



YEAR 7

ENTRANCE EXAMINATION

Friday 11th January 2008

MATHEMATICS

Time: 1 hour 15 minutes

Name: _____

Instructions:

Only use a pencil and a rubber

Work through the paper carefully without rushing.

Do your work clearly in the space near each question.

Do not rub out your working: you may get marks for it.

If you cannot answer a question go on to the next one.

No calculators or rulers allowed.

	Marker	Checker	
Section A			34
Section B			36
Section C			30
	Total		100

1.
$$\begin{array}{r} 5784 \\ + 419 \\ \hline 6203 \end{array}$$

2.
$$\begin{array}{r} 2605 \\ - 832 \\ \hline 1773 \end{array}$$

3.
$$\begin{array}{r} 927 \\ \times 7 \\ \hline 6489 \end{array}$$

4.
$$\begin{array}{r} 3706 \\ 8 \overline{)29648} \end{array}$$

5. Write down the number which is 5 less than eight thousand and three.

7998



6. Fill in the missing numbers to make the sum correct.

$$\begin{array}{r}
 \\
 \\
 \\
 + \\
 \hline

 \end{array}$$

7. A chocolate bar costs 36p. How many can Nikita buy for £3.00?

$$\frac{300}{36} = \frac{150}{18} = \frac{75}{9} = 8.3 \quad \underline{8}$$

8. There are 24 children in Alfie's class. Five eighths of the class have school lunch. How many children have school lunch?

$$\frac{5}{8} \times 24 = 15$$

15

9. Fill in the missing numbers in each of these number patterns:

- a) 2 8 14 20 26 32 38
- b) 1 3 9 27 81 243
- c) 8 6½ 5 3½ 2 ½

10. What fraction of the parallelogram below is shaded?

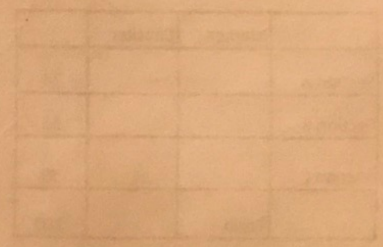


$$\frac{8}{24}$$

$$\frac{1}{3}$$

11. Write down the number between 41 and 51 which is divisible by both 3 and 4.

48



48



12. Jenny pays £156 for six nights Bed and Breakfast accommodation. How much would it cost her to stay there for 8 nights?

$$\frac{156}{6} = 26 \text{ for 1 night}$$

£ 208

13. a) Dita watched television from 5:35pm until 7:10pm. How long did she spend watching television?

1 hr 35 mins

b) Dita watches the television for 2 hours 45 minutes each weekend. How much time does she spend watching television over three weekends?

$$\begin{array}{r} 105 \\ \times 3 \\ \hline 495 \end{array}$$

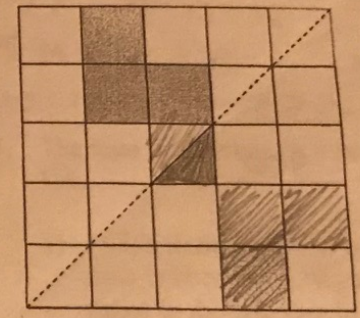
495 mins

14. Arrange these numbers in order, starting with the smallest.

0.75 0.8 0.65 $\frac{5}{12} = 12 \overline{)5.00} = 0.41\bar{6}$
 0.7 $\frac{3}{4}$ $\frac{4}{5}$ 0.65 five twelfths

$\frac{5}{12}$ 0.65 0.7 $\frac{3}{4}$ $\frac{4}{5}$

15. Shade the diagram so that the dotted line is line of symmetry.

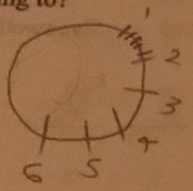


16. Jamie got seven questions wrong in a test out of 25 questions. What percentage of the questions did he get wrong?

$$\frac{7}{25} \times \frac{100}{1} = 28\%$$

28%

17. The second hand of a clock points to the number 2. After one minute and twenty seconds what number will it be pointing to?

