

Owl Tutors 13 + Entrance Examination

Maths Level 3 Non-Calculator Paper 1

Total marks: 100

Time allowed:
60 minutes

1. Matthew, Matthias and Mattia went to the cinema.

Matthew paid for all three boys with £40 and got back £11.65 change. How much was the price of one cinema ticket?

	PRICE
Popcorn – small / large	£2.25 / £2.99
Drink – small / large	£1.99 / £2.65
Bag of sweets / chocolate	£1.50

The boys order 2 bags of sweets, one large popcorn, 2 large drinks and 1 small drink.

a) How much did the food and drink order come to? (2 marks)

.....

b) How much change did they receive from a £20 note? (1 mark)

.....

c) At the end they spend the change on sweets and chocolate. How many bags will they be able to buy? (2 marks)

.....

2. Calculate:

ai) $44 - (12 - 3^2)^2$ (2 marks)

.....

ii) $3^4 + 4^2$ (2 marks)

.....

iii) $-5(14 - 3^3)$ (2 marks)

.....

b) Joseph thinks of a number, multiplies it by 3, adds 9 and then takes the square root of the result. He gets 12 as his final answer. What number did he start with? (2 marks)

.....

3. Write

ai) 0.185 as a percentage (1 mark)

.....

ii) $3/16$ as a decimal (2 marks)

.....

bi) Write 240 grams as a fraction of 4kg in its simplest form. (2 marks)

.....

ii) Find 14% of £525 (2 marks)

.....

4. Louise, Harvinder and Joe share money they earn from washing cars of friends, family and neighbours in the ratio 5 : 4 : 3 respectively.

a) If Louise took a share of £30 last weekend, what did Joe earn?

..... (1 mark)

b) In the month of June they earned altogether £132. What did Harvinder earn in the month of June? (2 marks)

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c) Joe earned £30 less than Louise in May. How much more money was earned in May than June? (2 marks)

.....

5a. Simplify

i) $6y^2 + 7y - 6y - 4 - 3y^2$ (2 marks)

.....

ii) $8c^2d \times (4cd)^2$ (2 marks)

.....

iii) $\frac{9wz^3}{15w^2z}$ (2 marks)

.....

6a. Simplify to their simplest forms

$3e - 7 - 2(4e - 5)$ (2 marks)

.....

b) Fully factorise

$20a^3 - 15a^5$ (2 marks)

.....

7a. Using $f = -3$ and $g = 5$, find the value of the following expressions: (1 mark)

i) $3g - 5f$
.....

ii) $f(4g - f^2)$ (2 marks)

.....

iii) $\frac{f - 3g}{4f + 2g}$ (2 marks)

.....

b) Use the formula $a = \frac{h(a + b)}{2}$, to find b if $h = 5$, $a = 3.5$ and $a = 20$. (2 marks)

.....

c) Solve the following inequalities (2 marks)

i) $5x - 14 > 1$
.....

ii) $25 - 3x \geq -5$ (2 marks)

.....

iii) x is a prime number. What values of x satisfy both inequalities in ci and cii? (1 mark)

8ai) Sam's family drink $2\frac{1}{4}$ bottles of milk a day. For how many days will 18 bottles last them? (2 marks)

