

13+ Mathematics

The Perse School Entrance Examination

Specimen Paper

Time allowed: 1 hour

Instructions to candidates:

1. Show all working - you may receive marks for correct working even if your final answer is wrong.
2. Answer as many questions as you can, in any order. You are not expected to finish the paper.
3. Do not spend too long on any one question - if you get stuck, move on to the next.
4. Answers and working should be written on the exam paper in the spaces provided.
5. Calculating aids are **NOT** permitted.

NAME: _____ **SCHOOL:** _____

1. Multiply 607 by 508

Answer: _____

2. (a) Simplify $m^2 \times m^7$

Answer(a): _____

- (b) Multiply out and simplify the following

$$7(x + 4) - 3(2x - 1)$$

Answer(b): _____

3. How many minutes are there in 0.4 hours ?

Answer: _____

4. (a) Find the value of $2^3 \times 5^2$

Answer(a): _____

(b) Write 300 as a multiplication of prime numbers, leaving your answer in a form that involves indices as in part (a)

Answer(b): _____

5. The height of the Eiffel tower is 2.95×10^2 m. What is this in millimetres? Leave your answer in scientific form.

Answer: _____ mm

6. Solve $\frac{x}{3} + x = 28 - x$

Answer: $x =$ _____

7. Calculate 5.06×7.2

Answer: _____

8. In this question, $a = -3$, $b = 4$ and $c = 2$

Calculate the value of each of the following:

(i) a^3

Answer(i): _____

(ii) $2ab$

Answer(ii): _____

(iii) $(3c - 2a)^2$

Answer(iii): _____

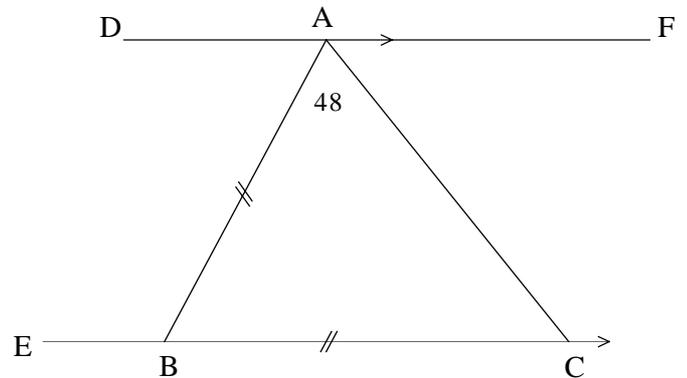
9. (i) Express $6\frac{1}{4}$ as a top heavy fraction.

Answer(i): _____

(ii) Hence find the square root of $6\frac{1}{4}$

Answer(ii): _____

10. In the diagram shown opposite,
DF is parallel to EC and AB is
equal in length to BC.
Angle BAC = 48°



Calculate:

(i) Angle ABC

Answer: $\angle ABC =$ _____

(ii) Angle BAD

Answer: $\angle BAD =$ _____

(iii) Angle ABE

Answer: $\angle ABE =$ _____

11. The table below gives information about pupils in a school

	Left handed	Right handed
Boys	103	447
Girls	87	363

(a) How many pupils are there in the school?

Answer(a): _____

(b) What % of the school are left handed?

Answer(b): _____

(c) What is the ratio of boys to girls?

[Leave your answer in the form $p : q$ where p and q have no common factor]

Answer(c): _____

(d) One person is chosen at random from the pupils at the school. What is the probability that the person chosen is a left handed girl?

Answer(d): _____

12. Two boxes inside a larger box both have five boxes inside them. How many boxes are there in total?

Answer: _____

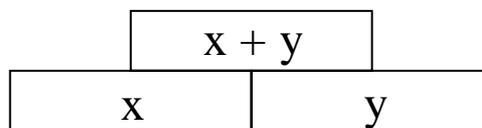
13. Write 0.225 as a fraction in its lowest terms.

Answer: _____

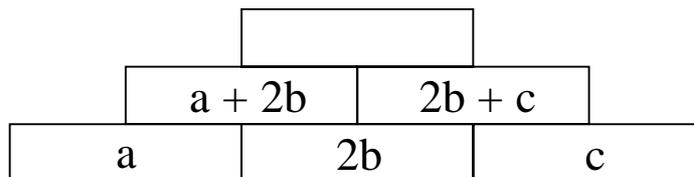
14. The sum of two numbers is 100. The difference between them is 56.
What is the larger number?

