



**YEAR 7 ENTRANCE AND  
SCHOLARSHIP EXAMINATION**  
**Mathematics**  
**Specimen Paper F**

**Mark Scheme**

**Time allowed for this paper: 1 hour**

**Instructions**

- Attempt all the questions.
- Calculators must not be used.
- Show all of your working on this paper.
- There are 100 marks available in total for this test.
- You must not write in the squares on the bottom right of each page.
- The marks available for each part of a question are given in square brackets.



Method marks - any sensible method with just a numer slip.

Calculate:

1.  $2017 + 597$

$$\begin{array}{r} 2017 \\ 597 \\ \hline 2614 \\ \hline \end{array} \quad (M1)$$

Answer: 2614 (A1) [2]

2.  $63 \times 42$

$$\begin{array}{r} 63 \\ 42 \times \\ \hline 126 \\ 2520 \\ \hline 2646 \\ \hline \end{array} \quad (M1)$$

Answer: 2646 (A1) [2]

3.  $6.48 \div 6$

$$\begin{array}{r} 1.08 \\ 6 \overline{) 6.48} \\ \hline \end{array} \quad (M1)$$

Answer: 1.08 (A1) [2]

4.  $7.257 - 3.47$

$$\begin{array}{r} 6.1 \\ 7.257 \\ 3.470 - \\ \hline 3.787 \\ \hline \end{array} \quad (M1)$$

Answer: 3.787 (A1) [2]

5. Write down the missing terms in each of the sequences below:

(a) 3, 9, 15, 21, 27, 33 [2]

(b) 32, 16, 8, 4, 2, 1 [2]

(c) 100, 132, 116, 124, 120, 122, 121 [2]

(d) 1, 2, 6, 24, 120, 720, 5040 [2]

6. Circle the factors of 99:

9

198

990

33

66

11

18

48

A2 - all 3, no incorrect

A1 3 correct plus one incorrect OR 2 correct, no incorrect. [2]

7. Subtract  $20 + (1 \times 7)$  from  $(20 + 1) \times 7$ .

27

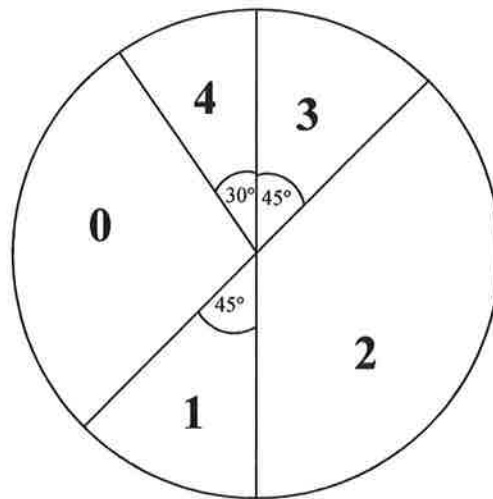
147

MC

$$147 - 27 = 120$$

Answer: 120 [2]

8. In a survey a group of children were asked how many films they had seen in the last week. No-one in the group had seen more than four films, and the results are shown in the pie chart below.



- (a) Work out the percentage of children who had seen exactly three films.

$$\text{(M1)} \quad \frac{45}{360} = \frac{1}{8}$$

Answer: 12.5 % [2] (A1)

- (b) Work out the fraction of children who had seen no films, giving your answer in its lowest terms.

$$180 - 30 - 45 = 105 \quad \text{(M1)}$$

$$\text{(M1)} \quad \frac{105}{360} = \frac{7}{24}$$

Answer:  $\frac{7}{24}$  [3] (A1)

Nine of the children who were surveyed had seen exactly one film and another nine had seen exactly three films.

- (c) Fill in the table below to show the number of children who had seen 0, 2, and 4 films.  $5^\circ = 1$  child.

| Number of films             | 0  | 1 | 2  | 3 | 4 |
|-----------------------------|----|---|----|---|---|
| Number of children surveyed | 21 | 9 | 27 | 9 | 6 |

$$\frac{105}{5} = 21$$

$$\frac{135}{5}$$

$$\frac{30}{5}$$

[3]

- 9 10. (a) Calculate  $0.35 + \frac{4}{5} + \frac{37}{100}$ , leaving your answer as a decimal.

