ST EDWARD'S
OXFORD

13+ ENTRANCE EXAMINATION
2013

MATHEMATICS

1 hour

Name: _____

There are 60 marks available.

Calculators are not allowed.

Show all your working on the paper – answers without working may not get full marks.

1. Work out the following.

1.2×6

.....

1 mark

$1.2 \div 6$

.....

1 mark

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2. Work out 374×23

.....

2 marks

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3. (a) I pay **£16.20** to travel to work each week. I work for **45 weeks** each year.

How much do I pay to travel to work each year? Show your working.

£

2 marks

(b) I could buy one season ticket that would let me travel for **all 45 weeks.**
It would cost **£630.** How much is that per week?

£

1 mark

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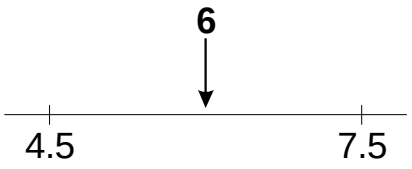
4. The number 6 is halfway between 4.5 and 7.5



The number 6 is halfway between **2.8** and .....

1 mark

The number 6 is halfway between **–12** and .....

1 mark

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5. Write each expression in its simplest form.

$7 + 2t + 3t$

.....

1 mark

$b + 7 + 2b + 10$

.....

1 mark

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6. Fill in the missing numbers.

$\frac{1}{2}$ of 20 = $\frac{1}{4}$ of .....

1 mark

$\frac{3}{4}$ of 100 = $\frac{1}{2}$ of .....

1 mark

$\frac{1}{3}$ of 60 = $\frac{2}{3}$ of .....

1 mark

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7. Solve these equations.

$2k + 3 = 11$

k = ...

1 mark

$6 + 2x = x - 6$

x = ...

2 marks

$2(2n + 5) = 12$

n = ...

2 marks

$\frac{3(2y+4)}{14} = 1$

y = ...

2 marks

8. (a) In a magazine there are three adverts on the same page.

Advert 1 uses $\frac{1}{4}$ of the page

Advert 2 uses $\frac{1}{8}$ of the page

Advert 3 uses $\frac{1}{16}$ of the page

In total, what **fraction** of the page do the three adverts use?
Show your working.

2 marks

(b)

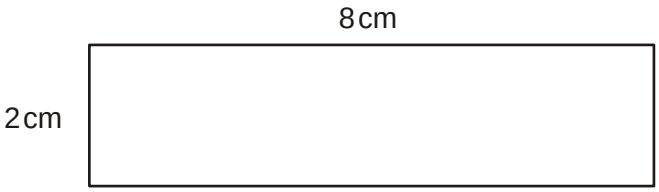
Cost of advert: **£10** for each $\frac{1}{32}$ of a page

An advert uses $\frac{\mathbf{3}}{\mathbf{16}}$ of a page. How much does the advert cost?

£

1 mark

9. Here is a rectangle.



Not drawn accurately

(a) A **square** has the **same area** as this rectangle. What is the **side length** of this square?

..... cm

1 mark

(b) A **different square** has the **same perimeter** as this rectangle. What is the **side length** of this square?

..... cm

1 mark

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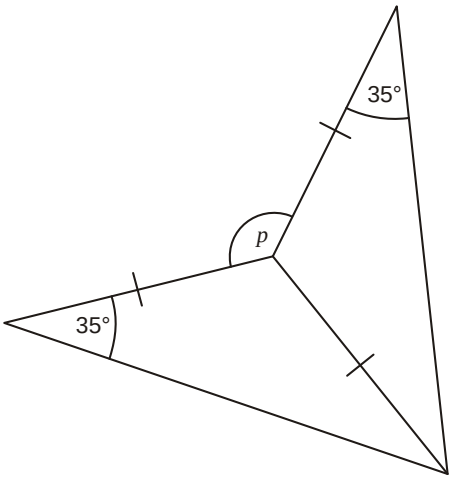
10. This shape has been made from two congruent **isosceles** triangles.

Not drawn accurately



What is the size of angle *p*?

p = ...°

2 marks

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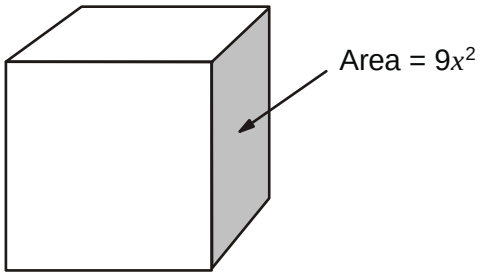
11. The area of a **face** of this cube is $9x^2$



Write an expression for the **total surface area** of the cube. Write your answer as simply as possible.

.....

2 mark

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12. Work out the **number** that is halfway between **27 × 38** and **33 × 38.** Show your working.

.....

