Name: _____ **Candidate Number:** _____

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ENTRANCE EXAMINATION 2009
PART 2 ARITHMETIC EXAMINATION

Time available: 60 minutes

Write your name and candidate number in the spaces provided at the top of the page.

Try to answer all the questions in the order that they appear.

Write your working and your answer in the space provided after each question. If you cannot answer a question, go on to the next.

If you run out of space for an answer, use the space provided after Question 12.

All your working must be shown because it may be worth some marks. Scrap paper must therefore not be used.

Take care to leave yourself enough time to answer all the questions. Use any time you have left to make the best attempt you can at any questions you have not done.

Calculators may not be used.

1. Alison went to the supermarket to do a quick shop. She bought these items.

   4 cakes, which cost 58 p each.

   600 gram of cheese, which costs £5.35 per kg.

   A joint of beef, which should have cost £8.60 but which was labelled '25% off'.

   Fill in Alison's shopping bill:

	£	p
Cakes		
Cheese		
Beef		
Total		

5 Marks

2. The mean (average) of a set of numbers is the total of the numbers divided by the number of numbers.

   For example, the mean of 5, 6 and 10 is 7 because $\frac{5 + 6 + 10}{3} = \frac{21}{3} = 7$

   Find the mean of each of these sets of numbers.

   (a) 5, 6, 9, 12.

   _____

   _____

   (b) 2, 2, 7, 19, 22.

   _____

   _____

   (c) Five 4's, six 5's and nine 10's.

   _____

   _____

   _____

5 Marks

3. A teacher wrote these statements on the board.

$$1^2 = 1 = \frac{1}{6} \times 1 \times 2 \times 3$$

$$1^2 + 2^2 = 5 = \frac{1}{6} \times 2 \times 3 \times 5$$

$$1^2 + 2^2 + 3^2 = 14 = \frac{1}{6} \times 3 \times 4 \times 7$$

(a) He then asked John to write out the next line of this pattern.
Write down the line that John needs to write.

_____

(b) The teacher then said that we could carry on this sequence for many more lines.
Further on down the sequence there will be a line beginning,

$1^2 + 2^2 + 3^2 + 4^2 + \ldots + 15^2 =$

He asked Robert to complete that line.
Write down the reminder of this line that Robert needs to write.

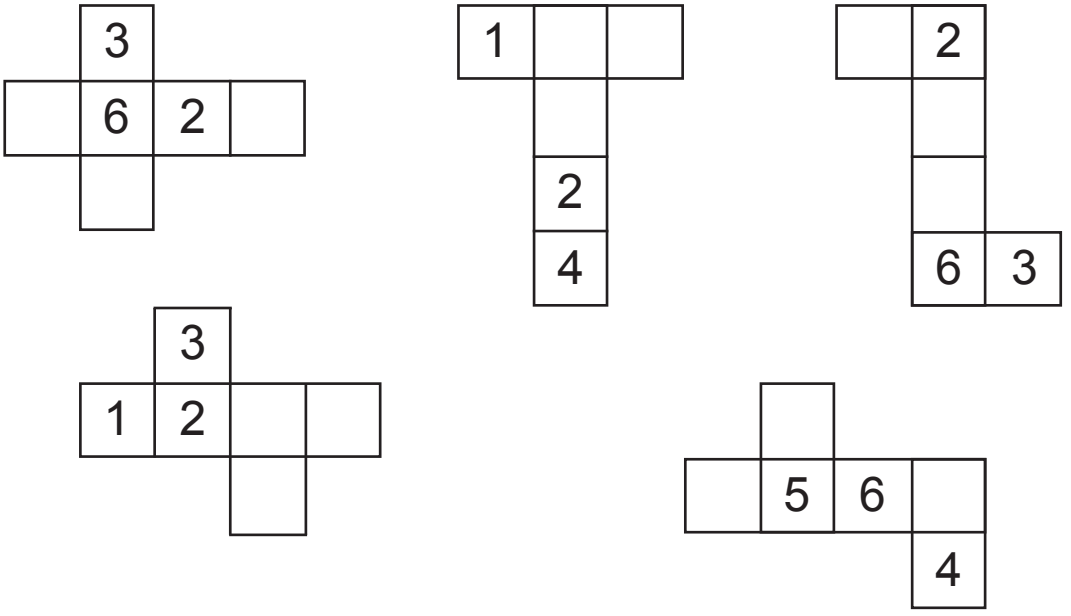
_____

5 Marks

4. On a normal dice, each pair of opposite faces always adds up to 7. For example 5 is on the opposite face to 2, and so on.