(M1) conversion to decimals

$$\begin{array}{r} 0.35 \\ 0.80 + \\ 0.37 \\ \hline 1.52 \end{array}$$

as a fraction  $\frac{38}{25}$

(M1) sensible attempt at addition

Answer: 1.52 [3] (A1)

- (b) Write  $\frac{21}{70}$  as a decimal.

$$\frac{21}{70} = \frac{3}{10} \left( = \frac{30}{100} \right) = 0.3$$

(M1)

Answer: 0.3 [2] (A1)

- 10 11. Simon and Fiona are sharing a cupboard. If Simon's things take up  $\frac{2}{5}$  of the space and Fiona's things take up  $\frac{2}{7}$  of the space, what fraction of the cupboard is empty?

$$\begin{aligned} 1 - \frac{2}{5} - \frac{2}{7} &= 1 - \frac{14}{35} - \frac{10}{35} \\ &= \frac{35 - 24}{35} \\ &= \frac{11}{35} \end{aligned}$$

(M1)

Answer:  $\frac{11}{35}$  [3] (A1)

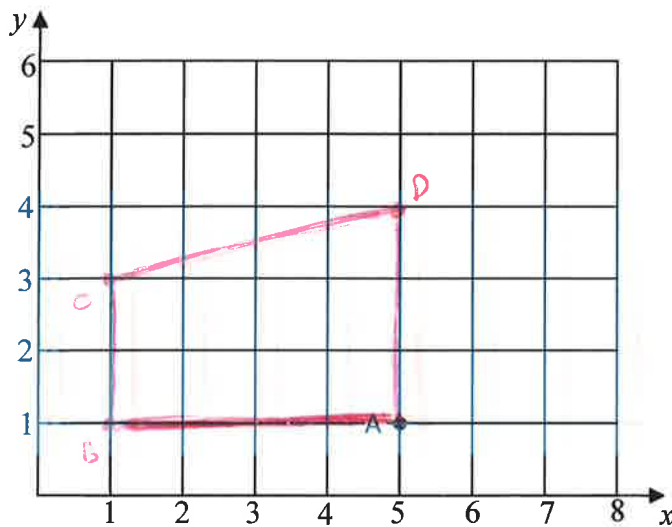
- 11 ~~12~~. (a) Round 1619 to the nearest 10.

Answer: 1620 [1] (A1)

- (b) Round 2017 to the nearest 100.

Answer: 2000 [1] (A1)

- 12 ~~13~~. A, B and C and D are 4 points on a grid. A is at (5, 1), B is at (1, 1) and C is at (1, 3) and D is at (5, 4).



- (a) Plot the points B, C and D and then connect them to form the quadrilateral ABCD.

[1]

- (b) State what type of quadrilateral has been formed.

Answer: Trapezium [1] (A1)

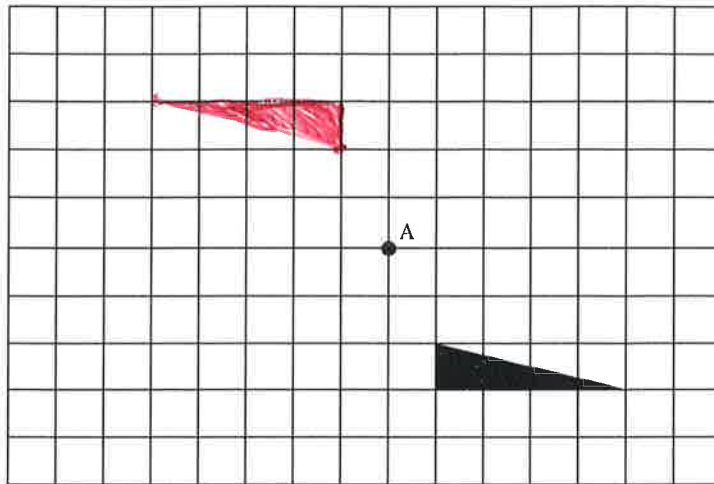
- (c) The side length of each small square in the grid is 1 cm. Work out the area of the quadrilateral ABCD.