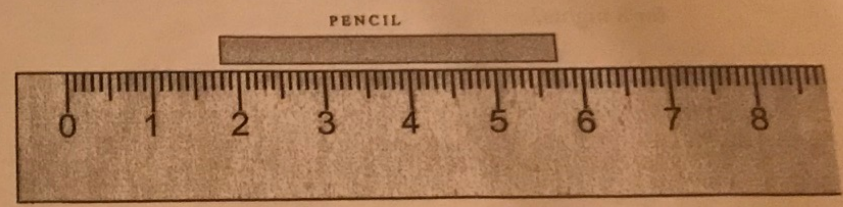


6

18. Charlotte buys 500g of cheese which costs £5.30 per kilogram, six bananas at 15p each and two chocolate bars at 56p each. How much change will she have from a ten pound note?

cheese	<u>2.65</u>		
bananas	<u>0.90</u>		
chocolate bars	<u>1.12</u>		
change	<u>5.33</u>		

19. Hui Ling measures her pencil before she sharpens it.

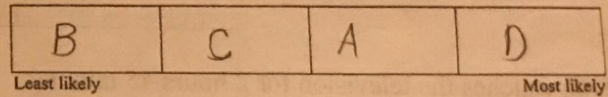


What is the length of the pencil?

3.9 cm

20. Arrange the letters for each of these events in order, starting with the least likely:

- A Rolling a dice and getting a three $\frac{1}{6} = .1\bar{6}$
- B Rolling two dice and getting a total of 15 0
- C The next person who walks in the door was born on a Wednesday $\frac{1}{7} = .1\bar{4}$
- D The last digit of a telephone number is NOT a 9 $\frac{9}{10} = \frac{1}{5} = 0.2$



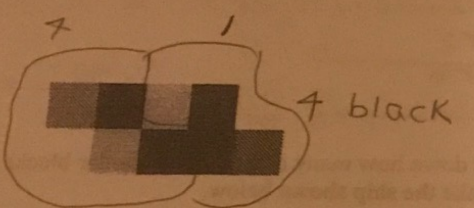
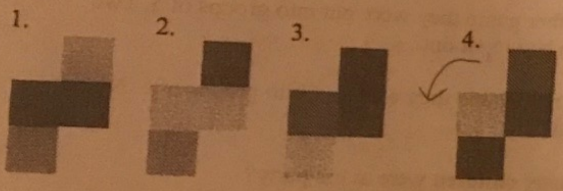
21. Maria telephoned Priya on her mobile. The rate for the first three minutes was 7p per minute. After that the telephone call cost 5p per minute. The telephone call lasted 21 minutes. How much did it cost?

$$3(.07) + 18(.05) = 1.11$$

1.11



22. Which two shapes can be fitted together to make the larger shape?



1, 4

23. $15 \times 34 = 510$

Use this information to work out:

- a. 150×340 51000
- b. 15×17 255
- c. $510 \div 17$ ~~10000~~ 30

24. Clara has four brothers.
 Sam's age added to Ben's age gives 12.
 The total of Frederick's and Sam's and Ben's ages is 28.
 Mylo's age added to Sam's age gives 20.
 The total of all the brothers' ages is 39.

spot the differences from each equation

Work out the ages of Clara's brothers.

- ① $S + B = 12$
 - ② $F + S + B = 28$
 - ③ $M + S = 20$
 - ④ $S + B + M + F = 39$
- Sam 9
 Ben 3
 Frederick 16
 Mylo 11

25. The time in Australia is 9 hours ahead of our time in the UK.

a) I wish to ring a friend in Australia so that for them the time is between 6.30 pm and 8.30 pm. Between what times in the UK should I ring them?

9:30 AM, 11:30 AM

The time in the USA is 5 hours behind UK time.

b) What time is it in Australia when it is 4 am in the USA?

4 am
 + 5 hrs = 9 am
 + 9 hrs = 6 PM

6 PM

26. 8 3 5 4 9

Using all these digits once only make

a) the largest number 9 8 5 4 3

means last 2 digits divisible by 4

b) the largest number divisible by 4 9 5 3 8 7

the smallest even number ~~3 5 8 9 4~~

3 4 5 9 8

19, 36

27. Zac had a 24 hour digital clock. 2am is shown as 02:00 and 8.35pm is shown as 20:35. The numbers glow in the dark. The numbers are displayed as shown.

0 1 2 3 4 5 6 7 8 9

What is the time when the glow from the clock is least?

