Science 10
Chapter Nine: Distance and Speed

Name: Key **/65**

Part I: Significant Digits

State the number of **significant digits** for each of the following. [6]

a. 4500 cm 2
b. 103.010 km 6
c. 0.0041950 s 5
d. 1.879×10^{-3} s 4
e. 950.0 km 4
f. 51.002 h 5

2. Complete the following calculations by providing the **correctly rounded answer** with the **correct significant digits and units** [4]

	TRUE ANSWER	FINAL ANSWER
a. 43.5mm x 1.245 mm x 15.0 mm =	81.236	81.2 mm
b. 0.012m + 12.28m + 5.75m =	18.042	18.04m
c. 19.38 h – 8.7 h =	10.68	10.7h
d. $\frac{110\ km}{2.3\ h}$ =	47.826	48 Km/h

Part 2 : Definitions - Complete the following sentence. [2]

a. Accuracy depends on user skills.
b. Precision depends on Fines of scale.
c. The slope of a line on a distance-time graph gives the Speed.
d. The average speed is equal to the instantaneous speed Constant.

Part 3: Factor label method [8]

Convert the following quantities into the units stated. Round your answer to the correct number of significant digits. **(You must show all work in order to obtain full value)**

a. 66 m/s to km/h

$$\frac{66\,m}{s} \times \frac{1\,km}{1000\,m} \times \frac{3600\,s}{h}$$

$= 237.6$ km/h
240 km/h

b. 851.2 **min** into **days**

$$851.2\,min \times \frac{1\ days}{1440\,min}$$

$= 0.5911$ days

c. 2.54 **m** into **cm**

$$2.54\,m \times \frac{100\,cm}{1\,m} = 254\,cm$$

d. 111 **km/h** into **m/s**

$$\frac{111\,km}{h} \times \frac{1000\,m}{km} \times \frac{h}{3600\,s}$$

$= 30.8$ m/s

Part 4: Rearranging Equations [4]

Rearrange the following equations for the desired variable.

a. $A = lwh$; solve for h =

$$\frac{A}{lw} = \frac{lwh}{lw}$$

$$h = \frac{A}{lw}$$

b. $D = 3a - 2b$; solve for b

$$D - 3a = 3a - 3a - 2b$$

$$\frac{D - 3a}{-2} = \frac{-2b}{-2} \rightarrow b = \frac{D - 3a}{-2}$$

c. $P = \frac{W}{t}$; solve for t

$$\frac{W}{P} = \frac{Pxt}{P} \quad t = \frac{W}{P}$$

d. $V = \frac{Ah}{3}$; solve for A=

$$\frac{3V}{h} = \frac{Ah}{h} \quad A = \frac{3V}{h}$$

Part 5: Distance, Speed and Time

(For this section you must show all your work in order to obtain full value)

1. In 1979, Bryan Allen pedaled the Gossamer Albatross aircraft 36.8 km across the English Channel in a time of 174 minutes (convert to hours).

e. Calculate the average speed of the aircraft in km/h. [4]

V=
D= 36.8 km
T= 174 min

$V = \frac{d}{t}$ $\frac{36.8\,km}{174\,min} \times \frac{60\,min}{h} = 12.7\,km/h$

the average speed is 12.7 km/h.

f. Assuming that he maintained this same average speed, what total distance could he cover in 4.93 hours? [4]

V= 12.7 km/h
D=
T= 4.93 h

$D = V \times t$ $12.7\,km/h \times 4.93\,h = 62.6\,km$

total distance 62.6 km.

2. At the equator the earth spins a distance of 41830.07 km every day. What speed does the earth spin at in kilometers per hour? [4]

V=
D= 41830.07 km
T= 24 h

$V = \frac{d}{t}$ $\frac{41830.07\,km}{24\,h} = 1742.92\,km/h$

The earth spins 1742.92 km/h.

3. A) Stan has two alternate means if getting to work: taking the bus, or taking the train. Each mode of transportation follows a slightly different route from Stan's house to his workplace. The bus travels a distance of 40 km at an average speed of 80km/h, and the train travels 33 km at an average speed of 78 km/h. **Calculate the time each takes in minutes.** [8]

Bus

V= 80 km/h
D= 40 km
T=

$t = \frac{d}{v} = \frac{40\,km}{80\,km/h}$

$= 0.5\,h = 30\,min.$

Train

V= 78 km/h
D= 33 km
T=

$t = \frac{d}{v} = \frac{33\,km}{78\,km/h}$

$= 0.42\,h \times \frac{60\,min}{h} = 25.2\,min.$

b) Which one is the faster means of transportation & by how many minutes? (2)

The train is faster by 5 minutes.