8 + 2 o.e

(M1)

Answer: 10 cm<sup>2</sup> [2] (A1)

13. Rotate the triangle through  $180^\circ$  about the point marked A

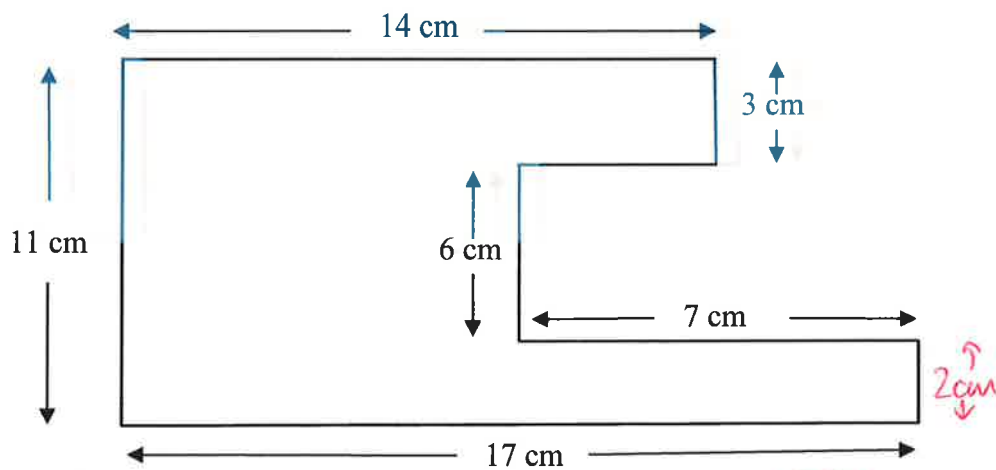


(A1) right way up  
(A1) right location.

[2]

14. Work out the perimeter of this shape.

Note: all angles are right angles but the diagram has not been drawn to scale.



$14 + 11 + 3 + 6 + 7 + 2 + 17 = 64$

(or  $11 + 11 + 14 + 17 + 7$  without working out 2cm)

Answer: 60 cm [3]

16. The example below shows a quick way to work out the difference between two square numbers.

$$19^2 - 16^2 = (19 + 16)(19 - 16) = 35 \times 3 = 105$$

Use this method to work out the following:

(a)  $17^2 - 13^2$

$$(17+13)(17-13)$$

$$= 30 \times 4$$

Answer: 120 [2]

(b)  $888^2 - 112^2$

$$(888+112)(888-112)$$

$$= 1000 \times 776$$

Answer: 776000 [2]

(c)  $7.5^2 - 2.5^2$

$$(7.5+2.5)(7.5-2.5)$$

$$= 10 \times 5$$

Answer: 50 [2]

16. The mean (average) of five numbers is 28. The mean of a different set of twelve numbers is 11. Calculate the mean of all of the numbers together.

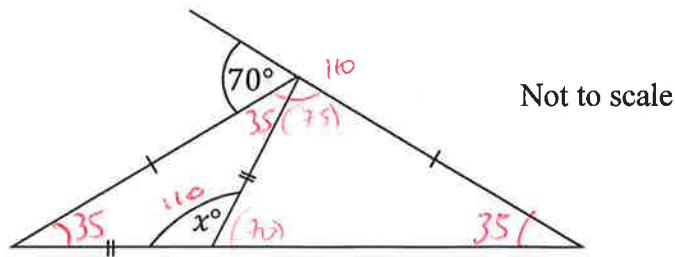
$$28 \times 5 + 12 \times 11 = 140 + 132 = 272$$

$$\frac{272}{17} = 16$$

Answer: 16 [3]



