SEVENOAKS SCHOOL

YEAR 7 (11+) ENTRANCE EXAMINATION
January 2019
for entry in September 2019

MATHEMATICS

Name: _____

School: _____.

Time allowed: 1 hour

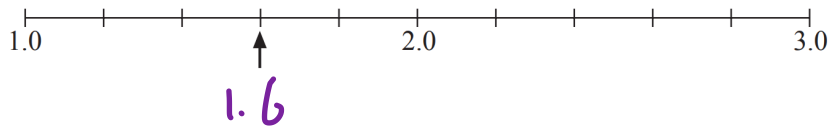
Equipment needed: Pen, pencil, eraser, ruler.

Information for candidates:

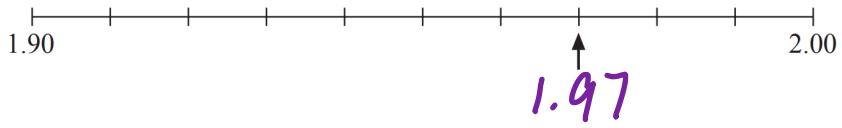
1. Calculators are NOT allowed.
2. Write your name and school on this sheet.
3. Write your answers on the question paper in the space provided.
4. There are 20 questions in this paper, try to answer all of them, but don't worry if you don't complete the paper. If you get stuck, just go on to the next question and if you have time at the end come back to the one(s) you left.
5. There are 58 marks in total available for this paper. Marks for each question are shown in square brackets [ ] after the question.
6. Show all your working. You may be awarded marks for correct working even if your final answer is incorrect, and a correct answer unsupported by correct working may not receive full marks.

1. Label each arrow with the value indicated on the scale.

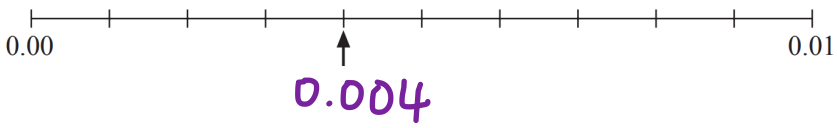
(a)



(b)



(c)



[3 marks]

2. Calculate:

(a) $8 + 5 \times 21$

113 [1 mark]

(b) $8 - 5 + 21$

24 [1 mark]

(c) $21 \div (5 - 8)$

-7 [1 mark]

(d) $(-8) + (-5)$

-13 [1 mark]

(e) $(-8)^2$

64 [1 mark]

3. Patrick spends £375.84 on his electricity bill each year.

(a) How much is his bill each month?

$375.84 \div 12 = £31.32$

£31.32 [2 marks]

(b) How much does his electricity bill cost him over five years?

$375.84 \times 5 = £1879.20$

£1879.20 [2 marks]

4. Calculate:

(a) $\frac{1}{4} \times \frac{1}{3}$

$\frac{1}{12}$ [1 mark]

(b) $\frac{1}{4} \div \frac{1}{3}$

$\frac{1}{4} \times \frac{3}{1}$

$\frac{3}{4}$ [1 mark]

(c) $3\frac{1}{4} + 4\frac{1}{3}$

$\frac{13}{4} + \frac{13}{3}$

$= \frac{39}{12} + \frac{52}{12}$

$= \frac{91}{12} = 7\frac{7}{12}$

$7\frac{7}{12}$ [2 marks]

5. Place the following numbers in **descending** order:

$\frac{4}{5}$ 0.8	0.6	$\frac{5}{6}$ 0.83	70% 0.7	$\frac{2}{3}$ 0.6
$\frac{5}{6}$	$\frac{4}{5}$	70%	$\frac{2}{3}$	0.6

[2 marks]

6. A swimming club has 480 members.
   $\frac{2}{5}$ of the members are women.
   $\frac{1}{3}$ of the members are men.
   The rest of the members are children.

   (a) What percentage of the members are women?

   $\frac{2}{5} = \frac{4}{10} = 0.4 = 40\%$

   40% [1 mark]

   (b) How many of the members are men?

   $\frac{1}{3} \times 480 = 160$

   160 [1 mark]

   (c) How many of the members are children?

   $480 - 192 - 160 = 128$

   128 [2 marks]

7. Write down the next two terms in each of the following sequences:

(a) 5, 11, 17, 23, ..29.., ..35..

(b) 52, 45, 38, 31, ..24.., ..17..

(c) 1, 2, 4, 8, ..16.., ..32..

(d) 3, 8, 15, 24, ..35.., ..48..

[4 marks]

8. In a fruit yoghurt weighing 117g, the ratio of weight of fruit to weight of yoghurt is 2:7. Calculate the weight of fruit.

