



**City of London School  
Entrance Examination**

**For entry in September 2008**

**MATHEMATICS  
Group 3**

**Name:** \_\_\_\_\_ **Candidate No.** \_\_\_\_\_

**Time allowed:  $1\frac{1}{4}$  hours**

**Write your answers on the question paper.**

**Marks may be obtained for showing clear working, which should appear in the spaces provided.**

**CALCULATORS ARE NOT ALLOWED.**

## 1. Work out

a)  $20.2 - 44.04 + 30.33$

a).....

b)  $5.991 - 1.995$

b).....

c)  $3.14 \times 0.4$

c).....

d)  $1.995 \div 0.19$

d).....

2. Work out the following in their **simplest** form, and as mixed numbers if necessary.

a)  $\frac{1}{2} + 3\frac{4}{5}$

a).....

b)  $9\frac{1}{7} \div 8$

b).....

$$\text{c) } \frac{131}{222} - \frac{178}{333}$$

c) .....

$$\text{d) } \left( \frac{\frac{1}{2} - \frac{2}{3}}{\frac{3}{4} - \frac{4}{5}} \right) \div \frac{5}{6}$$

d) .....

3. Solve these equations.

$$\text{a) } 3 - 6x = 18$$

a)  $x =$  .....

$$\text{b) } 4x - 16 = 2(x + 9)$$

b)  $x =$  .....

c)  $\frac{x}{7} - 3 = 8$

c)  $x = \dots\dots\dots$

4. Multiply out the brackets, simplifying where possible.

a)  $3x(5x + y)$

a)  $\dots\dots\dots$

b)  $(x - 4)(x + 4)$

b)  $\dots\dots\dots$

c)  $(x - 3)^2$

c)  $\dots\dots\dots$

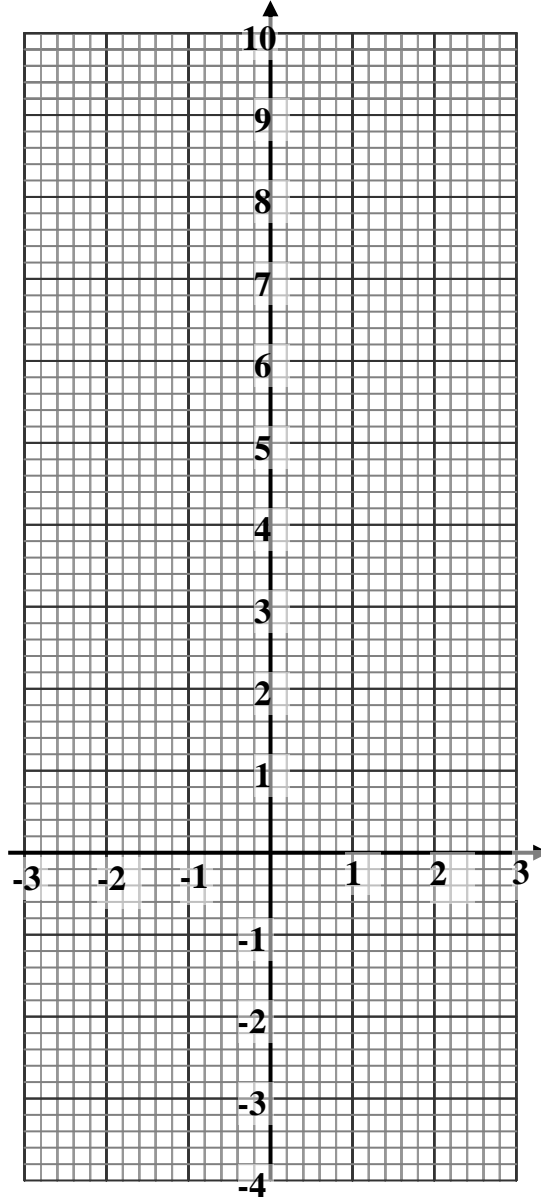
5. Solve the inequality  $3 - 2x < 5$ .

$\dots\dots\dots$

6.

a) Complete the table below for  $y = x^2 - x - 3$ .

