High School Mathematics Test 2013

Year 9

Proportion

Non Calculator Section

Skills and Knowledge Assessed:

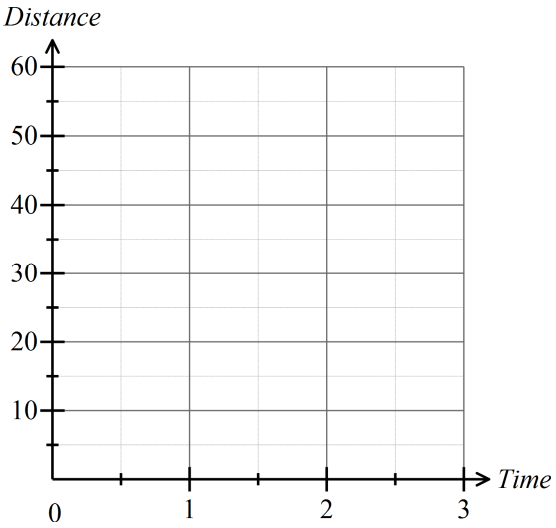
- Solve problems involving direct proportion. Explore the relationship between graphs and equations corresponding to simple rate problems (ACMNA208)

Name_____

Section 1 Non Calculator Section

Write all working and answers in the spaces provided on this test paper.

1. A cyclist travels at a constant speed of 20 km/h for three hours. Represent this on the distance time graph.

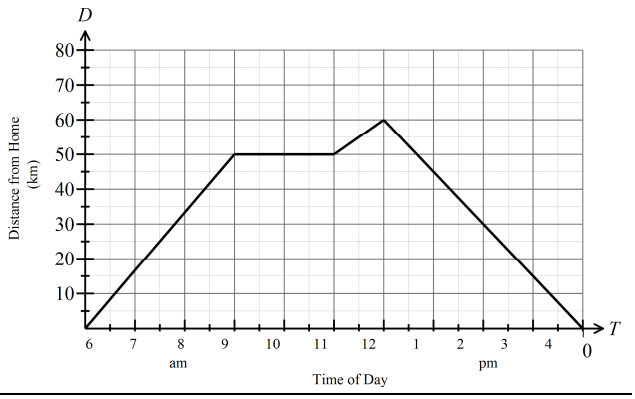


2. The graph shows Meka's travels starting from home on a day last week.

   Between what times was she stopped?

   ……

   …….



3. The distance/time graph shows a journey in a truck. In which section of the journey marked $A - E$ is the truck travelling at the greatest speed. Explain why you chose this section.

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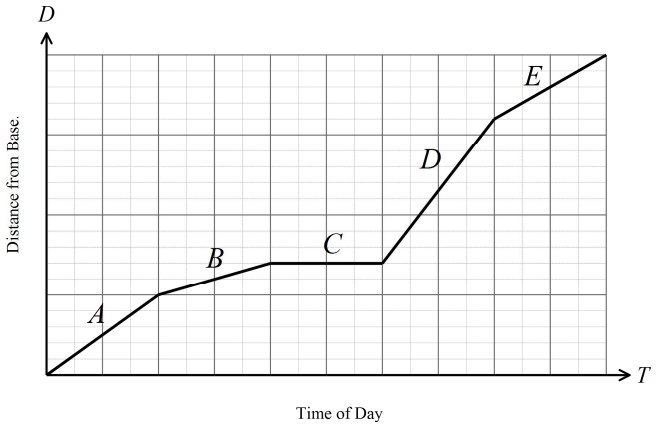
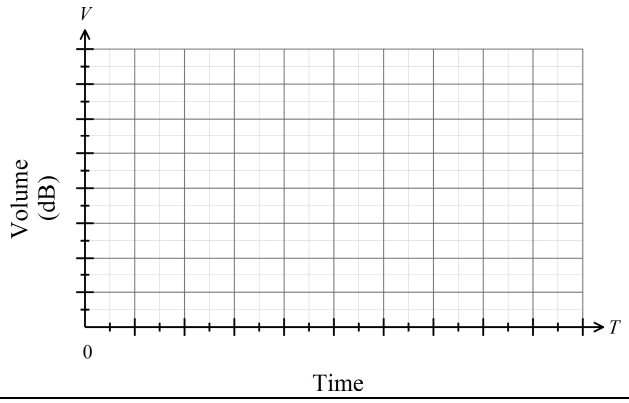


4. At a concert The Band plays a song which starts quietly and increases to a maximum volume where it remains for a few minutes and then gradually decreases until it ends.

