Nelson Maths 9 for the CSF II
Homework and Assessment Sheets

Time and rates — ME 9-8

Name: _____ **Class:** _____

Due date: _____ **Parent's signature:** _____

Level 5 /10	Level 6 /20

Part A: Level 5

How much time has elapsed when a clock hand moves through the following angles?

	Hand	Angle	Elapsed time
1	minute	180°	
2	minute	270°	
3	minute	36°	
4	hour	30°	

Lan lives in city *A*, and wants to travel by plane 1500 km west to city *B*. The time in city *B* is 3 hours behind city *A*. Lan thought that this time difference meant she could leave *A* at 9 am and arrive in *B* at the same local time (9 am)!

5 How much time would she be travelling for? _____

6 What speed must her plane travel at to achieve this? _____

7 Is her plane likely to travel at this speed? _____

8 Would she need to travel faster or slower if city *A* had daylight saving but city *B* did not? _____

9 Bonnie cycles 36 km in 2 hours and Amanda cycles 45 km in $2\frac{1}{2}$ h.
Who rode the fastest and at what speed did she ride? _____

10 Two students have new watches, but one is analogue and one is 24-hour digital. They record the time taken to complete a $4\frac{1}{4}$ hour task. If they finished at 20 to 6 in the afternoon by the analogue watch, at what time did they start by the 24-hour digital watch? _____

Part B: Level 6

If bacteria divide in two every half hour on warm nutrient plates, fill in the table for a plate starting with one bacterium.

	Time	Number of bacteria in index form	Number of bacteria in numerical form
1	30 min	2^1	
2	2 hours	2^4	
3		2^{10}	
4			>1 million

Complete the data on rates of heating different volumes of water. Answer in the units indicated.

	Temperature rise	Time taken	Rate of increase
5	17°C	15 min	°C/h
6	96°C	1.5 h	°C/h
7	22.5°C		90°C/h

In each case, which of the following is cheaper, *A* or *B*?

8 **A** hiring a TV set at \$2 per week **B** \$100 annually _____

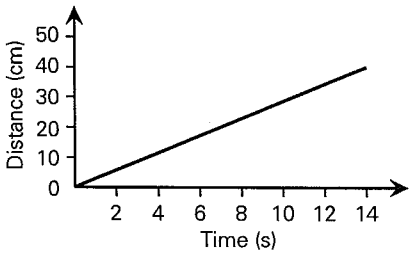
9 **A** $\frac{1}{4}$ share of flat A at \$375 a month **B** $\frac{1}{2}$ share of flat B at \$960 annually _____

10 **A** 17.5 L of petrol at 0.84 cents/L **B** 18 L at 0.82 cents/L _____

Overtime work is paid at a higher rate than normal pay. Calculate the weekly earnings of a person who works the following combination of normal and overtime hours.

	Week	Time at \$16/h	Overtime at \$22.50/h	Total earnings
11	1	30 h	10 h	
12	2	38 h	$11\frac{1}{2}$ h	
13	3		20 h	\$998

Answer the following questions about the graph on the right.

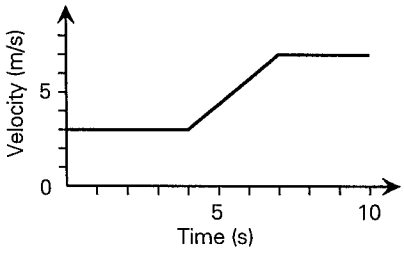


14 What is the object's speed? _____

15 Is the speed constant? _____

16 How far did it travel in the last 2 seconds? _____

Answer the following questions about the graph on the right.



17 During what time(s) is the object at constant velocity? _____

18 During what time(s) is it accelerating? _____

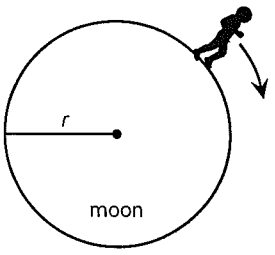
19 During what time(s) is it stationary? _____

20 Distance is calculated as the area under a velocity–time graph. What distance did the object travel during the 10-second interval? _____

Puzzler

The diagram shows a 2 m tall astronaut walking once around the circumference of the moon.

If he takes 50 days, how much faster would his head travel than his feet?