$x$	-3	-2	-1	0	1	2	3
$y$							

b) Hence draw the graph of  $y = x^2 - x - 3$  on the grid.c) On the same axes above draw the straight line graph of  $y = 2x - 1$ .d) Write down the co-ordinates of the point where the graphs intersect.  
Give your answers correct to 1 d.p.

d) .....

7. If  $h = 7, m = -3, s = -4$ , find the value of

a)  $h - (m - s)$

a).....

b)  $h - m - s$

b).....

c)  $\frac{m - h}{s - m}$

c).....

d)  $m - h \div h - s$

d).....

8. Decrease £8640 by 45%.

£.....

9. £198 is divided in the ratio 2:4. What is the larger share?

£.....

10. Write  $\frac{355}{113} = 3.141\ 592\ 920\ 353\ 982\ \dots$  to:

a) 3 decimal places

a) .....(3 d.p.)

b) 13 decimal places

b) .....(13 d.p.)

11. Write  $\frac{2}{7}, 0.27, 28.5\%, \frac{14}{50}$  in order of size, from the smallest to the largest.

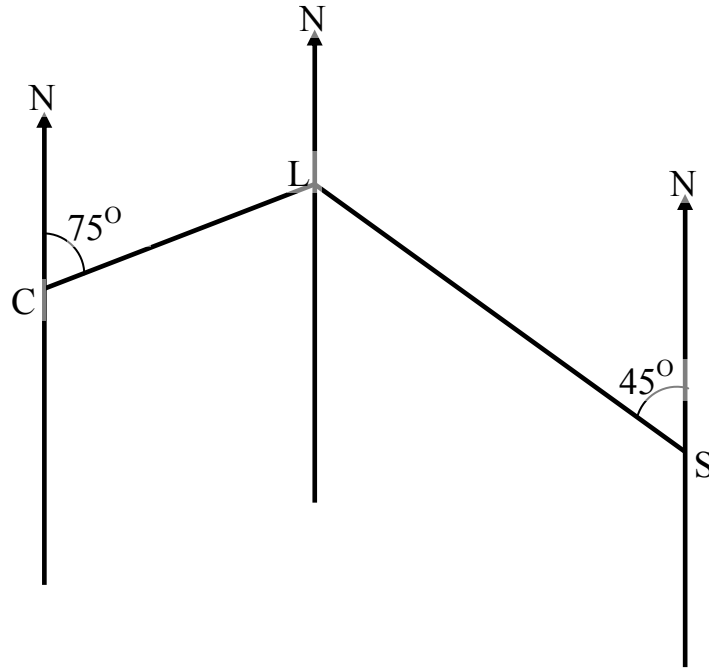
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12. Write down the bearing of:

a) L from C.....<sup>o</sup>

b) S from L.....<sup>o</sup>

c) C from L.....<sup>o</sup>



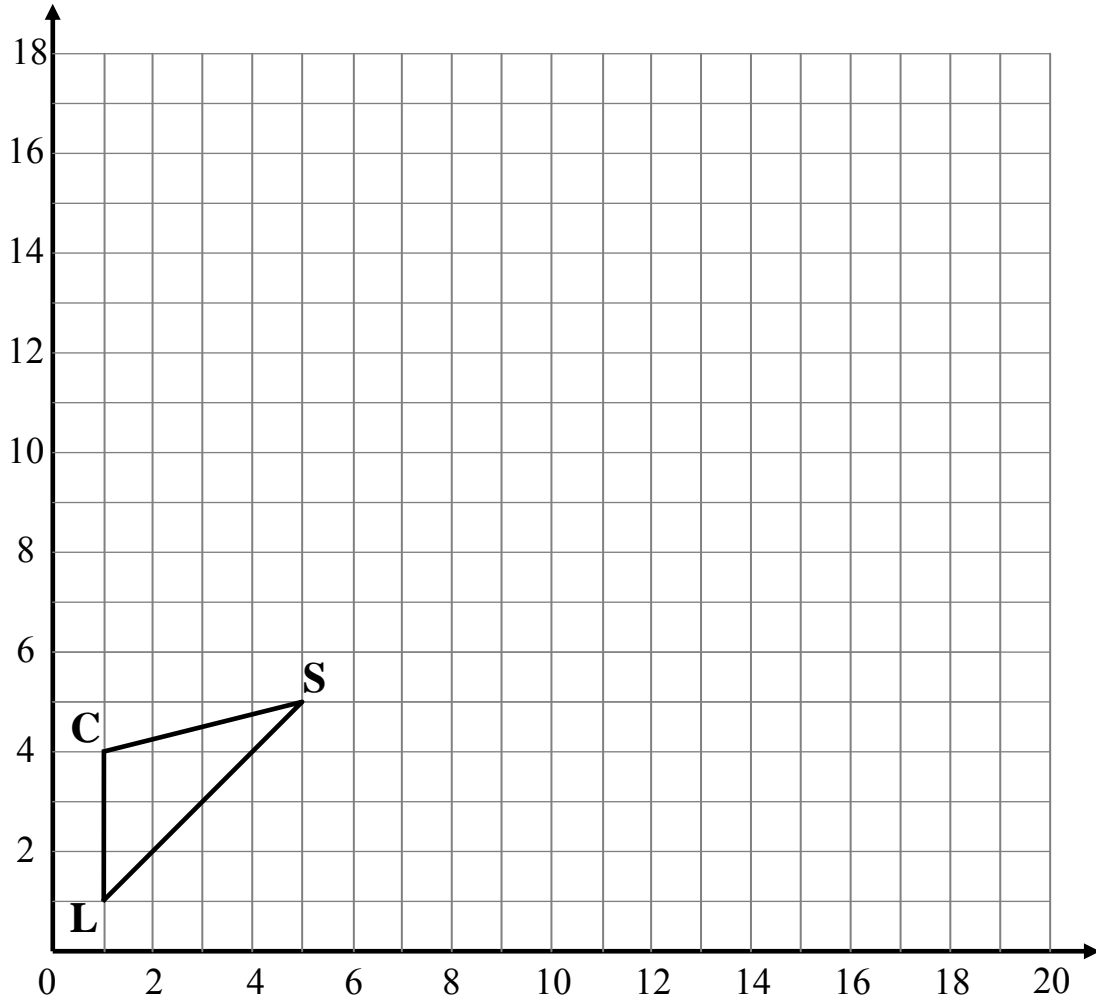


13.

a) Write down the area of the triangle CLS.

a) .....units<sup>2</sup>

b) Enlarge the triangle CLS using a scale factor of 4 and centre of enlargement (0,1).

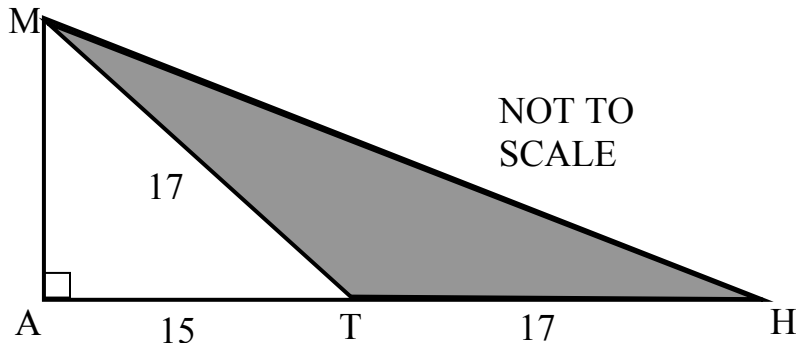


c) Write down the area of the enlarged shape.

c) .....units<sup>2</sup>

14.

