Artwork by Lucy Phillips, Year 12

St Albans High School
for Girls

11+ Entrance Examination

In

Mathematics Specimen Paper

1 Hour and 15 Minutes

INSTRUCTIONS

1 DO NOT OPEN THIS PAPER UNTIL YOU ARE TOLD THAT THE EXAMINATION HAS STARTED.

2 There are 32 questions in the paper. Always check that you have turned over the page and that you have not missed any pages.

3 You will need to work steadily but quickly, taking care to be as accurate as possible.

4 You may write in pencil or pen.

1. Add $48 + 84$

Answer…….

2. Subtract $128 - 54$

Answer…….

3. Multiply 24×7

Answer…….

4. Divide $285 \div 3$

Answer…….

5. Write in figures the number *thirteen thousand and eighty three*

Answer…….

6. Work out half of three million, forty-thousand, two-hundred. Write your answer in words.

Answer…….

…….

7. How much larger is $7\frac{4}{5}$ than $3\frac{2}{5}$?

Answer…….

8. Ian buys
    - 3 bananas at 12p per banana
    - 5 apples at 11p per apple

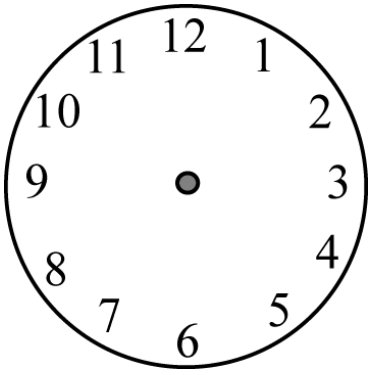
    If Ian pays with a £2 coin how much change would Ian get? Give your answer in pounds and pence.

Answer £…….

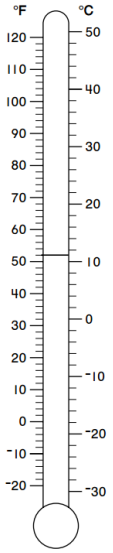
9. The digits 3, 1, 9 and 2 can be arranged in any order to make four digit numbers. What is the difference between the largest and smallest numbers that you can make?

Answer…….

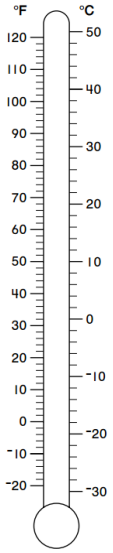
10. Draw hands so that the clock below shows a time of 16.30.



11.



The diagrams show two thermometers. One of the thermometers shows a temperature of $52°F$. Shade the other so that it shows a temperature of $46°C$



12. Jacqueline needs to catch a flight early tomorrow morning. She needs to get out of bed at 3.15 am, but wants to make sure that she has at least $7\frac{1}{2}$ hours of sleep. What is the latest time that Jacqueline can go to sleep this evening?

Answer…….p.m.

13. Arrange the following numbers in order, starting with the smallest

$$\frac{1}{5} \qquad 0.6 \qquad 25\% \qquad 0.21 \qquad \frac{13}{48} \qquad 0.56 \qquad 0.1348$$

14. In a Tennis club $\frac{1}{9}$ of the players are left handed. There are three times as many players who wear glasses as there are who are left handed. What fraction of the players wear glasses?

Answer…….

15. Boxes of eggs hold 12 eggs. How many boxes will be needed to hold 158 eggs?

Answer…….

16. It takes Katie 3hours to jog 18 miles at a steady pace. If Katie decides to run for only two hours, but at the same speed how far would she run?

Answer…….

17. Find two whole numbers which multiply together to give 18 and a difference of 7.

Answers……. and ……

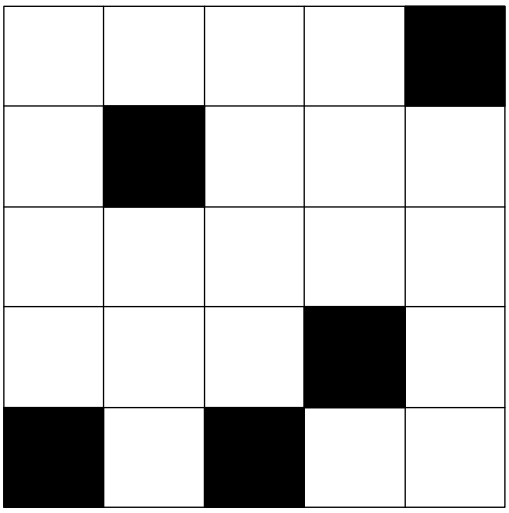
18. Pairs of avocados are sold in a shop. 16 pairs of avocados are sold at a total cost of £24. The shopkeeper now decides to separate the pairs and sell the avocados individually, but without any change to the total price. What is the cost of an individual avocado? Give your answer in pence.

Answer…….pence

19. A number is multiplied by itself and the answer is 41. The number that I first thought of lies between two whole numbers. Write the two whole numbers in the boxes below.

☐ and ☐

20. Shade exactly three squares so that the shape has reflection symmetry about any line.



21. At 5.00 am the temperature is $-3°C$. At 10.30 am the temperature has risen steadily by $2°C$ per hour. What is the temperature at 10.30 am?

Answer…….

22. Four people meet to discuss a new swimming competition. Each person shakes everyone else's hand exactly once. How many handshakes are there in total?

Answer…….

23. Jessica hires a boat from a Kiosk in the park. The owner of the boat charges £2 to take the boat and then £3 for each hour that it is used. If Jessica uses the boat for half an hour she only needs to pay half the hourly cost.