2 : 7

117 ÷ (2+7) = 13

2 : 7

26 : 91

26 [2 marks]

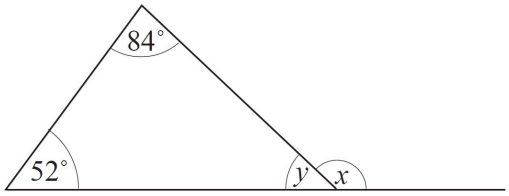
9. A bottle of blackcurrant cordial makes enough drink to fill 60 glasses when it is diluted in the ratio 1 part cordial to 4 parts water. How many glasses of drink would a bottle of cordial make if it is diluted in the ratio 1 part cordial to 5 parts water?

60 ÷ (1+4) = 12

12 × (1+5) = 72

72 [2 marks]

10. In the diagram below (not to scale), find the angles marked x and y.

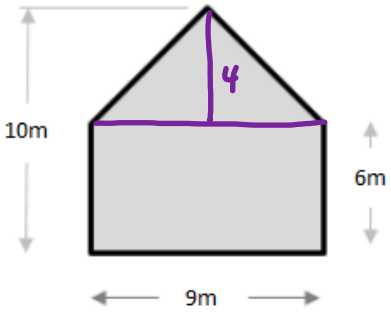


$y: 180-84-52=44°$

$x: 180-44=136°$

_____ [2 marks]

11. The diagram below (not to scale) shows the cross-section of Roger's house. Find the total area of the cross-section.



$10-6=4\,m$

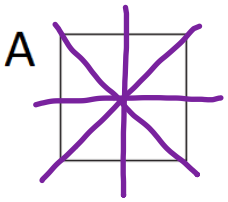
SA of $\triangle$: $4\times9\div2=18\,m^2$

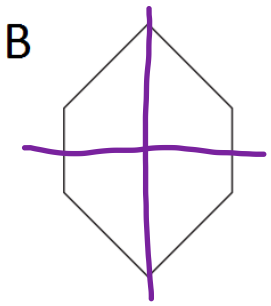
SA of $\square$: $6\times9=54\,m^2$

$18+54=72m^2$

$72m^2$ [2 marks]

12. (a) Draw all the lines of symmetry on each of these shapes.

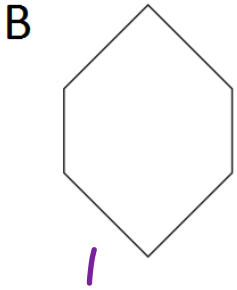




[2 marks]

(b) State the order of rotational symmetry of each of these shapes.

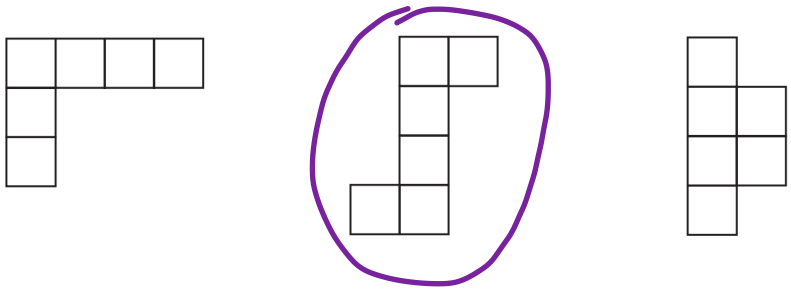
4



1

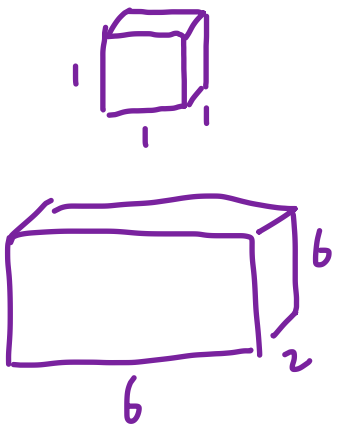
[2 marks]

13. Circle the net(s) below which can be folded to make a cube.



[2 marks]

14. Dini has 72 small wooden cubes, each measuring 1cm × 1cm × 1cm. She arranges them all so that they form a cuboid. Given that the perimeter of the base of the cuboid is 16cm, what is its height?



$16 \div 2 = 8$

6 2

So $6 \times 2 = 12$ cubes at base

$72 \div 6 \div 2 = 6$ cm

6 cm [2 marks]

15. How many minutes are there from 11:11 until 23:23 on the same day?

$$\begin{array}{r} 23:23 \\ -\ 11:11 \\ \hline 12:12 \end{array}$$

$\Rightarrow$ 12h & 12min

$12h = 12 \times 60$

$= 720$ min

$720 + 12 = 732$ min

732 min [2 marks]

16. The snowfall on Tuesday was 5cm less than on Monday. On Wednesday twice as much snow fell than on Tuesday. In fact, 30cm of snow fell on Wednesday. How much snow fell on Monday?