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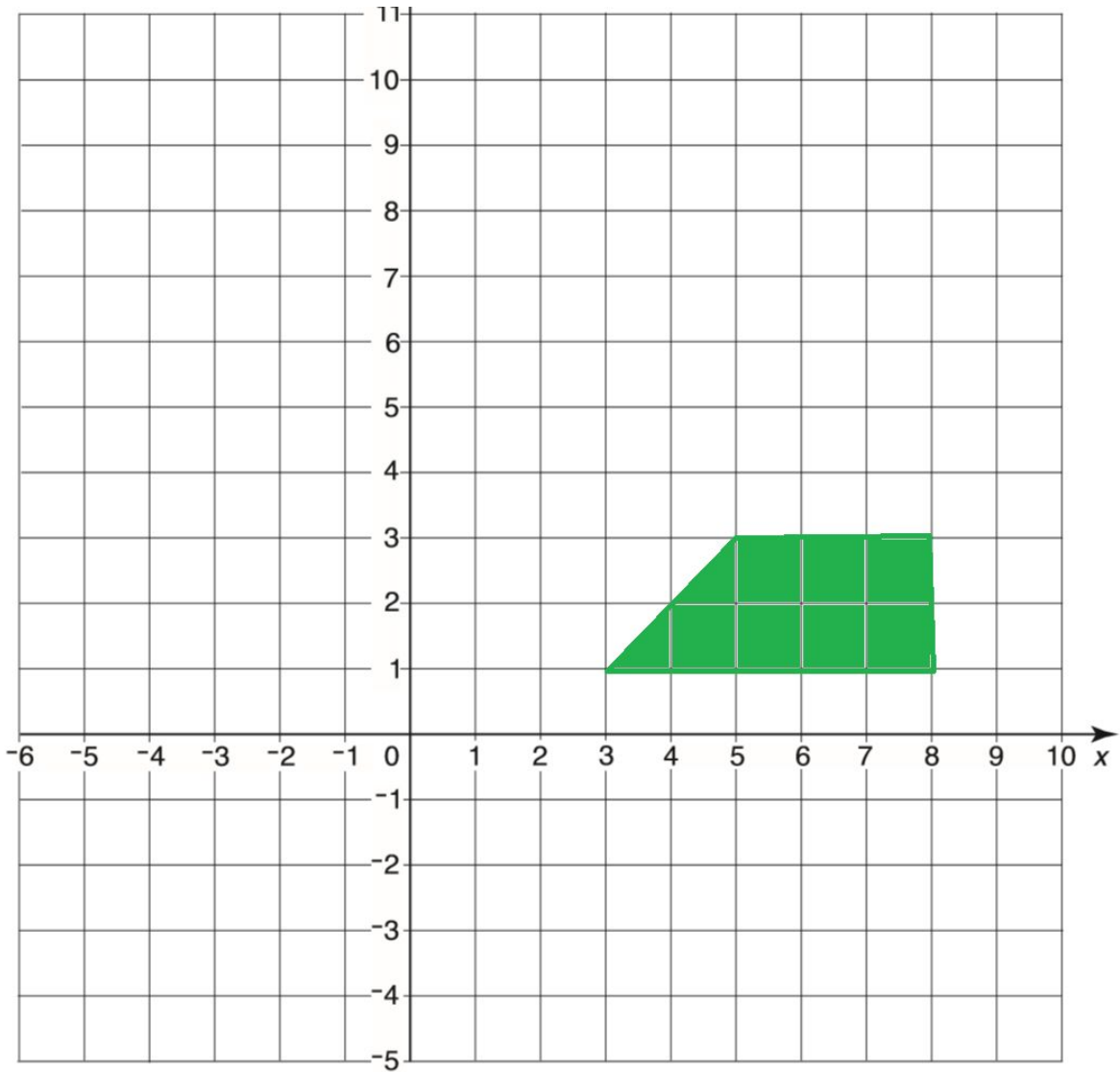
ii) Sam herself drinks $\frac{3}{8}$ of a bottle of milk each day. How many bottles will she get through by herself in 20 days? (2 marks)

.....

b. Having eaten $\frac{5}{8}$ of a chocolate bar, 9 pieces are left. How many pieces were in the chocolate bar in the first place? (2 marks)

.....

9.



a) What is the name of the quadrilateral shown on the grid? (1 mark)

.....

b) Rotate this shape 180° about the point (1,0). Label this shape A (2 marks)

ci) Reflect shape A in the line $y = 0$. Label this shape B (2 marks)

ii) What is the equation for the line of reflection to reflect shape B back to the original starting shape? (1 mark)

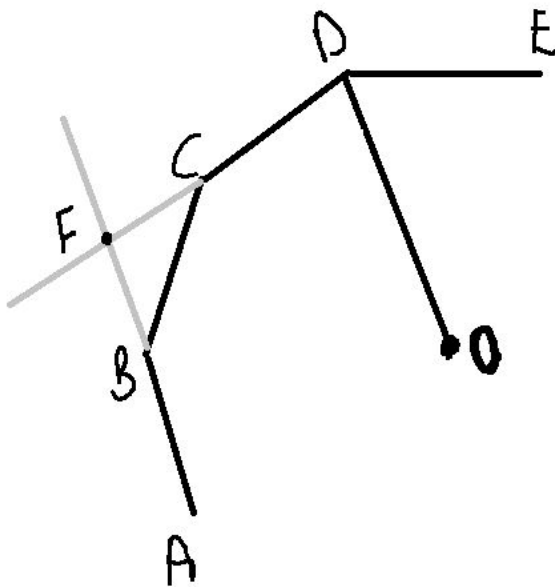
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di) Enlarge shape B by scale factor 2 from $(-6,-2)$. Label this shape C (2 marks)

ii) What would be the area if the original shape was enlarged by scale factor 4? (2 marks)

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10. Points ABCDE are a part of a regular polygon (with centre O). When lines AB and CD extend, they both meet at point F. Angle CDO is 70° .



