Name: ..... **School:** .....

TONBRIDGE SCHOOL

Year 9 Entrance Examinations 2013

MATHEMATICS (Lower)

Saturday 9 November 2013

Time allowed: 1 hour

Total Marks: 100

THIS IS A NON-CALCULATOR PAPER

Instructions:

1. Complete "Name" & "School" section at the top of cover page
2. **All questions** should be attempted and **answers given in the space provided**
3. A completely correct answer may receive no marks unless all workings are shown

1. (a) Write 35% as a fraction, **in lowest terms**.

Answer: ..... (2)

(b) Write $\frac{9}{15}$ as a decimal.

Answer: ..... (2)

(c) Calculate 25% of $40.00.

Answer: $..... (2)

(d) Calculate $\frac{1}{6}$ of 4.2 metres.

Answer: ..... (2)

2. (a) By **first** writing each number correct to 1 significant figure, estimate the answer to

$$\frac{3.4 \times 156}{21.3}$$

Answer: ..... (3)

(b) Calculate $2^2 \times \sqrt{144}$

Answer: ..... (2)

(c) (i) Write 84 as a product of prime factors, **using indices in your answer**.

Answer: ..... (2)

3. (a) Calculate the following, **giving answers as fractions in simplest form**:

(i) $(2)^2 - \left(\frac{1}{2}\right)^2$

Answer: ..... (2)

(ii) $\frac{8}{11} \; x \; \frac{1}{4}$

Answer: ..... (2)

4. (a) 180 centimetres of chord are needed to make a skipping rope.

How many metres of chord are needed to make 25 of these skipping ropes?

Answer: ..... (2)

(b) A total of 3 kilograms of jam is needed to fill 8 identical pots.

How many grams of jam does each pot contain?

Answer: ..... (2)

5. (a) Rory buys a drink for £1.15 and a packet of crisps for 91 pence.

How much does he spend altogether ?

Answer: £..... (2)

(b) Ali buys two CDs *each* costing £7.48. She pays with a £20 note.

How much change should he receive ?

Answer: £..... (2)

(c) A bottle of water costs 69 pence.

What is the cost of 9 bottles of water ?

Answer: £..... (2)

(d) Luke spends £5.60 on apples which cost 35pence each.

How many apples does he buy ?

Answer: ..... (2)

6. (a) It takes 1 hours 35 minutes to travel from London to Hastings by train. Tom catches the 8.45 a.m. train from London.

At what time should Tom arrive in Hastings ?

Answer: ..... (2)

(b) How far does a bus travel in 55 minutes at 30km/h ?

Answer: ..... km (2)

7. Calculate

(i) the sum of 123.5 and 28.74

Answer: ..... (1)

(ii) the difference between 20.4 and – 10.7

Answer: ..... (1)

(iii) 2.4 x 0.4

Answer: ..... (2)

(iv) 240 ÷ 0.4

Answer: ..... (2)

8. (a) Fully simplify the following:

(i) $\frac{8a^4b}{2a^2}$

Answer: ..... (2)

(ii) $y \times y \times y$

Answer: ..... (1)

(iii) $6y^2 + 2y^2$

Answer: ..... (1)

(b) Multiply out the brackets and simplify **fully:**

$$3(3a^2 - 4b) - 2(b - a^2)$$

Answer: ..... (3)

(c) Factorise **completely**

$$48n^2 + 12n$$

Answer: ..... (2)

9. Solve the following:

(i) $4x = 6$

Answer: $x =$ ..... (1)

(ii) $2x - 3 = 3$

Answer: $x =$ ..... (1)

(iii) $\frac{c}{5} = 3 + 1$

Answer: $c =$ ..... (1)

(iv) $2a + 12 = 21 - a$

Answer: $a =$ ..... (2)

(v) $\frac{1}{4}(b + 3) = 10$

Answer: $b =$ ..... (2)

(vi) $\frac{1}{2}(7y + 1) - 3 = 8$

Answer: y = ... (3)

10. (a) Given that $x = 4 \quad y = 2 \quad z = -1$ find the value of

(i) $xy - 2y$

Answer: ..... (2)

(ii) $4y - 3z$

Answer: ..... (2)