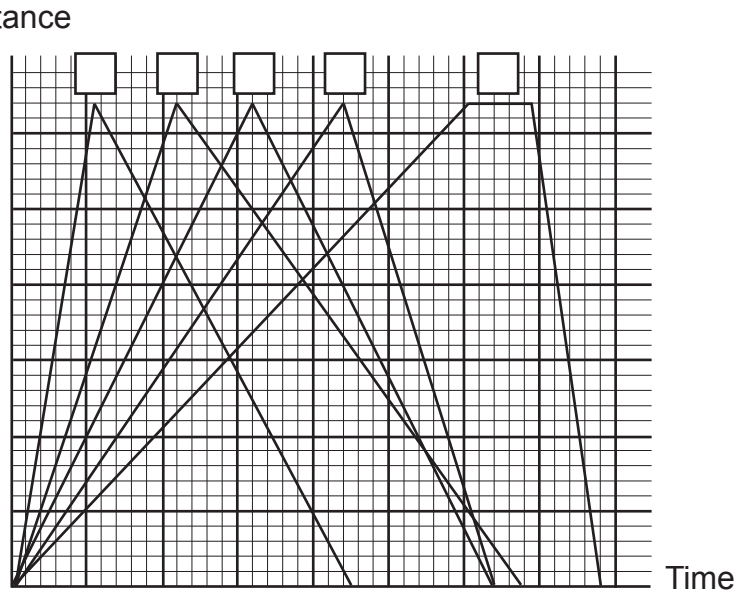
Here are some nets which can be folded up into normal dice.

Fill in the missing numbers on the faces.



5 Marks

5. The graph shows the distance from the start of a two length swimming race of five swimmers.



Alex swam at exactly the same speed throughout.

Betty led throughout.

Carl came equal second.

Dario had to rest at the turn.

Enya dropped two places from the turn to the finish.

Write the letters A, B, C, D and E in the boxes above the graphs to show which swimmer each graph illustrates.

5 Marks

6. Five teams took part in a recent hockey tournament at school. The results were published on a board for the players to see. The five teams each scored a different number of points. Sadly it was raining and some of the results were washed away.

Fill in the missing numbers in the table. Points were earned for winning and for drawing but no points were earned if a team lost.

	No. of Games Played	No. of Games Won	No. of Games Drawn	No. of Games Lost	No. of Goals Scored	No. of Goals Against	Total Points
A	4	4	0	0	10	3	12
B	4	3	0	1	11	5	
C	4	1	1	2		7	4
D	4				7	13	
E	4				5	16	

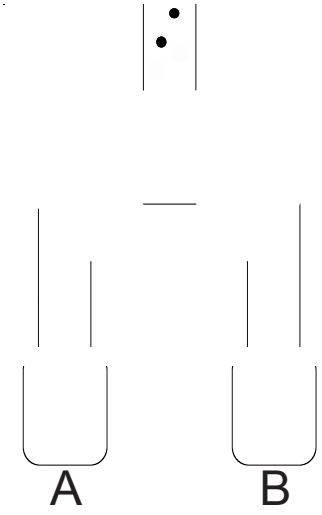
5 Marks

7. In a game, balls are dropped into a feeder which leads to tubes.
The balls can each go down any tube.

For example:

If 2 balls are dropped into a 2-tube, there are 3 possible outcomes. These are:

2 in A, 0 in B;
1 in A, 1 in B;
0 in A, 2 in B.



We write this as:

A	B
2	0
1	1
0	2

(a) Complete the table below for 2 balls in a 3-tube.

A	B	C

(b) Complete the table below for 3 balls in a 3 tube.
You may not need to use all of the rows.

A	B	C

5 Marks

8. Rachel, Steven and Tim run a race.

Rachel runs 200 metres.
Steven starts of 20 metres behind Rachel, and Tim starts even further back.

They start running at the same time and all three cross the finishing line together.

(a) Rachel runs at a speed of 8 metres per second. How many seconds does she take to run her 200 metres?

_____

_____

_____

(b) How fast does Steven run?

_____

_____

_____

(c) Tim runs at a speed of 9·4 metres per second. How far behind Steven did Tim start?

_____

_____

_____

5 Marks

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9. The **rem** of two numbers is the remainder obtained when the product of the two numbers is divided by 11.

For example, 7 rem 6 = 9 because $7 \times 6 = 42$, and when 42 is divided by 11 there is a remainder of 9.

(a) Work out 9 rem 8.

(b) If 6 rem 3 = 7, what is 3 rem 6?

(c) If 4 rem x = 3, what is the value of x?

(d) Complete this table to show all the remainders.

	1	2	3	4	5	6	7	8	9	10
1										
2										
3							10			
4										
5										
6							9			
7						9				
8										
9										
10										

(e) What is 5 rem 6 rem 7?

10 Marks

10. In this question, you have to write down the ten digits 0, 1, 2, 3, 4, 5, 6, 7, 8, 9 in an order so that all these rules apply.