2 marks

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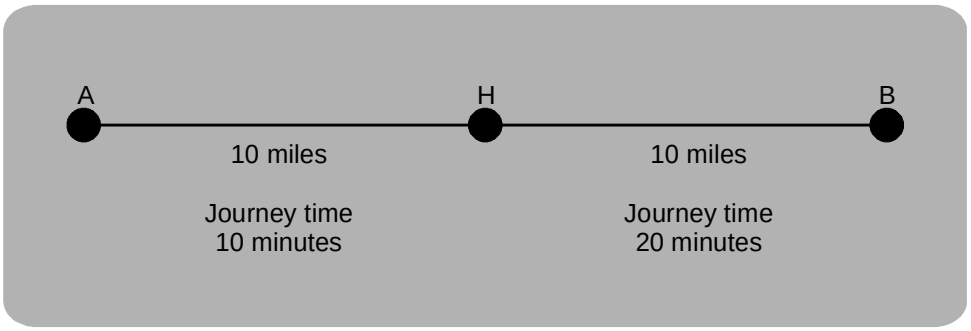
13. The diagram shows the distance between my home, **H**, and two towns, **A** and **B**.

It also shows information about journey times.



(a) What is the average speed of the journey from my home to **town A**?

.....

1 mark

(b) What is the average speed of the journey from my home to **town B**?

.....

1 mark

(c) I drive from town A to my home and then to town B. The journey time is 30 minutes. What is my average speed? Show your working.

.....

2 marks

14. (a) ***m*** is an **odd** number. Which of the numbers below must be even, and which must be odd? Write 'odd' or 'even' under each one.

$2m$	m^2	$3m - 1$	$(m - 1)(m + 1)$

2 marks

(b) ***m*** is an **odd** number. Is the number $\frac{\boldsymbol{m+1}}{\boldsymbol{2}}$ odd, or even, or is it not possible to tell?

Tick (✓) the correct box.

odd		even		not possible to tell	

Explain your answer.

1 mark

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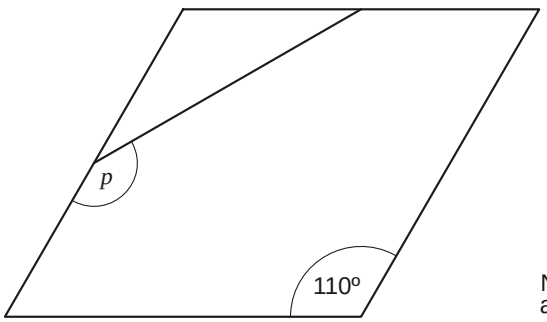
15. The diagram shows a **rhombus**. The **midpoints** of two of its sides are joined with a straight line.

What is the size of angle *p*?



Not drawn accurately

p = ...°

2 marks

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16. To make 1 litre of fruit juice cocktail takes

$\frac{1}{2}$ **litre of orange juice** $\frac{1}{3}$ **litre of apple juice** $\frac{1}{6}$ **litre of grape juice**

How much fruit juice cocktail would be made if you used 0.75 litres of orange juice?

2 marks

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17. (a) Circle the **best** estimate of the answer to **72.34 ÷ 8.91**

6 *7* *8* *9* *10* *11*

1 mark

(b) Circle the **best** estimate of the answer to **32.7 × 0.48**

1.2 *1.6* *12* *16* *120* *160*

1 mark

(c) ***Estimate*** the answer to $\frac{8.62 + 22.1}{5.23}$ Give your answer to **1 significant figure**.

.....

1 mark

(d) **Estimate** the answer to $\frac{28.6 \times 24.4}{5.67 \times 4.02}$

.....

1 mark

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18. (a) **Draw lines** to match each *n*th term rule to its number sequence.

***n*th term**	**Number sequence**
$4n$	4, 7, 12, 19, …
$(n + 1)^2$	4, 8, 12, 16, …
$n^2 + 3$	4, 9, 16, 25, …
$n\,(n + 3)$	4, 10, 18, 28, …

2 marks

(b) Write the **first four** terms of the number sequence using the *n*th term rule below.

$n^3 + 3$ ——— _____, _____, _____, _____

2 marks

19. Look at these number cards.

0.2	**2**	**10**	**0.1**	**0.05**	**1**

(a) Choose two of the cards to give the **lowest possible answer**.

☐ **×** ☐ **=** .....

2 marks

(b) Choose two of the cards to give the answer **100**

☐ ÷ ☐ **=** 100

1 mark

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20. Work out

$$\frac{1 \times 2 \times 3 \times 4 \times 5}{1 \times 2 \times 3} =$$ .....

1 mark

$$\frac{(1 \times 2 \times 3 \times 4 \times 5)^2}{(1 \times 2 \times 3)^2} =$$ .....

1 mark

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21. What is $\frac{1}{2} of\ 10^3$:

.....

1 mark

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22. a) Find the values of *a* and *b* when *p* =10.

$$a = \frac{3p^3}{2} \qquad\qquad b = \frac{2p^2(p-3)}{7p}$$

a = ...

1 mark

b = ...

1 mark

b) Simplify this expression as fully as possible:

$$\frac{3cd^2}{5cd}$$

1 mark

END OF TEST