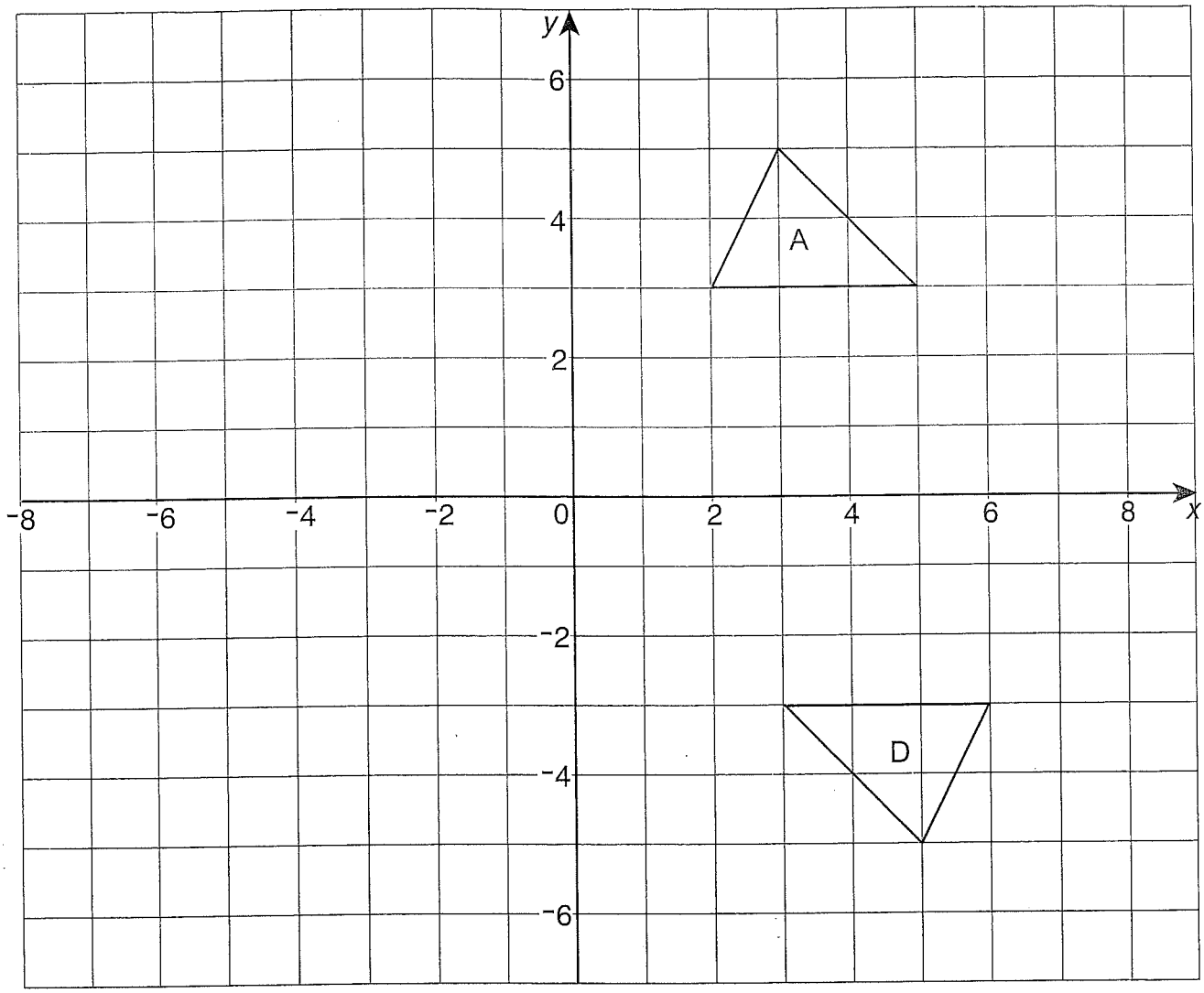
(iii) $\frac{x^3}{y^2}$

Answer: ..... (2)

(iv) $(x - z^2)^3$

Answer: ..... (3)

11.



(a) Answer the following parts on the grid above.

(i) Draw and label the line $x = -1$ (1)

(ii) Reflect triangle A in the line $x = -1$
Label the image B. (1)

(iii) Enlarge triangle A by scale factor 2 with centre (3, 5).
Label the image C. (2)

(b) Describe in detail the single transformation which maps triangle A on to triangle D.

Answer: .....

..... (2)

12. (a) Here is a number grid:

25	**30**	**35**	**40**
30	**36**	**42**	**48**
35	**42**	**49**	**56**
40	**48**	**56**	**64**

Pat chooses a number from the grid at random.
What is the probability that it is

(i) the number **48**?

Answer: ..... (1)

(ii) an even number?

Answer: ..... (1)

(iii) a prime number?

Answer: ..... (1)

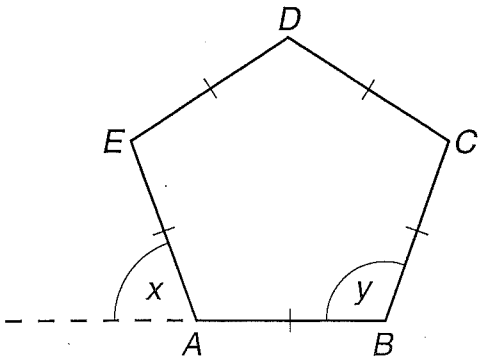
(b) When Anu tosses an ordinary 10p coin, it lands *heads* up.
What is the probability that the same coin lands *tails* up the next time Anu tosses it?

Answer: ..... (1)

(c) The probability that Murphy will eat chips on any particular day is $\frac{2}{5}$
On how many days would you expect Murphy to eat chips this year?

Answer: ..... days (2)

13.



not to scale

(i) What special name is given to the regular shape *ABCDE*?