Represent this on the graph provided.



5. The graph shows the depth of water in a tank over a period of 10 hours. Describe when water is poured into the tank and when it is drained from the tank.

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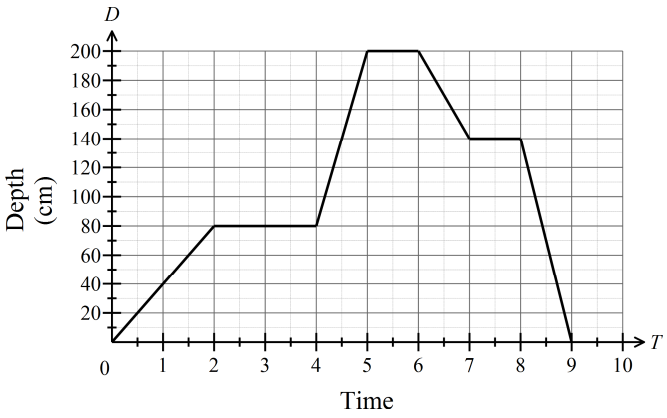
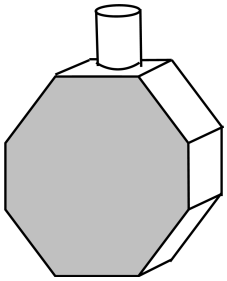
……

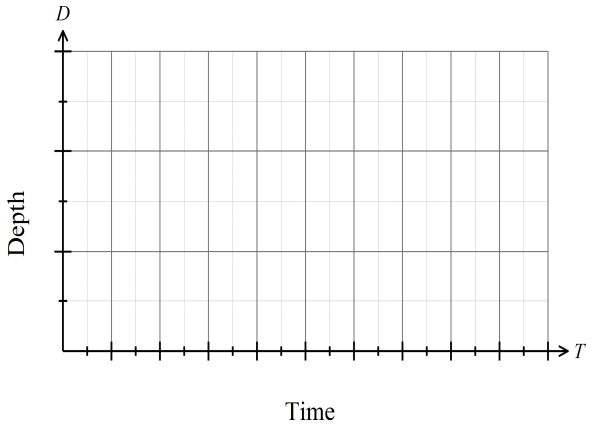
……

……



6. Water is poured at a constant rate into the bottle shown.
Draw the graph which shows how the depth of water increases as the water is poured.





7. The number of people in an audience (N people) is directly proportional to the number of rows of seats which are filled (r). Each row holds 50 people. Write an equation that links N and r.

……

……

8. The volume of water (V m^3) in a cylindrical tank is directly proportional to the depth of the water (d m). The volume of water was 2 400 m^3 when the depth was 1.5 m. Write an equation linking V and d.

……

……

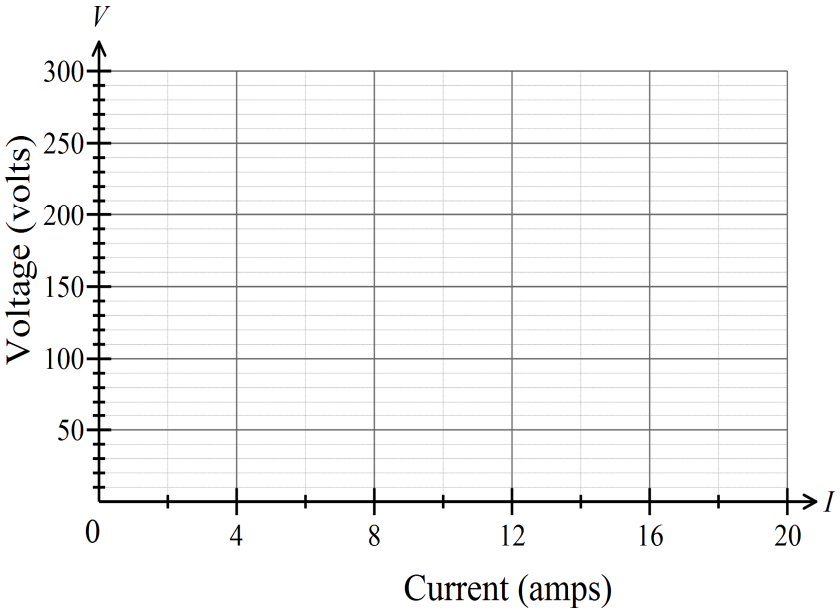
9. The number of bricks (n) needed for a particular wall is directly proportional to the height (h cm) of the wall. A wall which is 200 cm high requires 800 bricks. How many bricks are needed for a wall that is 150 cm high?