What is the time when the glow from the clock is greatest?

least glow 1:11

greatest glow 23:58
08:08

28. At a party all the children were put into groups of 4 to play a game. Two children had to sit out.

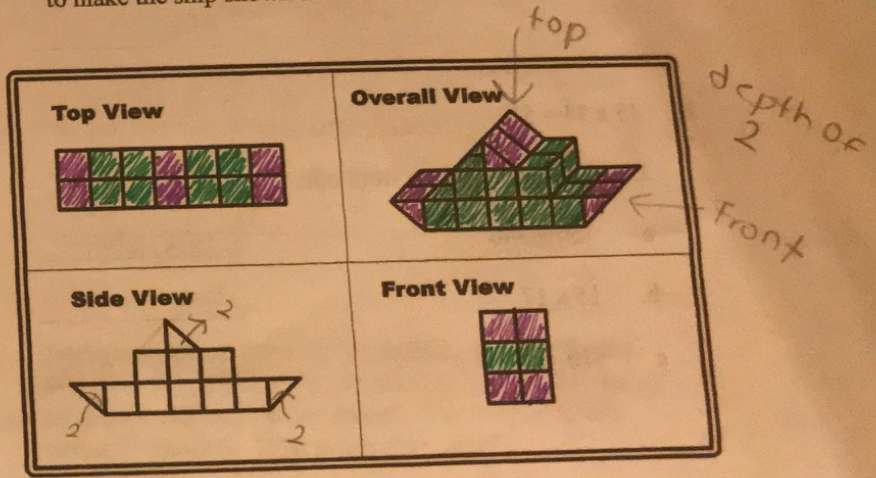
For another game they were put into groups of 5. Two children had to sit out.

For the next game they were put into groups of 6. No one had to sit out.

How many children were at the party?

$\div 4 \Rightarrow r2$ 6, 12, 18, 24, 30, 36, 42, 48
 $\div 5 \Rightarrow r2$
 $\div 6 \Rightarrow r0$ 42
ignore multiples of 4

29. Write down how many cubes and triangular blocks are used to make the ship shown below.



triangles looks square

Cubes: 16

Triangular blocks: 6

Side elevation
Front elevation
top = plan

30. A, B and C represent different digits.

$$\begin{array}{|c|c|} \hline A & B \\ \hline \end{array} + \begin{array}{|c|} \hline C \\ \hline \end{array} = 50$$

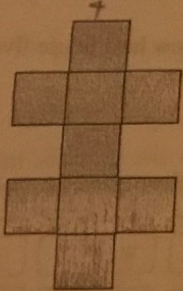
$$\begin{array}{|c|c|} \hline B & C \\ \hline \end{array} + \begin{array}{|c|} \hline A \\ \hline \end{array} = 41$$

What are the values of A, B and C?

$$\begin{array}{r} 43+7 \\ 37+4 \end{array}$$

A 4
B 3
C 7

31. This shape is made from 9 identical squares.



The area of the shape is 144cm^2 .
What is the perimeter of the shape?

$$9x^2 = 144$$

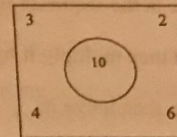
$$x^2 = 16$$

$$x = 4$$

80

$$20(4) = 80$$

32. Look carefully at this example to see how the 4 numbers in the corners of the square are used to make the number in the middle.



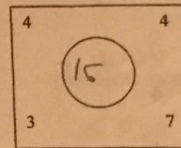
$$3 \times 6 - 4 \times 2$$

$$= 18 - 8$$

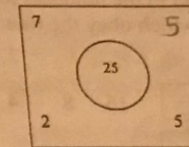
$$= 10$$

So 10 goes in the middle

(a) Find the missing numbers in each of the following.

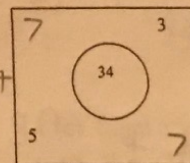


$$28 - 12 = 16$$



$$35 - 2x = 25 \Rightarrow 2x = 10 \Rightarrow x = 5$$

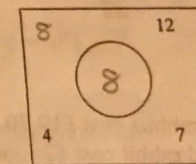
(b) In each of these squares the 2 missing numbers are the same. Fill in the missing numbers.



$$x^2 - 15 = 34$$

$$x^2 = 49$$

$$x = 7$$

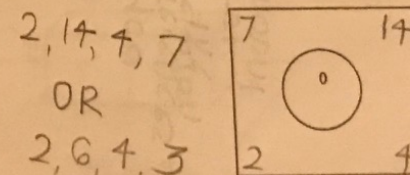


$$7x - 48 = x$$

$$6x = 48$$

$$x = 8$$

(c) None of the missing numbers in this square is the same. Fill in 4 numbers which would work.



2, 14, 4, 7
OR
2, 6, 4, 3
OR
3, 6, 2, 9

(Many options)

33. Here is a sequence of whole numbers
7 22 11 34 17

The rule for the next number in the sequence is:

- if the last number is odd then multiply it by 3 and add 1
- if the last number is even then halve it.