- a) In the right-angled triangle MAT,  $AT = 15$ ,  $MT = 17$ .  $TH = 17$ . Calculate the length MA. (lengths given are in cm)

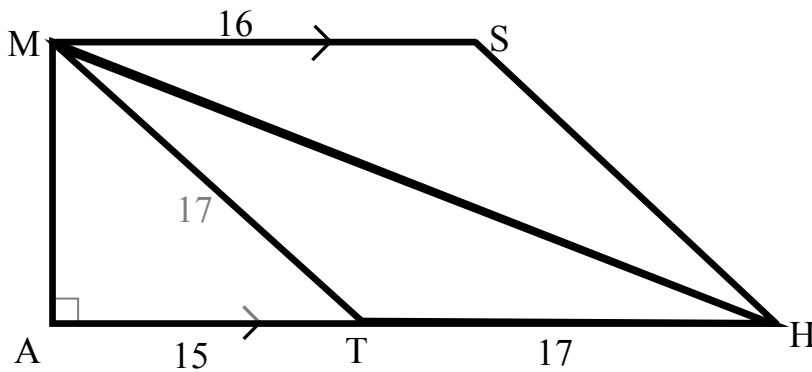


a)  $MA = \dots\dots\dots$  cm

- b) Calculate the area of the shaded triangle MTH.

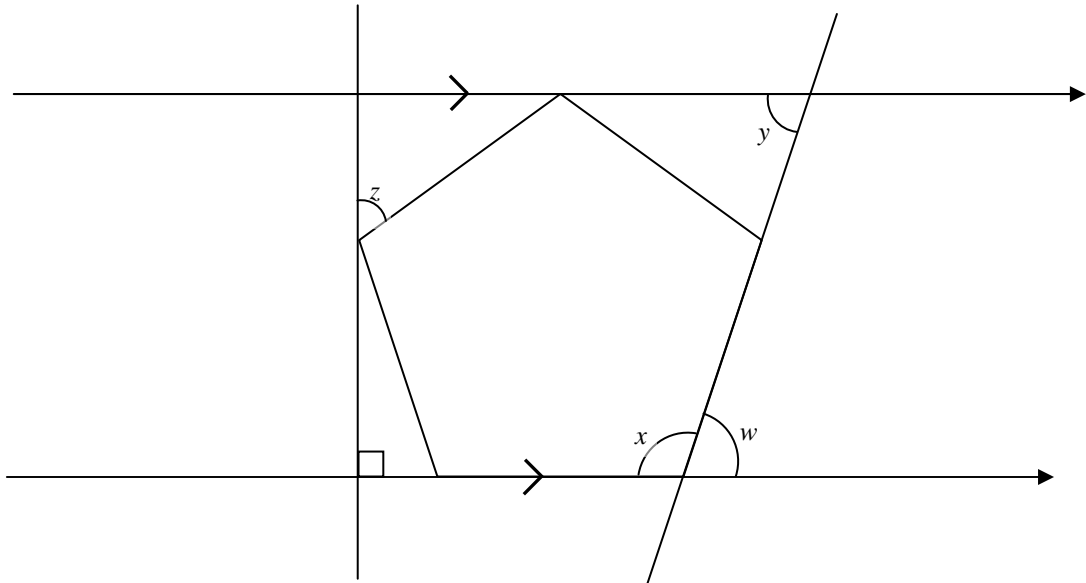
b)  $\dots\dots\dots$   $\text{cm}^2$

- c) Calculate the area of the trapezium MAHS.



c)  $\dots\dots\dots$   $\text{cm}^2$

15. A regular pentagon is shown within two parallel lines.



a) Calculate the exterior angle  $w$  and the interior angle  $x$ .

a) exterior angle  $w = \dots\dots\dots$  interior angle  $x = \dots\dots\dots$

b) Calculate the angle  $y$ .

b)  $y = \dots\dots\dots$

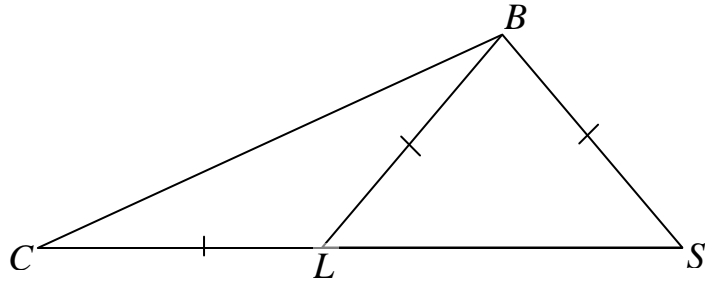
c) Calculate the angle  $z$ .

c)  $z = \dots\dots\dots$

16.