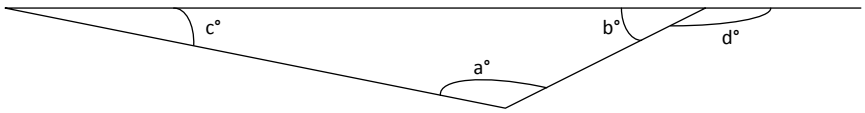
    a. How much will Jessica pay to row the boat for 2 hours?

Answer…….

    b. If Jessica pays £15.50 for how long has she hired the boat?

Answer…….

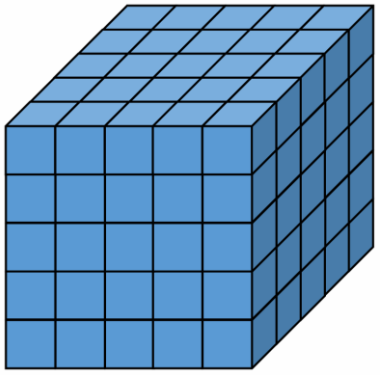
24.



The angles in a triangle always add up to $180°$. In the triangle shown above angle $a°$ is three times as big as angle $b°$ and angle $b°$ is twice as large as angle $c°$. Find the angle $d°$ shown in the diagram.

Answer…….

25.



The diagram shows a large cube that has been made by stacking smaller, 1cm cubes together.

a. Suppose that you are now trying to make the cube for yourself.

How many 1cm cubes will be needed to construct the larger cube?

Answer…….

b. Once you have constructed the larger cube you decide to paint it red, including the base.

(i) Once painted, how many 1cm cubes will have at least one red face.

Answer…….

(ii) How many 1cm cubes will have two red faces.

Answer…….

26. Jason and Patrick win a prize of £75 for their entry into an inventing competition. For every 2 hours that Patrick worked on the project Jason worked 3, so it is decided that for every £2 that Patrick receives Jason should receive £3. How much will Jason and Patrick receive? Write your answers in the boxes below.

Jason ☐ Patrick ☐

27. The diagram shows two equilateral triangles and a rectangle. Calculate the size of angle $a°$.

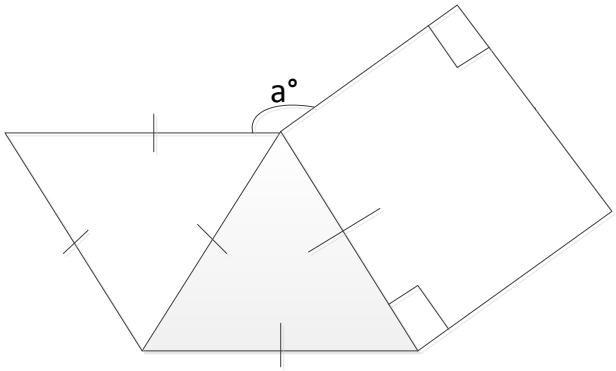
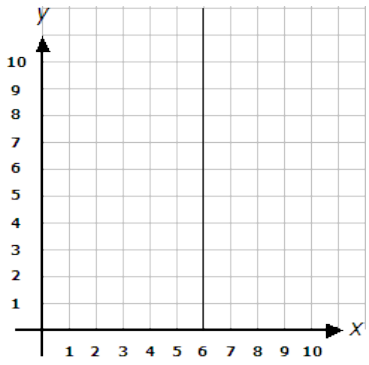


Diagram not drawn to scale

Answer…….

28.



a. One the grid above plot all four of the following points and label them A, B, C and D. Join your points to form a rectangle.

A(3, 3)
B(5, 3)
C(5, 7)
D(3, 7)

b. A straight vertical line is drawn so that it passes through 6 on the x axis. This line is shown on the grid already. On the same grid reflect the rectangle ABCD in the line and write down the co-ordinates of all four corners of your new shape.

c. If, instead, the vertical line had passed through 20 on the x axis and you reflected ABCD in the new line, what would the co-ordinates of all four corners of your new shape be?

29. For each of the sequences write down the next three terms

a.	3	7	11	15	19	....	....	....
b.	8	17	35	71	143	....	....	....
c.	$\frac{2}{3}$	$\frac{3}{5}$	$\frac{5}{7}$	$\frac{7}{11}$	$\frac{11}{13}$	....	....	....
d.	11	24	46	86	162	....	....	....

30. In a particular kind of arithmetic $a \circ b$ means multiply a by itself and add the result to the answer you get if you multiply b by itself.

So, for example

$$\begin{aligned} 3 \circ 5 &= 3 \times 3 + 5 \times 5 \\ &= 9 + 25 \\ &= 34 \end{aligned}$$

a. Work out $2 \circ 4$

Answer…….

b. Work out $\frac{1}{2} \circ \frac{1}{2}$

Answer…….

c. Find a positive value of c that works in the following:

$$c \circ c = 50$$

Answer…….

31. Three consecutive **positive** numbers are multiplied together. This means that the second number is 1 more than the first, and the third number is 1 more than the second. For example

$4\times5\times6$ $8\times9\times10$ $15\times16\times17$

Circle all statements below that are **always true**.

The answer is divisible by 3

The answer is a multiple of 6

The answer is even

The answer is odd

The answer is a multiple of 5

The answer is divisible by 8

The answer is prime

The answer is a square number

32. If 5! Means $5\times4\times3\times2\times1$ and 4! Means $4\times3\times2\times1$

a. Work out the value of 6!

Answer…….

b. Fill in the box if $3!\times4=\square!$

c. Fill in the box if $3!\times20=\square!$

d. Fill in both boxes if $10\times9\times8=\frac{\square!}{\square!}$

End of Examination