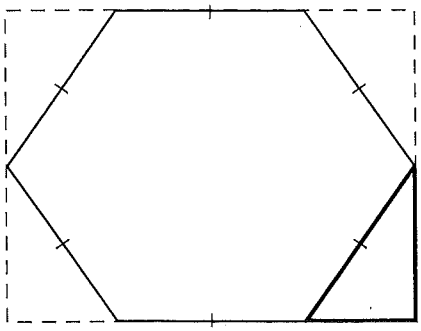
Answer: ..... (1)

(ii) Calculate the size of each of the angles marked *x* and *y*.

Answer: *x* = ... ° (2)

y = ... ° (1)

(b)



not to scale

A regular hexagon is drawn on a rectangular tile, as shown above.

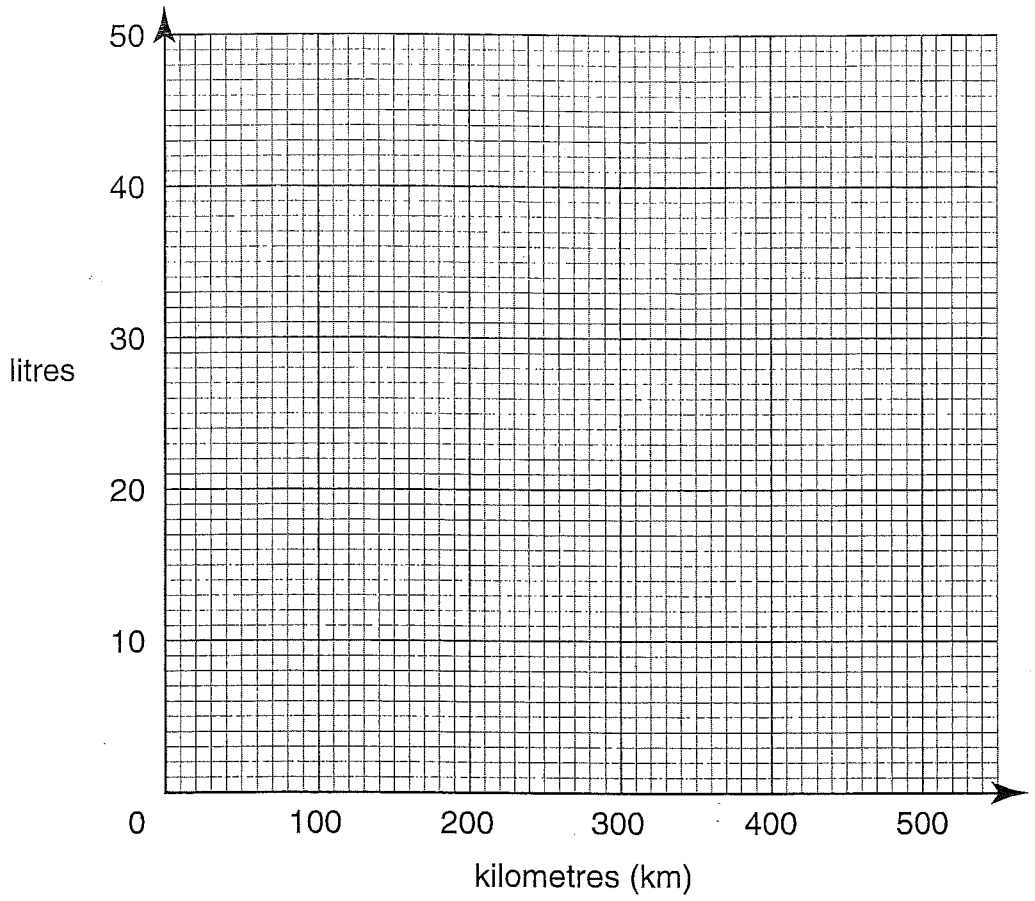
Calculate the size of each of the angles in the corner triangle (shown in bold).

Answer: ....., ..., ... ° ° ° (2)

14 On average, Bob's car uses 9 litres of petrol every 100 kilometres.

(i) Using this fact, calculate the number of litres of petrol that Bob's car uses to travel 500 kilometres.

Answer: ..... litres (1)



(ii) On the grid draw a line which shows how much petrol is used for distances up to 500 km. (2)

(iii) Use your graph to answer the following, showing clearly where you take your readings.

(a) How far will the car travel on 30 litres of petrol?

Answer: ..... km (2)

(b) Bob wants to travel 230 kilometres. His car contains 5 litres of petrol. How much more petrol will he need?

Answer: ..... litres (2)

15. a and b are two positive numbers.

a is $2\frac{1}{2}$ times as large as b.

(i) Write down an equation in terms of a and b to show this.

Answer: ..... (1)

2 times a is 16 more than b.

(ii) Write down an equation in terms of a and b to show this.

Answer: ..... (1)

(iii) Using your answers to parts (i) and (ii), solve equations to find the value of a and b.

Answer: a = ...

Answer: b = ... (4)

TOTAL MARKS = 100