In the following sequence the first three numbers have been left out. Fill in the numbers to show three different possible sequences which obey the rule above.

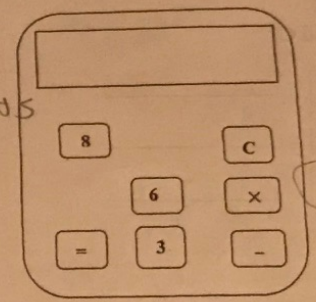
can't $-1, \div 3$ so double

20	10	5	16	8	4	2	1	4
	64	32	16	8	4	2	1	4
3	10	5	16	8	4	2	1	4

21 or 128

can't $-1, \div 3$

35. Sarah spilt juice all over her calculator. Now only the five buttons shown work, as well as the equals and clear buttons.



C is the clear button.
= is the equals button.

The other working buttons are:
3 6 8 x -
Buttons can be used as many times as you like.

Starting with the clear button, show how to use five more buttons to make the answer shown.

- a) C 8 X 6 - 3 = 45
- b) C 3 X 3 - 8 = 1
- * c) C 6 8 - 3 6 = 32

78 - 3
40 - 8
68
86 - 68
88 - 68

34. Three pet rabbits cost £19.70.
The second rabbit cost £2 more than the first.
The third rabbit cost 80p less than the second.
What is the cost of the first rabbit?

$$x + y + z = 19.70$$

$$y = x + 2$$

$$z = y - .80$$

tune into first amount
subtract the 80p
tells you

$$x + x + 2 + y - .80 = 19.70 \quad \text{£ } 5.50$$

$$x + x + 2 + x + 2 - .80 = 19.70$$

$$3x = 16.50$$

$$x = 5.50$$

take off first difference
OR: without algebra
Assume each rabbit cost same amount except 2nd costs £2 extra and 3rd costs £1.20 extra

$$2.00 + 1.20 = 3.20$$

$$19.70 - 3.20 = 16.50$$

$$\frac{16.50}{3} = 5.50$$

* In relation to the 1st always

similar to question
27 but can't do without algebra

33. Here is a sequence of whole numbers
7 22 11 34 17

The rule for the next number in the sequence is:

- if the last number is odd then multiply it by 3 and add 1
- if the last number is even then halve it.

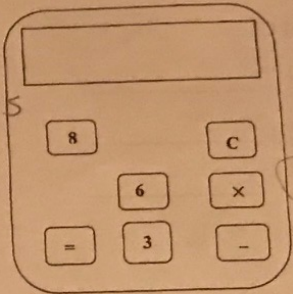
In the following sequence the first three numbers have been left out. Fill in the numbers to show three different possible sequences which obey the rule above.

Handwritten notes: *can't -1, ÷3 so double*

20	10	5	16	8	4	2	1	4
	64	32	16	8	4	2	1	4
3	10	5	16	8	4	2	1	4

Handwritten notes: *21 or 128*, *can't -1, ÷3*

35. Sarah spilt juice all over her calculator. Now only the five buttons shown work, as well as the equals and clear buttons.



C is the clear button.
= is the equals button.

The other working buttons are:
3 6 8 × -

Buttons can be used as many times as you like.

Starting with the clear button, show how to use five more buttons to make the answer shown.

*-1, ÷3 } to 90 backwards
x2*

take off first difference

OR: without algebra
Assume each rabbit cost same amount except 2nd costs 22 extra and 3rd costs £1.20 extra

$$2.00 + 1.20 = 3.20$$

$$19.70 - 3.20 = 16.50$$

$$\frac{16.50}{3} = 5.50$$

** In relation to the 1st always*

- a) $C \ 8 \times \ 6 \ - \ 3 = 45$
- b) $C \ 3 \ x \ 3 \ - \ 8 = 1$
- * c) $C \ 6 \ 8 \ - \ 3 \ 6 = 32$

48 - 3

40 - 8

68

86 - 68

88 - 68

34. Three pet rabbits cost £19.70.
The second rabbit cost £2 more than the first.
The third rabbit cost 80p less than the second.
What is the cost of the first rabbit?

$$x + y + z = 19.70$$

$$y = x + 2$$

$$z = y - .80$$

tells you first amount of first rabbit

$$x + x + 2 + y - .80 = 19.70$$

$$x + x + 2 + x + 2 - .80 = 19.70$$

$$3x = 16.50$$

$$x = 5.50$$

Similar to question 27 but without algebra

36. Zoe, Laura, Sam, Ali and Craig each gave one of the others a present. No one got two presents.
 Laura received a CD. Ali received a book. Craig gave a video. Ali gave a scarf, but not to Craig. Sam gave a puzzle and did not receive the scarf.