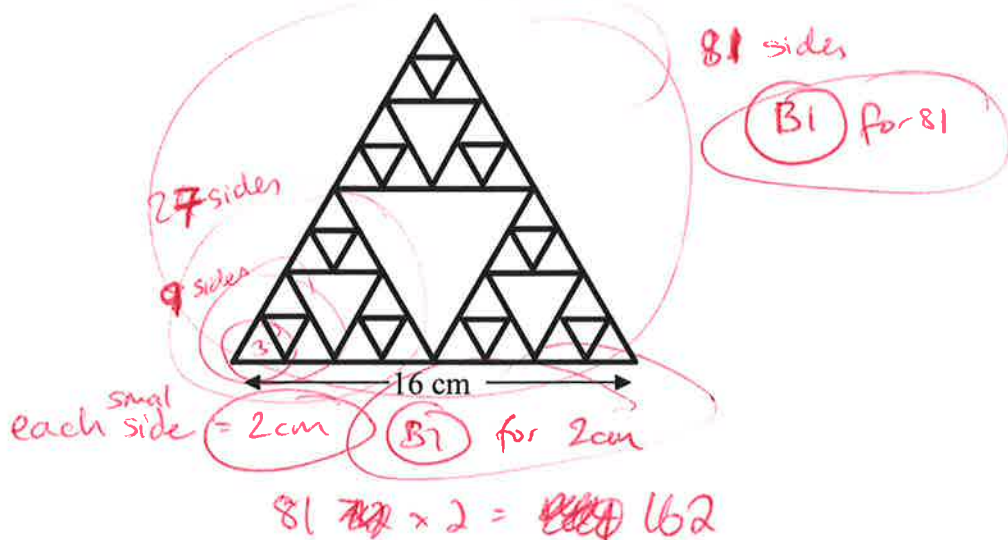
18. Work out the value of  $x$  from the diagram below.  
17.



$x = 180 - 35 - 35$  (M1) for any correct  $35^\circ$  angle. (M1)

Answer:  $x = \underline{110}$  (A1) [3]

19. The shape below is made up of equilateral triangles. The side length of the largest triangle is 16 cm. Work out the total length of all of the lines used to draw the shape.  
18.



Answer:  $\underline{162}$  (A1) cm [3]

20. Jon has 30% more money than Miguel and together they have £46. Calculate how much money Jon has.

19.

Ratio 13:10  
26:20

(M1)

or alternative method.

£26 : £20

(M1)

Answer: £ 26 [3]

(A1)

21. A group of children are playing a game where they can score either 2, 3 or 5 points on each turn. The children have had 8 turns each and recorded their scores in a table, but some of the entries have been deleted. Fill in the missing numbers to give a complete set of scores.

20.

| Name      | 2 points | 3 points | 5 points | Total Score |
|-----------|----------|----------|----------|-------------|
| Carl      | 1        | 6        | 1        | 25          |
| Alex      | 4        | 2        | 2        | 24          |
| Yusuf     | 3        | 3        | 2        | 25          |
| Jing      | 1        | 1        | 6        | 35          |
| Charlotte | 6        | 2        | 0        | 18          |

(A2) for 1, 1, 6

award A1 for 2 out of 3

(A1) for both 2 and 24  
(A1) for both 2 and 3

(A2) for 6, 2, 0

Award A1 for 2 out of 3.

[6]

22.  
21.

Write each of the numbers 80, 81, 82, 83, 84 and 85 in the spaces below, using each number only once, to make all of the statements true.

81 is a square number 81

83 is a prime number 83

80 is a multiple of 5 80 85

85 is the product of two prime numbers 82 85

82 is double a prime number 82

84 is a multiple of 3 81 84

(A4) all correct

-1 for each incorrect  
to minimum of ~~20~~  
(10)

[4]

23.  
22.

James cycles 4000m at 10 metres per second. Tom takes 100 seconds more to cycle the same distance. At what speed does Tom cycle?