    1. The number formed by the first five digits is a multiple of 5.
    2. The three digit number formed by the 7th, 8th and 9th digits is a multiple of 4.
    3. The number formed by the last two digits is a prime number.
    4. The 4th, 5th and 6th digits are consecutive digits, **decreasing** in size.
    5. The first two digits form a number which is a multiple of 14.
    6. The 7th and 8th digits form a 2-digit square number.
    7. The 3rd and 4th digits form a number which is a factor of 144.
    8. The four digit number formed by the 3rd, 4th, 5th and 6th digits is a multiple of 3.

    _____

    _____

    _____

    _____

    _____

    _____

    _____

    _____

    _____

    _____

    Answer

10 Marks

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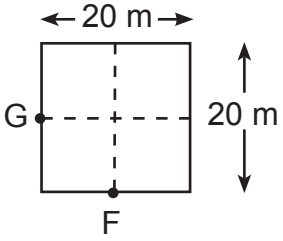
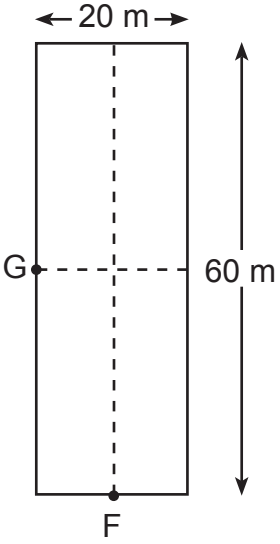
11. Fred and George love running. Just for fun they run at the same speed backwards and forwards across a rectangular playground until they collide. Fred runs North and South and George runs East and West.

Write down how far each boy runs starting from F and G in each case.



Distance is _____ m



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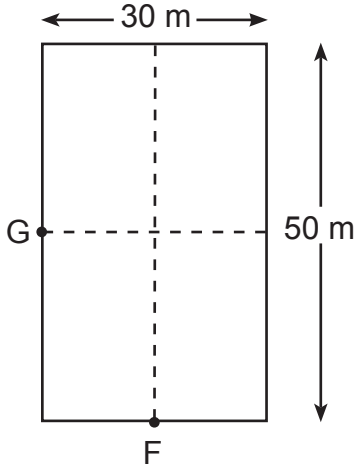

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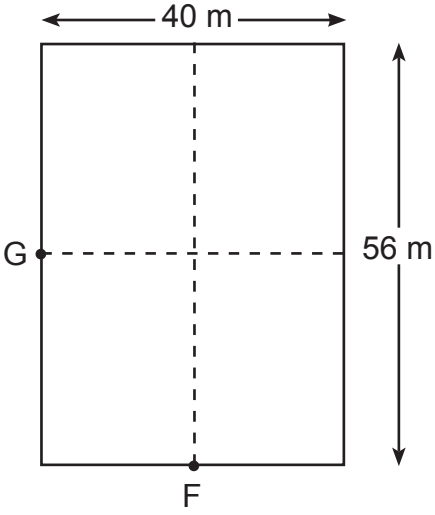
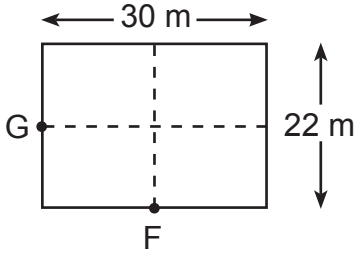


Distance is _____ m



Distance is _____ m

10 Marks

12. In Answrit, a quiz game for all the family, the quizmaster decides three things before each round of questions are given to a competitor:

    1. the number of questions;
    2. how many points are scored for each correct answer;
    3. how many points are deducted for each wrong answer.

    A competitor scores zero for a ‘pass’, i.e. a question he does not answer.

    Rodger is the quizmaster, and there are five competitors.

    Round 1.

    Andrew is the competitor.

    Rodger sets 20 questions, with 2 points for a correct answer and 1 taken off for a wrong answer.

    Andrew passes on 2 questions and gets 12 correct.

    How many points does he score?

    _____

    _____

    Round 2.

    Geraint is the competitor.

    Rodger sets 15 questions, with 4 points for a correct answer and 2 taken off for a wrong answer.

    Geraint scores 24 points and has 8 correct answers.

    How many questions did he pass on?

    _____

    _____

    Round 3.

    Irfan is the competitor.

    Irfan gets 20 correct answers, passes on 4 and scores 59 points. Rodger set 3 points for a correct answer and deducted 1 for a wrong answer.

    How many questions were set?

    _____

    _____

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Round 4.

Nigel is the competitor.

Nigel scores 204 points from 18 correct answers and 8 passes out of 30 questions.

Rodger set the points for a correct answer at four times the points taken off for a wrong answer.

How many points was each correct answer worth?

_____

_____

Round 5.

David is the competitor.

Rodger sets 50 questions. He gives a positive whole number of points for a correct answer and he take off 3 points for a wrong answer.

David answers more correct than wrong and has no passes. He scores zero points overall.

How many questions did he get wrong?

_____

_____

10 Marks

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