 80 km/h}$$

$$\text{Time saved} = 27.69 \text{ minutes} - 22.5 \text{ minutes}$$

$$\text{Time saved} = \boxed{5.19 \text{ minutes (to 2 dp)}}$$

(2 marks)

Question 3

The chart below shows the 2 kilometre sprint times of some speed boats in a race off the coast of Trinidad.

Name of Speedboat	Time
Icacos Fire	51 seconds
Erin Dragon	50 seconds
St. Patrick Speedster	49 seconds
Mr. La Brea	45 seconds

(a) Calculate the average speed (in km/h) of Mr. La Brea during the sprint.

$$\text{Average speed} = \frac{\text{Total Distance}}{\text{Total Time}} = \frac{2 \text{ km}}{\text{Total Time}}$$

$$\text{Total Time (Mr. La Brea)} = 45 \text{ seconds}$$

$$3600 \text{ seconds} = 1 \text{ hour} \quad 1 \text{ second} = \frac{1 \text{ hour}}{3600} \quad 45 \text{ seconds} = \frac{1 \text{ hour}}{3600} \times 45 \quad 45 \text{ seconds} = 0.0125 \text{ hour}$$

$$\text{Average speed} = \frac{\text{Total Distance}}{\text{Total Time}} = \frac{2 \text{ km}}{0.0125 \text{ hour}} = \boxed{160 \text{ km/h}} \quad \text{(2 marks)}$$

(b) Calculate the average speed (in km/h) of Icacos Fire during the sprint.

$$\text{Average speed} = \frac{\text{Total Distance}}{\text{Total Time}} = \frac{2 \text{ km}}{\text{Total Time}}$$

$$\text{Total Time (Icacos Fire)} = 51 \text{ seconds}$$

$$3600 \text{ seconds} = 1 \text{ hour} \quad 1 \text{ second} = \frac{1 \text{ hour}}{3600} \quad 51 \text{ seconds} = \frac{1 \text{ hour}}{3600} \times 51 \quad 51 \text{ seconds} = 0.014166666 \text{ hr}$$

$$\text{Average speed} = \frac{\text{Total Distance}}{\text{Total Time}} = \frac{2 \text{ km}}{0.014166667 \text{ hr}} = \boxed{141.18 \text{ km/h (to 2 dp)}} \quad \text{(2 marks)}$$

(c) The crew of Mr. La Brea want to achieve a time of 43 seconds in the next race. What should their average speed in km/h be?

$$\text{Average speed} = \frac{\text{Total Distance}}{\text{Total Time}} = \frac{2 \text{ km}}{\text{Total Time}}$$

$$\text{Required Time (Mr. La Brea)} = 43 \text{ seconds}$$

$$3600 \text{ seconds} = 1 \text{ hour} \quad 1 \text{ second} = \frac{1 \text{ hour}}{3600} \quad 43 \text{ seconds} = \frac{1 \text{ hour}}{3600} \times 43 \quad 43 \text{ seconds} = 0.011944444 \text{ hour}$$

$$\text{Average speed} = \frac{\text{Total Distance}}{\text{Total Time}} = \frac{2 \text{ km}}{0.011944444 \text{ hour}} = \boxed{167.44 \text{ km/h (to 2 dp)}} \quad \text{(3 marks)}$$

Question 4

The table below indicates the times recorded by five horses at a horse racing event, on the beach, in Cedros, Trinidad. The race distance is 1.5 km.

Name of Horse	Time
Palo Seco Spirit	72 seconds
Apache	73 seconds
Survivor	74 seconds
Coromandel Commander	68 seconds

(a) Calculate the average speed (in m/s) of each horse.

$$\text{Average speed} = \frac{\text{Total Distance}}{\text{Total Time}} \quad 1 \text{ km} = 1000 \text{ m} \quad 1.5 \text{ km} = 1000 \text{ m} \times 1.5 \quad 1.5 \text{ km} = 1500 \text{ m}$$

$$\text{Average Speed (Palo Seco Spirit)} = \frac{1500 \text{ m}}{72 \text{ seconds}} = \boxed{20.83 \text{ m/s (to 2 dp)}}$$

$$\text{Average Speed (Apache)} = \frac{1500 \text{ m}}{73 \text{ seconds}} = \boxed{20.55 \text{ m/s (to 2 dp)}}$$

$$\text{Average Speed (Survivor)} = \frac{1500 \text{ m}}{74 \text{ seconds}} = \boxed{20.27 \text{ m/s (to 2 dp)}}$$

$$\text{Average Speed (Coromandel Commander)} = \frac{1500 \text{ m}}{68 \text{ seconds}} = \boxed{22.06 \text{ m/s (to 2 dp)}}$$

(2 marks)

(b) Complete the table below to show the position of each horse in the race.

Place	Name of Horse
1st	Coromandel Commander
2nd	Palo Seco Spirit
3rd	Apache
4th	Survivor

(2 marks)

Question 5

A ferry leaves Port of Spain with passengers headed for a family day at Columbus Bay. The distance to be covered is 80 km.

(a) Calculate the average speed (in km/h) the ferry has to travel to arrive in 1 hour and 15 minutes.

$$\text{Average speed} = \frac{\text{Total Distance}}{\text{Total Time}} \quad 1 \text{ hour and 15 minutes} = 1.25 \text{ hours}$$

$$\text{Average speed} = \frac{80 \text{ km}}{1.25} = \boxed{64 \text{ km/h}}$$



(2 marks)

(b) The ferry leaves Port of Spain at 6am but arrives at its destination at 7:30 am. Calculate the average speed of the ferry in this case.

$$\text{Average speed} = \frac{\text{Total Distance}}{\text{Total Time}} \quad \text{Time taken} = 1 \text{ hour and 30 minutes} = 1.5 \text{ hours}$$

$$\text{Average speed} = \frac{80 \text{ km}}{1.5 \text{ hour}} = \boxed{53.33 \text{ km/h (to 2 dp)}}$$

(2 marks)



END OF WORKSHEET



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