James takes 400s

Tom takes 500s

(M)

(M)  $\frac{4000}{500} = 8$  ~~100~~

Answer: 8 (A1) metres per second [3]

24. The instruction  $x \spadesuit y$  means double  $x$  and add  $y$ .

23. For example:  $5 \spadesuit 3 = 2 \times 5 + 3 = 13$

(a) Work out the value of  $14 \spadesuit 55$

$$2 \times 14 + 55 = 83$$

(M1)

Answer: 83 (A1) [2]

(b) What is the value of  $a$  if  $9 \spadesuit a = 31$

$$18 + a = 31$$

(M1)

Answer: 13 (A1) [2]

(c) What is the value of  $b$  if  $b \spadesuit 10 = 16 \spadesuit b$

$$2b + 10 = 32 + b$$

$$b = 22$$

(M1)

Answer: 22 (A1) [2]

(d) The numbers  $c$  and  $d$  are such that  $c \spadesuit d = d \spadesuit c$ . Work out the value of  $d - c$ .

$$2c + d = 2d + c$$

$$c = d$$

(M1)

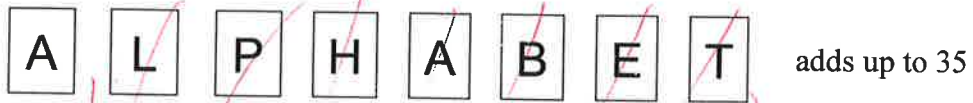
Answer: 0 (A1) [2]

24. ~~25.~~

The cards below have letters on one side, and the numbers 1, 2, 3, 4, 5, 6 and 7 on the other side (but not necessarily in this order on the cards).



You are told that:



$$PHABLET = 1 + 2 + 3 + 4 + 5 + 6 + 7 = 28$$

(M1)

(a) Find the value of



$$35 - 28 = 7$$

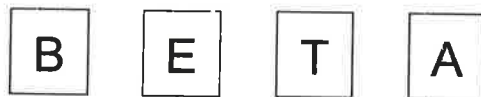
Answer: 7 [2]

(A1)

You are also told that



(b) Work out what the following add up to.



$$\begin{aligned} \text{BETA} &= \text{ALPHABET} + \text{A} - \text{ALPHA} \\ &= 35 + 7 - 20 \\ &= 22 \end{aligned}$$

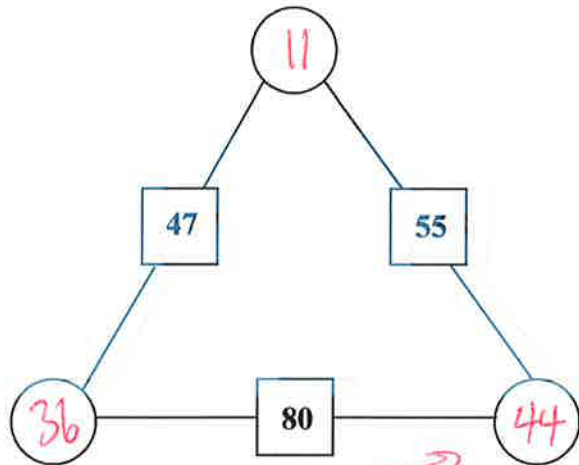
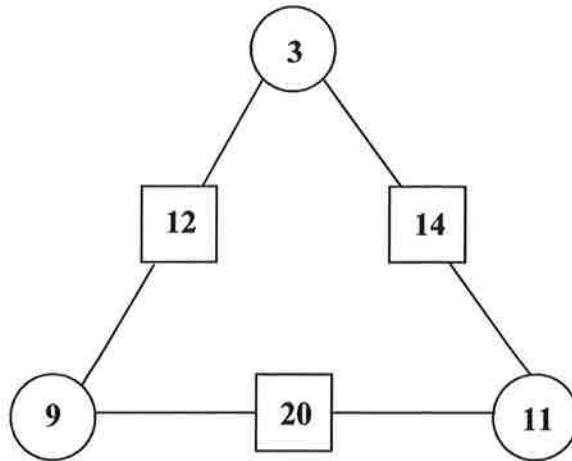
(M1)

Answer: 22 [2]

(A1)

26.  
25.