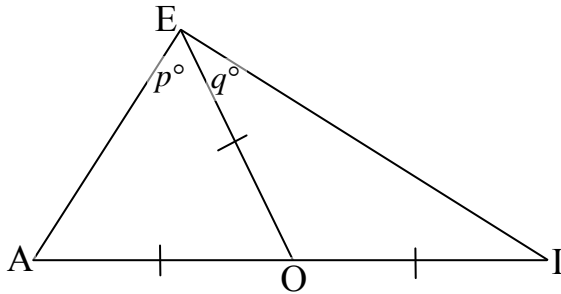
- a) In the triangle shown below, the lengths  $CL$ ,  $LB$  and  $BS$  are all equal and  $CS$  is a straight line.  $\hat{BCL} = 37^\circ$ .

Work out angle  $BSL$ .



a)  $\hat{BSL} = \dots\dots\dots$

- b) In the following diagram  $OA = OE = OI$ , and  $AOI$  is a straight line.

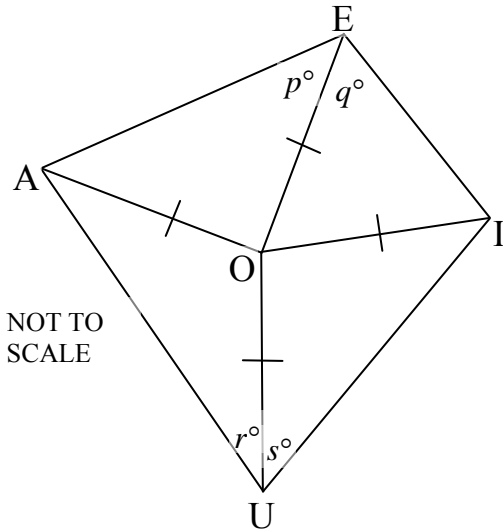


If  $p = 37$ , find the value of  $q$ .

b)  $q = \dots\dots\dots$

- c) In the following diagram  $AEIU$  is a quadrilateral and  $OA = OE = OI = OU$ .

Find the value of  $p + q + r + s$ .  
(You must show all your working)



c)  $p + q + r + s = \dots\dots\dots$

17.

- a) A 3 sided spinner is coloured red, yellow and blue. The probability it lands on red is 0.3 and on yellow is 0.45.  
What is the probability it lands on blue?

a) .....

- b) Another spinner is four sided and coloured red, yellow, blue and green. It is four times as likely to land on red as on yellow and twice as likely to land on yellow as on blue. Blue and green are equally likely.  
Find the probability it lands on blue.

b) .....

18.

- a) Express 1974 as a product of its prime factors.  
(show your working in a factor tree)

a)  $1974 =$  .....

- b) Given that  $1645 = 5 \times 7 \times 47$ , use your answer to part (a) to work out in its simplest form

$$\frac{2}{1645} + \frac{7}{1974} =$$

b) .....

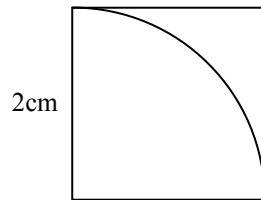
**19.** In this question use  $\pi = 3.14$ .

For a circle radius  $r$ , area  $A = \pi r^2$ .

**a)** Calculate the area of a circle of radius 2cm, correct to 2d.p.

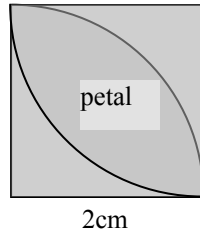
**a)** .....  $\text{cm}^2$

**b)** A square of side 2cm has a quarter circle drawn on the edges as shown.  
Calculate the area of the quarter circle, correct to 2d.p.



**b)** .....  $\text{cm}^2$

**c)** The square now has quarter circles which overlap to create a 'petal'.  
Calculate the 'petal' area, correct to 2d.p.



**c)** .....  $\text{cm}^2$

**END OF EXAM**