Fill in the spaces to show who received which present from whom.

Zoe received Scarf from Ali
 Laura received CD from Zoe
 Sam received Video from Craig
 Ali received Book from Laura
 Craig received Puzzle from Sam

received gave
 L = CD ① B ②
 A = BOOK ③ Scarf, not to C or S so Z ④
 C = PUZZLE ⑤ Video ⑥
 Z = K ⑦ CD ⑧
 S = only vid left ⑨
 (can't give puzzle to himself)

last to fill in can't give to themselves so from each other BOOK / CD

38. On ordinary dice the number of spots on opposite faces add up to 7.

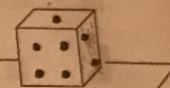
(a) How many spots are on the face opposite the one with 3 spots?



4

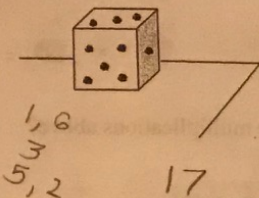
Rajni is playing with some dice. She places them on a table and adds up all the spots she can see.

For example in this case she can see 15 spots.



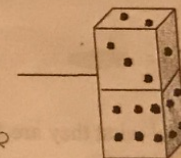
1, 2, 3 sum = 15

(b) How many spots can she see in the cases below?



1, 3, 5, 2

17

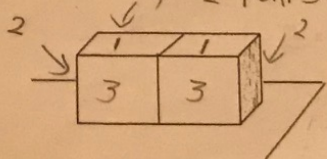


2 + 3 + 4 + 1 + 5 + 6 + 1 + 4 + 3 = 30

30

(c) Rajni tries arranging 2 dice on the table. What is the smallest number of spots she can see if she arranged them:

Missing 3 sides can only see 4 2 pairs (1 on 2 each)

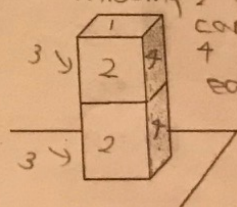


like this?

20

3 + 4 + 3 + 4 + 2 + 2 + 1 + 1

Missing 2 sides can only see 4 pairs (2 on each)



or like this?

29

2 + 5 + 2 + 5 + 3 + 4 + 3 + 4 + 1

37. In this number sequence two numbers next to each other are added together to give the following number.

5 3 8 11 19

Find the missing numbers in the sequence.

add to make 19
 9, 10 but 3 + 9 ≠ 10
 8, 11 ✓

Hide sixes and fives for non pairs

39. The different shapes stand for eleven of the numbers from 0 to 12.

Each shape is a different number.

$\blacksquare \times \blacksquare \times \blacksquare = \text{D}$ (2)	$\blacksquare \times \blacksquare = \star$ (7)
$\blacksquare \times \text{Oval} = \text{D}$ (3)	$\blacksquare \times + = \text{Hexagon}$ (9)
$\blacksquare \times \text{Oval} = \bullet$ (5)	$\blacksquare \times \diamond = \blacksquare$ (3)
$\blacksquare \times \blacksquare = \triangle$ (6)	$\diamond \times \text{Hexagon} = \text{Hexagon}$ (1) (identity)
$\triangle \times \blacksquare = \bullet$ (12)	$\blacksquare \times \nabla = \nabla$ (0)
$\blacksquare \times \blacksquare = \text{Oval}$ (7)	$\nabla \times \text{D} = \nabla$ (0)

only cube numbers ≤ 12 are 1, 8
1 already taken

○ means order I found them

only square numbers ≤ 12 are 1, 4, 9 but 1, 4 already taken

only have 5, 7, 10, 11 left so $2 \times 5 = 10$

Note: after looking at 2 lines above, we know this is 0 since it could have also been 1

Can you work out what they are from the multiplications above?

- $\text{Hexagon} = 10$
- $\blacksquare = 2$
- $\star = 9$
- $\blacksquare = 3$
- $\nabla = 0$
- $\text{D} = 8$
- $\triangle = 6$
- $\text{Oval} = 7$
- $\diamond = 1$
- $\bullet = 12$
- $+ = 5$