……

……

10. The voltage in a given circuit (V volts) is directly proportional to the amount of current (C amps) that is flowing in the circuit. A voltage of 250 volts occurs with a current of 16 amps.

Represent this relationship on the graph.



High School Mathematics Test 2013

Proportion

Year 9

Calculator Allowed Section

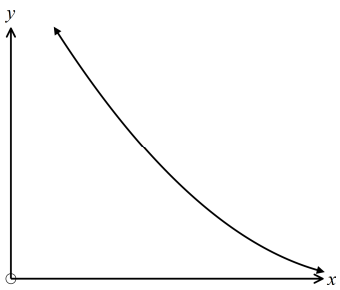
Name_____

Section 2 Multiple Choice Section

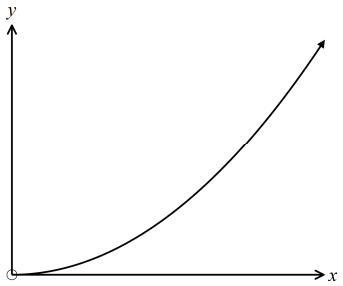
Mark all your answers on the accompanying multiple choice answer sheet, not on this test paper. You may do any working out on this test paper. Calculators are allowed for this section.

1. In which of these graphs is x directly proportional to y at a constant rate?

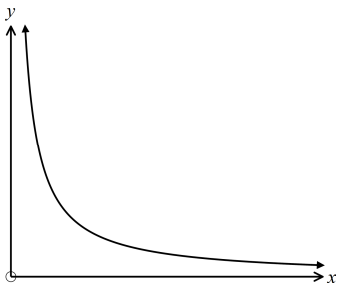
A.



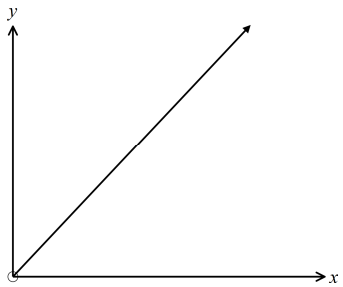
B.



C.



D.



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2. Here are two examples of relationships between two quantities.

   1. The cost of a piece of timber increases as the length of the timber increases.
   2. The time taken for a journey decreases as the speed of the car increases.

   Which is true?

   A. Both are examples of direct proportion.

   B. Example 1 only is an example of direct proportion.

   C. Example 2 only is an example of direct proportion.

   D. Neither is an example of direct proportion.

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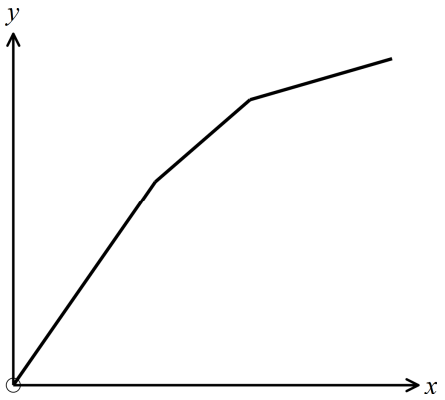
3. Which is the best description of what happens to y as x increases at a constant rate?



A. y increases at a constant rate.

B. y decreases at an increasing rate.

C. y increases at a decreasing rate.

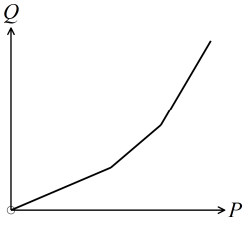
E. y increases at an increasing rate.

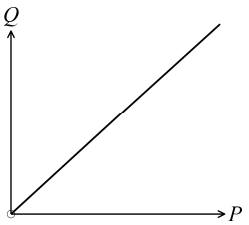
4. "The time taken to play a song on an MP3 player is directly proportional to the size of the file."

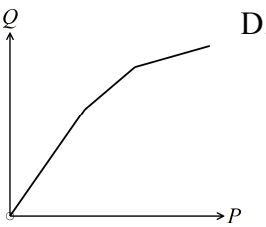
Using : T for the time to play the song.
S for the size of the file.
C for a constant.
Which equation could describe the relationship?

