The Haberdashers' Aske's Boys' School

Elstree, Herts

13+ Entrance Examination 2012

MATHEMATICS Paper 1

Time : 30 minutes

Full Name .....

Exam Number .....

Please follow these instructions

- Do not open this paper until you are told to do so.
- No calculators are allowed

1. Showing working, solve the equation

$$10x + 6 = 26$$

x = ……

2. A bag contains red and blue sweets. There are 18 sweets in total and twice as many blue sweets as there are red sweets. How many red sweets are there?

……red sweets

3. Calculate the mean of the numbers 11, 2, 17, 9 and 11

Mean = ……..

4. Find the next 3 terms in the sequence:

1 4 9 16 …..

Next 3 terms ……. …… ……..

5. Write $\frac{1}{8} + \frac{1}{16}$ as a single, simplified fraction.

Answer = ……

6. Simplify as far as possible

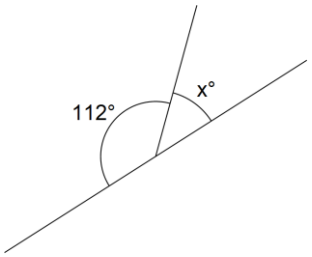
$$\frac{3}{8} \times \frac{64}{99}$$

Answer = ……

7. A car travels steadily at 33 metres per second along a straight road. If this continues for 2 minutes, how far in km will the car travel?

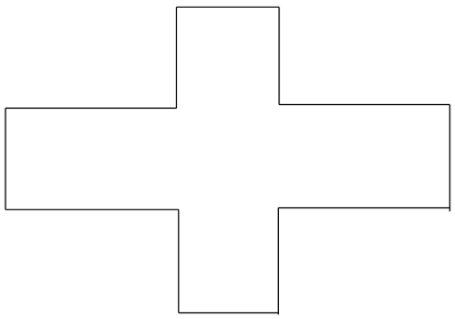
Answer = ……km

8. Find the angle *x* in the following diagram. You must show full working.



x =……degrees

9. Draw all lines of symmetry on the following shape



10. Simplify as far as possible

$$p^3 \times p^4$$

Answer = …….

[Turn over]

11. Showing working, solve the equation

$$3(x + 2) = 21$$

x = ……

12. On Friday Jack walked *x* km. On Saturday Jack walked twice as far as he did on Friday. On Sunday Jack walked 3 more km than he did on Friday and Saturday combined. How far did Jack walk during Friday, Saturday and Sunday combined? Give your answer in terms of *x*.

Answer = ……km

13. Find the median of the numbers

3.2 4.6 7.1 2.4 3.8 10.1

Answer = ……

14. Find the next 3 terms in the sequence:

1 3 7 15 31 …..

Next 3 terms ……. …… ……..

15. Write as a single fraction:

$$\frac{1}{x} + \frac{2}{y}$$

Answer = ……

16. Simplify as far as possible

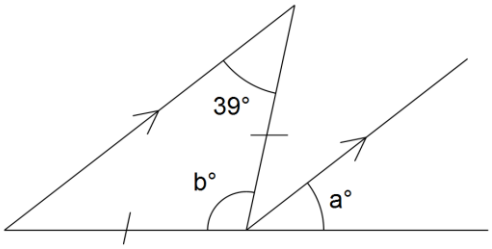
$$\frac{3t}{p} \times \frac{p^3}{9t^2}$$

Answer = ……

17. A car drives at 70 km per hour for 3 hours. The car then drives at 60 km per hour for 2 hours. If the car had completed this entire journey at 110km per hour, without changing speed, how long would the journey take? **You will be expected to show clear, well-organised working.**

Answer = …….hours

18. Find the values of *a* and *b* in the following diagram:



a = ……..degrees

b = ……..degrees

19. How many lines of symmetry do each of the following shapes have?

(a) A regular hexagon …….lines of symmetry

(b) A regular pentagon …….lines of symmetry

[Turn over]

20. Simplify as far as possible:

$$\frac{8}{9}x^4 \div \frac{16}{27}x^3$$

Answer = ……

21. Showing full working, solve the equation

$$2(x+3)+5(x-2)=3(x+7)-9$$

x = ……

22. 3 men take 2 days to dig 4 holes. How long will it take 2 men to dig 8 holes?

Answer = ……days

23. Find five numbers such that the mean and median are both 7, but the mode is 10.

Five numbers ….. ….. ….. ….. …..

24. Find the 300th term in the sequence

8 11 14 17 ….

300th term = ……..

25. Solve the equation

$$\frac{15-\sqrt{y}}{8}=1$$

y = ……..

26. Simplify as far as possible:

$$\frac{3(x+y)^3}{8}\times\frac{64(x+y)^2}{27(x+y)^7}$$

Answer = ……

27. How many minutes are there in 1.2 days?

Answer = ……..minutes

28. A square is enlarged so that it is exactly the same shape, but all sides are 3.1 times larger than they were to start with. If the area of the original square is 200 cm^2, what is the area of the enlarged square?

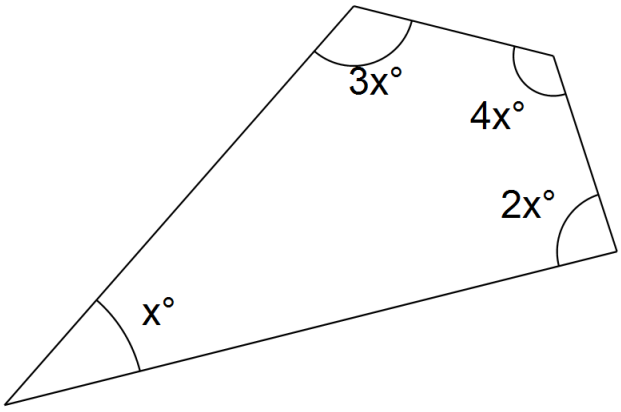
Answer = ……cm^2

[Turn over]

29. The number 1 is both a square number and a cube number. Find two more positive numbers that are both squares and cubes.

Two numbers …… ……

30. Find the value of *x* in the following diagram. **You must show your working fully, including the solution of any equation that you may use.**



x = ……

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