NOT TO SCALE

a) What is the size of angle ABC? (1 mark)

.....

b) How many sides does this regular polygon have? (2 marks)

.....

c) What is the size of angle BCF? (1 mark)

.....

d) What is the size of angle BFC? (2 marks)

.....

11.

a) A straight line has the equation $y = 1 - 3x$

i. Complete the table of values below for the line $y = 1 - 3x$ (2 marks)

X	-4	-2	0	2
Y				

ii. Draw and label the line $y = 1 - 3x$ on the following graph (1 mark)

b) A curve has the equation $y = 1 + x^2$

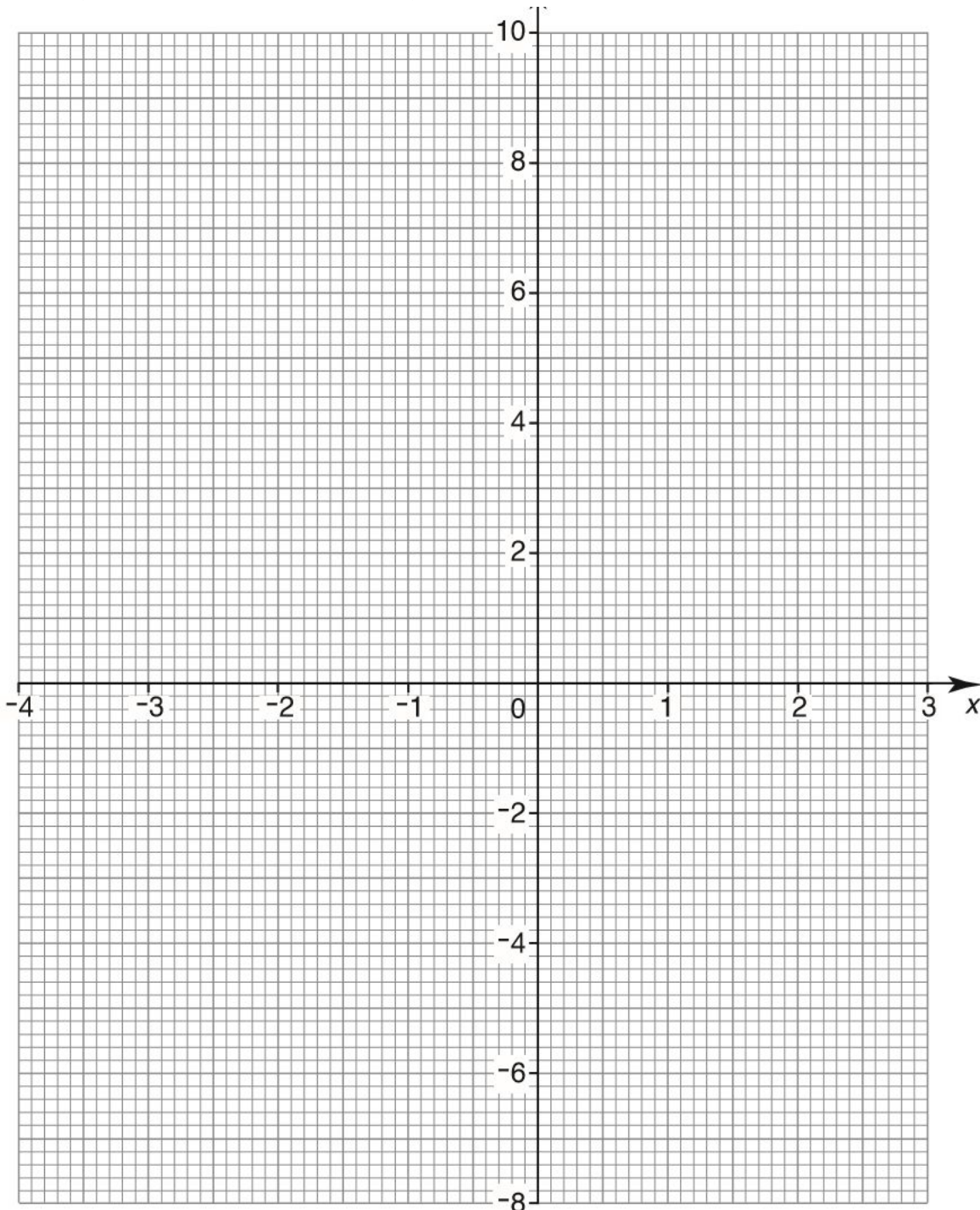
i. Complete the table of values below for the line $y = 1 + x^2$ (2 marks)