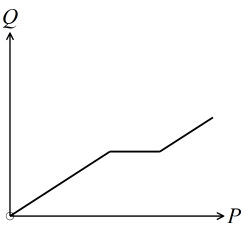
A. $T = C + S$ B. $T = \frac{C}{S}$ C. $T = C - S$ D. $T = CS$

5. Which graph shows that as P increases at a constant rate, Q is increasing at an increasing rate?

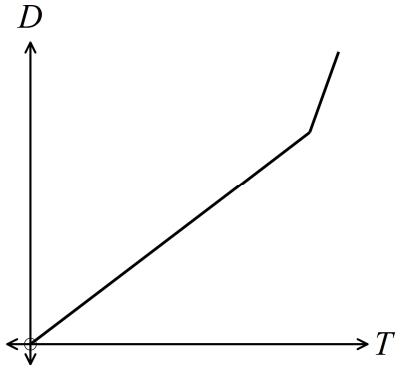
A. 

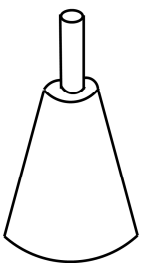
B. 

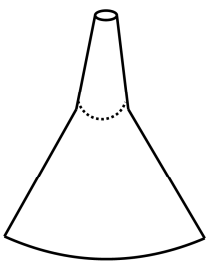
C. 

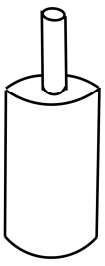
D. 

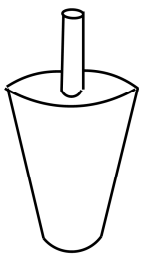
6. Water is poured at a constant rate into the bottles below. The depth of water is graphed against time. Which bottle might have been filled to produce this graph?



A. 

B. 

C. 

D. 

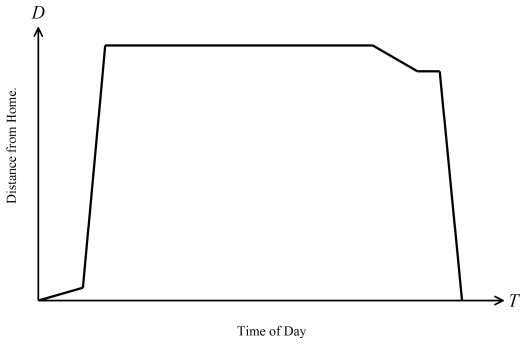
7. As the speed of a certain vehicle increases at a constant rate, the fuel consumption also increases at a constant rate. At a speed of 20 km/h the fuel consumption is 0.5 L/minute. Which equation describes this relationship?

A. $S = 10F$ B. $S = 40F$ C. $S = 50F$ D. $S = 80F$

8. The area of glass (A m^2) in a modular building is directly proportional to the number of window panels (N) that have been installed. A building with 12 window panels has an area of 30m^2. What area does a building with 21 window panels have?

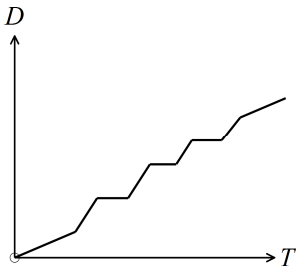
A. 2.5 m^2 B. 32.5 m^2 C. 36.0 m^2 D. 52.5 m^2

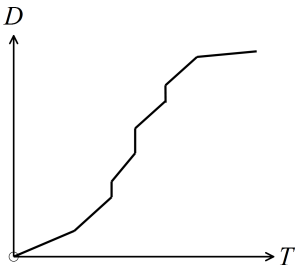
9. A distance/time graph is shown, representing Otto's journey from home to school and back again.
Which of these statements is not true?

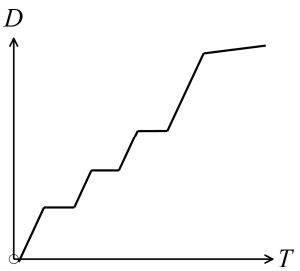


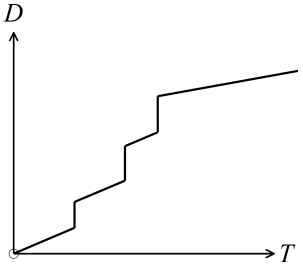
A. Otto walked from home to the bus stop.
B. He arrived just in time to catch the bus.
C. He got a lift straight after school to get home.
D. The lift took him all the way to his home.

10. Brian travels from home to the train station by cycle, then catches a train which stops at three stations before he gets off at the fourth station and walks to work. Which graph shows Brian's journey to work?

A.


B.


C.


D.