4. Kelly drove 11.5 hours per day for 7.4 days in order to get back home for spring break. Her average speed was 88 km/h. How far did she travel? [4]

V= 88 km/h
D=
T= 11.5 h x 7.4 days = 85.1 h

$d = V \times t$ $85.1\,km \times 88\,km/h$

$= 7488.8\,km$

5. Tori was told dinner would be ready at 5:45. She left her house at 1:00 pm and travelled in her car at an average speed of 97 km/h to her parents house 548 km away. Does Tori make it home in time for dinner? [4]

V= 97 km/h
D= 548 km
T=

$t = \frac{d}{v} = \frac{548}{97} = 5.65\,h$

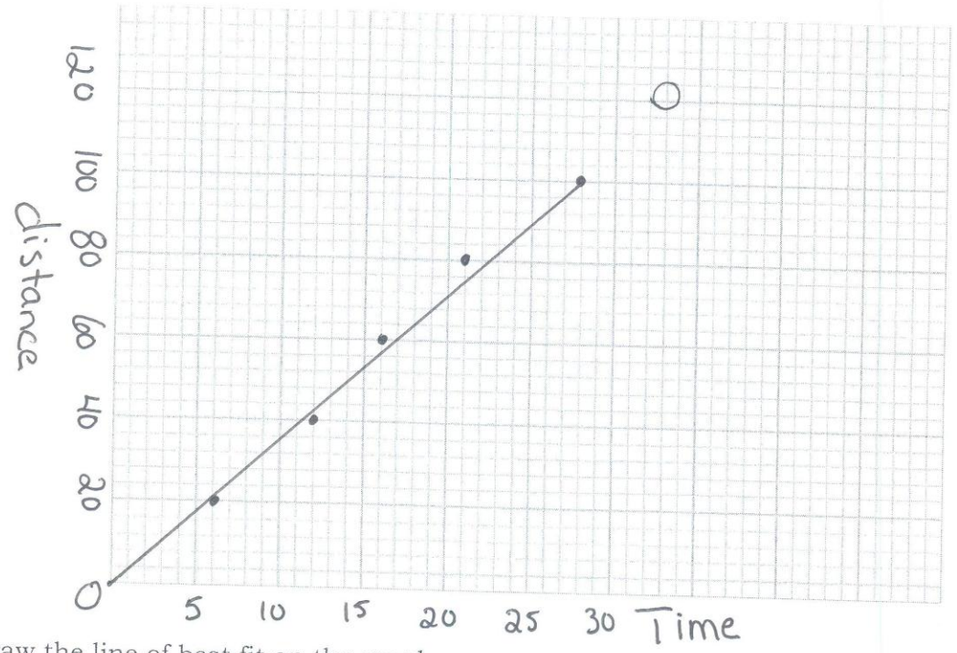
No tori will not make it in time for dinner.

Part 6: Distance- time Graphs **[9]**

1.A person begins to jog down the street. The data has been recorded in the table below

Time (s)	Distance (m)
0.0	0.0
6.0	20.0
12.0	40.0
16.0	60.0
21.0	80.0
28.0	100.0

a. Graph the above data onto the graph paper below. Be sure to label each axis along with **units** and give your graph a title. [4]



b. Draw the line of best fit on the graph [1]

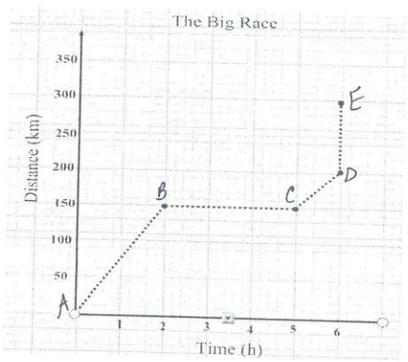
c. **Using the graph**, predict the joggers' time to reach 120m . [1]

about 33 seconds

d. Using the graph, calculate the **speed** of the jogger. [3]

$V = \frac{\Delta d}{\Delta t} = \frac{100m}{28\,sec} = 3.6\,m/s$ Approximatley

2.Tell me what is happening in this graph, according to speed and time. At the end tell me if this is a realistic graph(D- E) **[2]**



A-B, Constant speed

B-C Distance travel has stopped

C-D Constant speed

D-E Distance increases, but time has stopped. (impossible)