Vocabulary

Write the mathematical meanings of:

Analogue watch _____

Digital watch _____

Nelson Maths 9 for the CSF II
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Relationships, rates and proportion — ME 9-9

Name: _____ **Class:** _____

Due date: _____ **Parent's signature:** _____

Level 5 /10	Level 6 /20

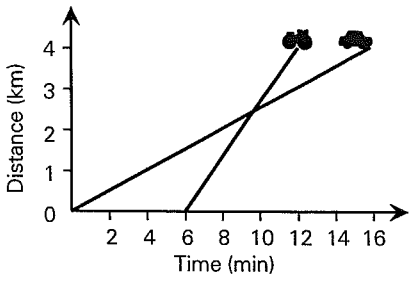
Part A: Level 5

1 Write the relationship between speed (S), distance (D) and time (T). _____

Use it to calculate the speed at which a student jogs to school 850 m from home in $7\frac{1}{2}$ minutes.

2 in m/min _____ **3** in km/h _____

This graph shows a motorcycle and a car travelling on the same journey from home.

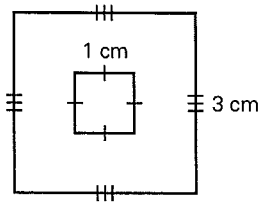


4 Which vehicle arrived first? _____
and by how many minutes? _____

5 What was the speed of the motorcycle? _____

6 At what distance from home did they pass? _____

In the diagram on the right, what is the simplest ratio of:



7 the small perimeter to the large perimeter? _____

8 the large area to the small area? _____

Circle the formula or rule which fits each situation.

9 Angelo (A) paints the fence four times as fast as Maurice (M).

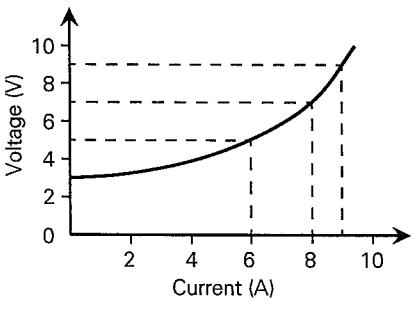
$A = \frac{M}{4}$ $M = A + 4$ $A = 4M$ $A = M + 4$

10 Fiona (F) always receives half the pocket money of her older sister Jacinta (J).

$F = J + \frac{1}{2}$ $F = 2J$ $J = F + \frac{1}{2}$ $J = 2F$

Part B: Level 6

The graph on the right shows the relationship between current and voltage for a light globe.



1 Is it a direct relationship? _____

2 Explain. _____

3 From the graph, estimate the voltage needed to produce a current of 6A? _____

4 Estimate how much extra voltage is required to increase the current from 8A to 9A? _____

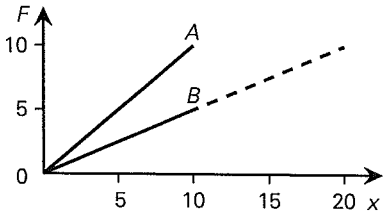
The time taken for one orbit by a satellite (T seconds) is related to the radius of the orbit (r metres) and the satellite's velocity (v metres/second). The relationship is $T = \frac{2\pi r}{v}$. Circle the correct answer.

5 If v is increased and r remains constant, then T will: increase decrease remain same

6 If r is increased and v remains constant, then T will: increase decrease remain same

7 If v and r are both doubled, then T will: increase decrease remain same

Two substances are stretched and behave according to Hooke's law which states $F = kx$, where F is the force applied and x is the extension in length. If k is constant for a particular substance, use the graph to find:



8 the value of k for substance A _____

9 the value of k for substance B _____

10 Which substance is more easily extended? _____

11 If the force on substance B were increased from 5 to 10 units, predict how much further it would extend. _____

Use the rule $SI = \frac{PRT}{100}$ for calculating simple interest and complete the table.

	SI ($)	*P* ($)	*R* (%)	*T* (years)
12		1000	5	1
13	640		8	1
14	60	500	3	

15 If $\frac{a}{9.2} = \frac{6}{13.8}$ $a =$ _____

16 If $\frac{18}{b} = \frac{27}{15}$ $b =$ _____

17 If \$20 represents 100%, \$30 represents _____

18 If \$20 represents 100%, \$_____ represents 80%.

If 250 mL of orange juice provides 480 kJ of energy, complete the table below.

	Amount	Energy provided
19	0.5 L	
20		840 kJ

Puzzler

If it takes 22 balls of wool to make a man's jumper and 18 balls to make a lady's jumper, how many complete jumpers of each kind would 352 balls make?

Vocabulary

Write the mathematical meanings of:

Relationship _____

Formula _____

Direct relationship _____