High School Mathematics Test 2013

Year 9

Proportion

Calculator Allowed Section

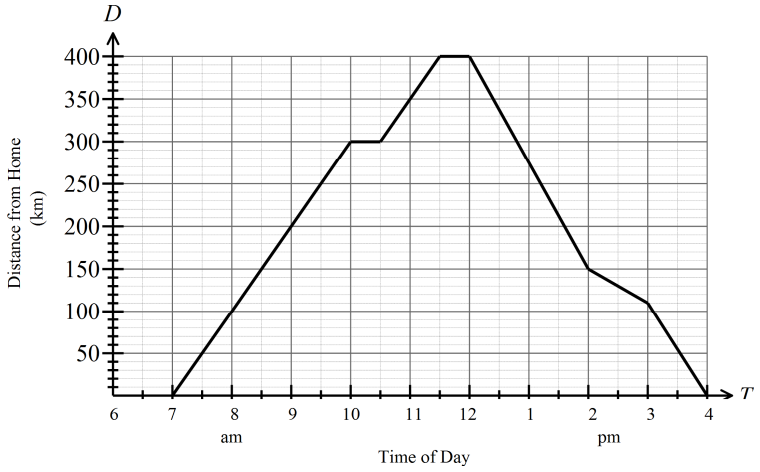
Name_____

Section 3 Longer Answer Section

Write all working and answers in the spaces provided on this test paper.

Marks

1. The graph below shows a trip by Gerald, a businessman who travelled to a meeting in Broome and returned on the same day



a) At what time did Gerald leave home? **1**

……

b) At what times was he stationary? **2**

……

c) At one stage he came upon a heavy storm and had to drive slowly. When did this occur? **1**

……

d) At what speeds did he travel on his return journey, and for how long did he travel at each speed? **3**

……

……

High School
Mathematics Test 2013

Multiple Choice Answer Sheet

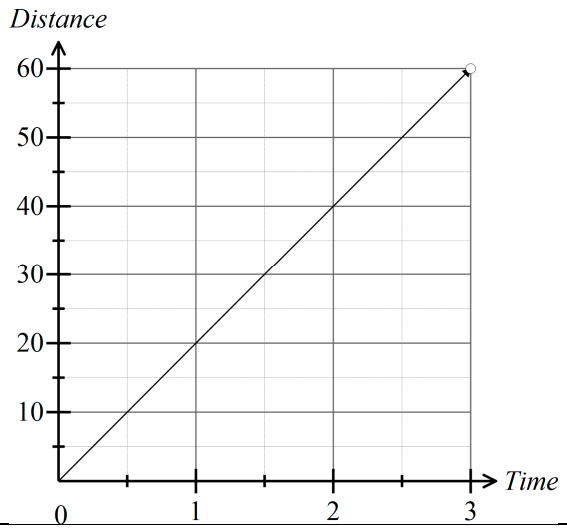
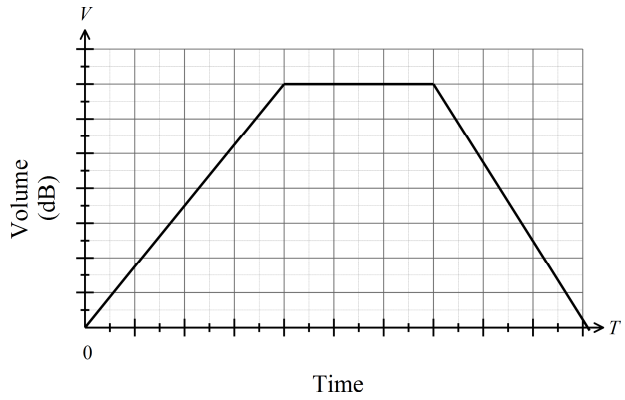
Name _____