X	-3	-2	-1	0	1	2	3
Y							

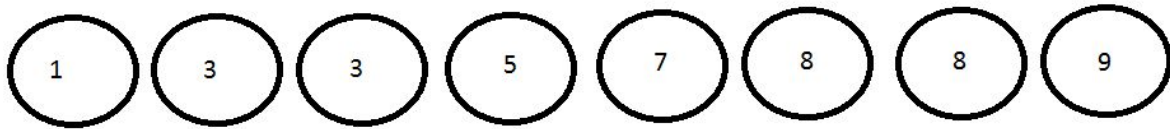
ii. Draw and label the line $y = 1 + x^2$ on the following graph (2 marks)

c) Find the point where the two graphs intersect when x is positive (2 marks)

(..... ,)



12. Tina has a bag containing number balls.



She takes one ball at random out of the bag.

a) What is the probability that it is cube number?

(1 mark)

.....

b) What is the probability that it is a prime number?

(1 mark)

.....

Tina does not replace the ball. The probability of picking a odd number is $\frac{5}{7}$. The probability of picking a number less than 7 is $\frac{4}{7}$.

c) What two numbers could the ball Tina picked out have been?

(2 marks)

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In another bag there is a mixture of yellow and green balls. There are 18 yellow balls in total. The probability of taking a green ball is $\frac{2}{5}$.

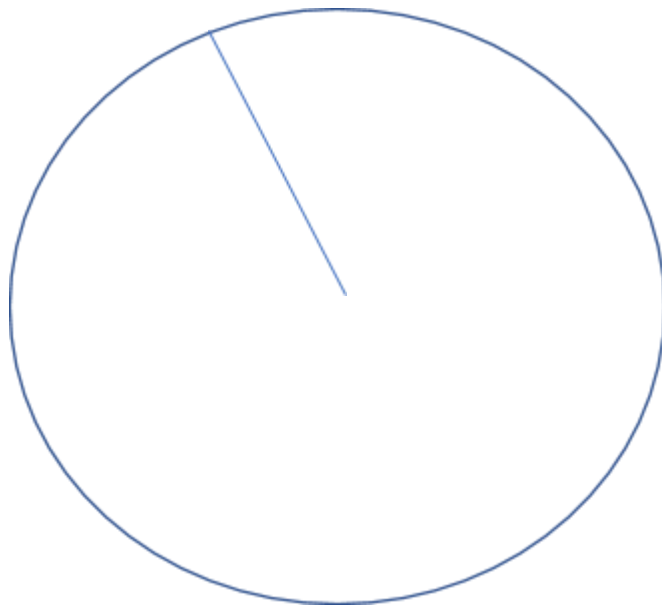
d) How many balls are there in the bag altogether?

(2 marks)

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13. 45 children go on a school trip and take a pre-prepared packed lunch which contains a bag of crisps. These crisps come in 5 different flavours. 12 of the packed lunches have ready salted, 5 have salt and vinegar, 18 have cheese and onion and the rest have prawn cocktail.

a. Draw a fully labelled pie chart to show this information. (4 marks)

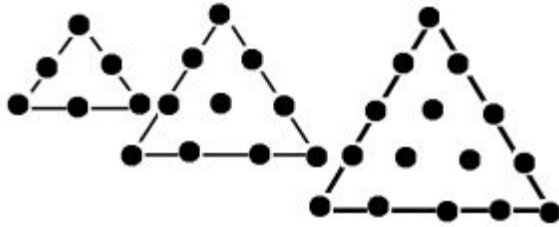


Out of all the children, all of those who had eaten salt and vinegar crisps and ready salted and $\frac{2}{3}$ of those who had eaten cheese and onion went on to buy an additional drink from the shop costing 50p a can.

b) How much was spent on drinks in total? (2 marks)

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14. The sequence below shows the 1st, 2nd and 3rd term of a sequence.



a) How many dots and lines will there be on the 4th term? (1 mark)

.....dots lines

b) Find an expression for the number of lines for the nth term. (2 marks)

.....

c) Which term in the sequence will have 87 lines? (1 mark)

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15a) At the sweet shop John buys 5 large cola bottles and 12 Turkish delights which costs him £1.34 in total. If x represents the cost of one cola bottle and y represents the cost of one Turkish delight, write out an equation, in terms of x and y , to show this information. (1 mark)

.....

b) Tim buys 8 large cola bottles and just 2 Turkish delights which costs him £0.96. Write out a second equation, in terms of x and y, to show this information. (1 mark)

.....

c) Solve the two equations to find the values of x and y. (4 marks)

X =

Y =

d) Another customer, Samir, buys equal numbers of cola bottles and Turkish delight and gets back £4.60 in change from a £10 note. How many sweets in total did Samir buy? (2 marks)

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