Mon	Tue	Wed
x	$x-5$	$2(x-5)$
20	15	30cm

$2(x-5)=30$

$2x-10=30$

$2x=40$

$x=20$

20 cm [2 marks]

17. In this multiplication, each letter stands for a different digit. What digit does C represent? **Show your working.**

$$\begin{array}{r} A\,6\,B\,4 \\ \times \quad\quad 7 \\ \hline C\,9\,D\,9\,8 \end{array}$$

$B\times 7+2=_9$

try $B\times 7+2=9$

$\Rightarrow B=1$

next $6\times 7=42$

$\Rightarrow D=2$

last $A\times 7+4=C9$

look at the units digit

$(9-4=5,\ 5\times 7=35)$

$\Rightarrow A=5$

$C=3$

$$\begin{array}{r} 5\,6\,1\,4 \\ \times \quad\quad 7 \\ \hline 3\,9\,2\,9\,8 \end{array}$$

C = 3 [3 marks]

18. Ning Ning wrote a list of all the numbers that could be produced by changing one digit of the number 200. How many of the numbers on Ning Ning's list are prime? **Explain your answer fully.**

if the hundreds / tens digit is changed, but the units digit is unchanged, the resulting number is, like 200, a multiple of 10, $\Rightarrow$ cannot be prime.

so we only need to consider the 9 numbers that can be changed on the units digit.

(202, 204, 206, 208 not prime

201 (2+1 is 3), 203 (7×29), 205 (multiple of 5), 207 (2+7 is 3),

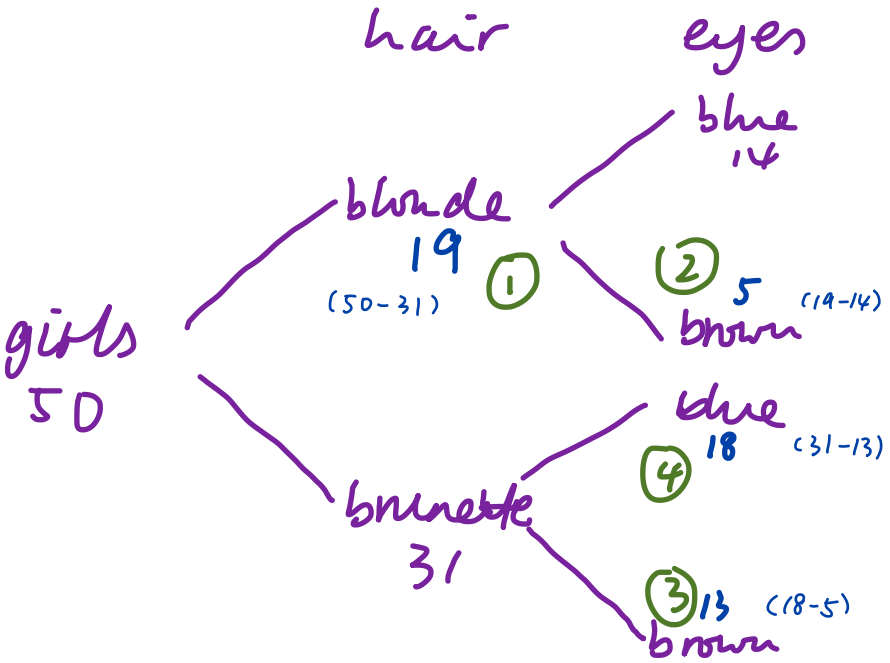
↑ so multiple of 3

209 (11×19)

So none of these are prime

0 [3 marks]

19. In a group of 50 girls each one is either blonde or brunette and is either blue-eyed or brown-eyed. 14 are blue-eyed blondes, 31 are brunettes, and 18 are brown-eyed. How many are brown-eyed brunettes?



_____ [3 marks]

20. The White Rabbit's (12-hour) pocket watch is running very fast! And yet it always shows the correct time on the hour, every hour, and **only on the hour**. When Alice says, "It's only half past one", what time does the White Rabbit's watch show?

watch runs 13h forward every hour,
(if it shows 12:00 at noon it would show 12:00 + 13h ⇒ 1:00 an hour later)
when it is 1:30 the watch should turn half of 13 hours (because only $\frac{1}{2}$ h have past) ⇒ 6h 30min past.

1 + 6h 30min = 7:30

7:30 [3 marks]

Strictly speaking 1:30 is not considered as a correct answer to this question, because if that is the case the minute hand will be the same as any other normal time, but the question only says ONLY ON THE HOUR.

END OF PAPER