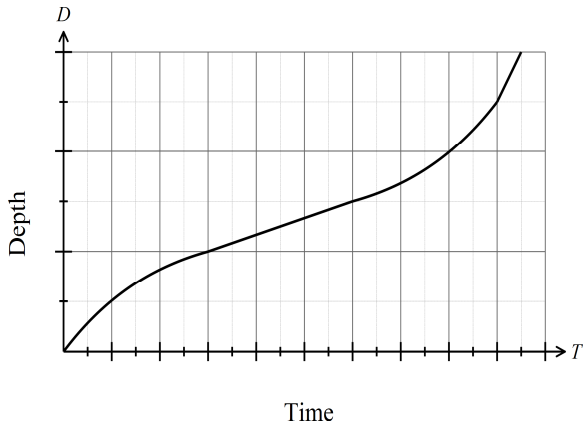
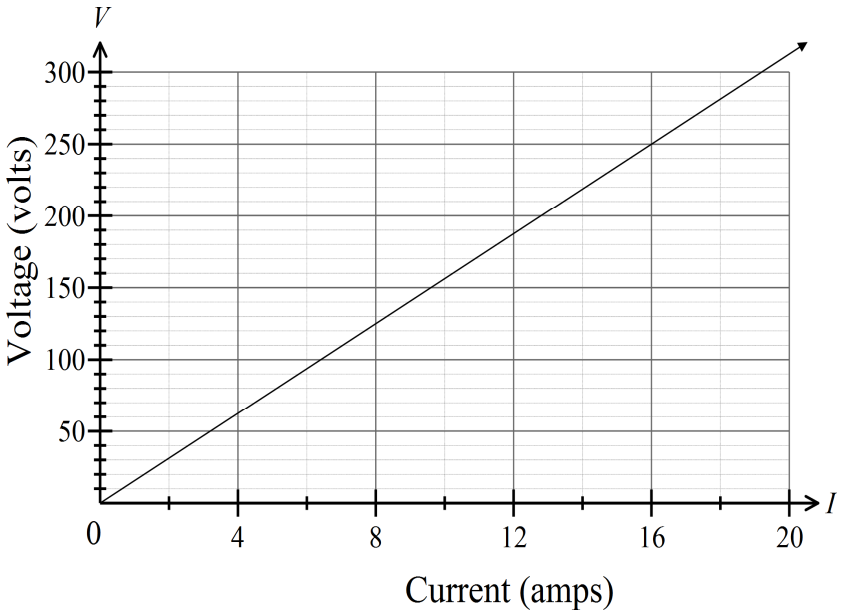
Completely fill the response oval representing the most correct answer.

1.	A ⬭	B ⬭	C ⬭	D ⬭
2.	A ⬭	B ⬭	C ⬭	D ⬭
3.	A ⬭	B ⬭	C ⬭	D ⬭
4.	A ⬭	B ⬭	C ⬭	D ⬭
5.	A ⬭	B ⬭	C ⬭	D ⬭
6.	A ⬭	B ⬭	C ⬭	D ⬭
7.	A ⬭	B ⬭	C ⬭	D ⬭
8.	A ⬭	B ⬭	C ⬭	D ⬭
9.	A ⬭	B ⬭	C ⬭	D ⬭
10.	A ⬭	B ⬭	C ⬭	D ⬭

High School
Mathematics Test 2013
Proportion

ANSWERS

Section 1	
1.	
2.	9 am till 11 am
3.	Section *D* as it has the steepest slope.
4.	
5.	Initially water is poured into the tank for 2 hours, it stops for 2 hours, then resumes at a faster rate until full. It stays at full for an hour and then drains for an hour, stops for an hour and drains again at a faster rate until empty.

6.	
7.	$N = 50r$
8.	$V = kd$ $2400 = 1.5k$ $k = \frac{2400}{1.5}$ $= 1600$ $V = 1600d$
9.	$n = kh$ $800 = 200k$ $k = \frac{800}{200} = 4$ $n = 4h$ $h = 150$ $n = 4 \times 150$ $n = 600$ 600 bricks are needed.
10.	

Section 2	
1.	D
2.	B
3.	C
4.	D
5.	A
6.	C
7.	B
8.	D
9.	C
10.	A

Section 3	
1.	a) 7:00 am
	b) 10:00 to 10:30 and 11:30 to12:00
	c) Between 2:00pm and 3:00 pm
	d) He travelled at 125km/h for 2 hours, till he hit a storm and slowed to 40 km/h for an hour, and then continued at 110km/h for another hour till he got home.

High School
Mathematics Test 2013

Multiple Choice Answer Sheet

Name Marking Sheet

Completely fill the response oval representing the most correct answer.

1.	A ○	B ○	C ○	D ●
2.	A ○	B ●	C ○	D ○
3.	A ○	B ○	C ●	D ○
4.	A ○	B ○	C ○	D ●
5.	A ●	B ○	C ○	D ○
6.	A ○	B ○	C ●	D ○
7.	A ○	B ●	C ○	D ○
8.	A ○	B ○	C ○	D ●
9.	A ○	B ○	C ●	D ○
10.	A ●	B ○	C ○	D ○