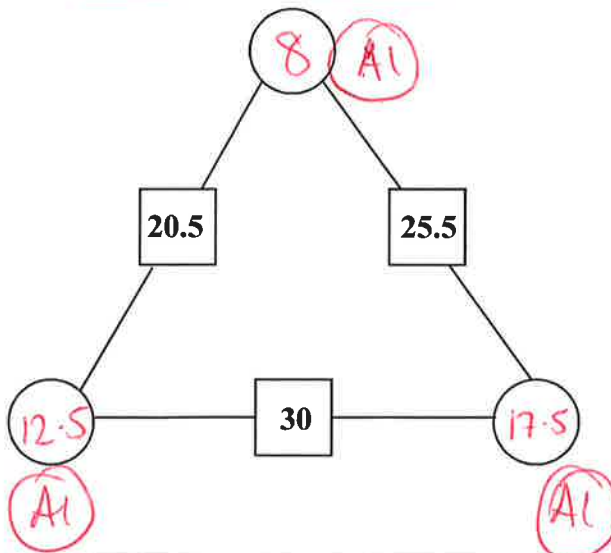
Along any line drawn, the numbers in the two circles at the end of a line should add together to make the number in the square between the two circles, as in the first example. Fill the remaining circles with numbers obeying this rule.



A2 all correct  
A1 2 out of 3.

notice eg is 8 more than

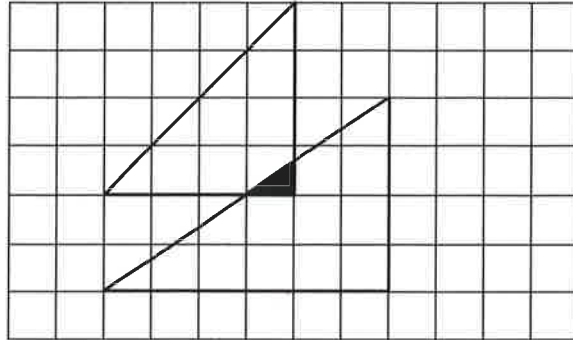
[2]



[3]

27.  
26.

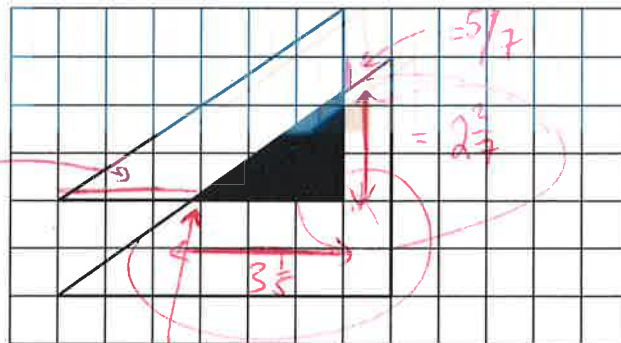
Each of the diagrams below shows a pair of triangles drawn on a grid of squares of side length 1 cm. Each corner of each triangle lies exactly at the corner of a square. The overlap between each pair of triangles is shaded. Work out the area of the shaded region in each case.



$$= \frac{1}{2} \times 1 \times \frac{2}{3} = \frac{1}{3}$$

(M1)

Answer:  $\frac{1}{3}$  cm<sup>2</sup> [2] (A1)



(M1) for either  $2\frac{2}{7}$  or  $3\frac{1}{5}$  correct

~~Other sensible approaches could earn method marks - please ask if unsure!~~

(M1) dependent on correct sides

$$\text{So } \frac{1}{2} \times 3\frac{1}{5} \times 2\frac{2}{7} = \frac{1}{2} \times \frac{16}{5} \times \frac{16}{7} = \frac{128}{35}$$

Other sensible approaches could earn method marks - please ask if unsure!

Answer:  $\frac{128}{35}$  cm<sup>2</sup> [3] (A1)

## **End of the Examination**

**If you have time, go back and check your answers and make sure that you have shown all of your working.**