Answer: _____

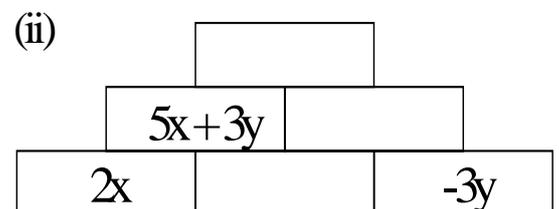
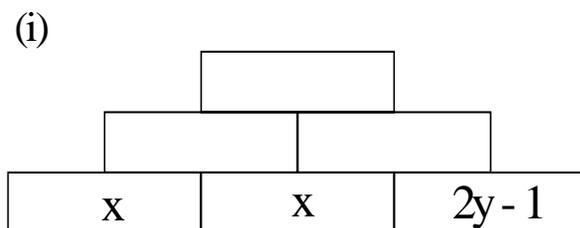
15. In these walls, the value of each brick is made by adding the value of the two bricks below it.
i.e.



- (a) Write a simplified expression for the number in the top brick of the wall shown below:



- (b) Fill in the missing expressions in each of the walls shown below:
(write your answers in a simplified form)



16. Calculate each of the following [**leave fractions in their lowest form**]

(a) $\frac{2}{3} + \frac{7}{12}$

Answer(a):_____

(b) $\frac{3}{4} - \frac{1}{4} \times \frac{2}{5}$

Answer(b):_____

(c) $\frac{7}{9} \div 1\frac{2}{5}$

Answer(c):_____

17. Write down the next number in each of the following sequences:

(a) 1, 6, ,11, 16, 21, _____

(b) $\frac{1}{25}$, $\frac{1}{5}$, 1, 5, 25, _____

(c) 45, 90, 30, 120, 24, _____

18. Simplify each of the following algebraic expressions:

(a) $\frac{6t \times 5t}{15t^2}$

Answer(a):_____

(b) $6y \times 4y - 7y^2$

Answer(b):_____

(c) $\frac{x}{4} + \frac{x}{3}$

Answer(c):_____

19. In this question, take $\pi = 3.14$

The school groundsman uses a roller to maintain a level playing field.
The roller has a cylinder of diameter 80cm.

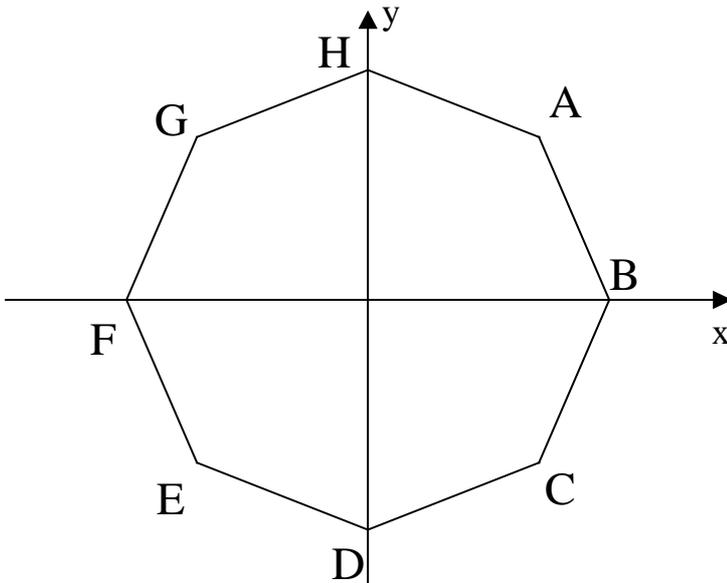
(a) He pushes the roller round exactly once. How far has the roller moved?

Answer(a): _____ cm

(b) The groundsman pushes the roller forward 12560cm. Calculate how many turns the cylinder goes round.

Answer(b): _____ turns

20. The diagram shows a regular octagon with axes at its centre.



The line through A and C has equation $x = 5$

(a) What is the equation of the line through E and C ?

Answer(a): _____

(b) What is the equation of the line through A and E ?

Answer(b): _____

(c) What is the equation of the line through H and D ?

Answer(c): _____

21. In this question, we define a new operation in arithmetic, using \star as a symbol.

$$a \star b = ab + a - b$$

For example, $3 \star 7 = 21 + 3 - 7 = 17$

(i) Calculate $5 \star 2$

Answer(i): _____

(ii) Calculate $3 \star \frac{1}{2}$

Answer(ii): _____

(iii) Solve the equation $x \star 5 = 8$

Answer(iii): $x =$ _____

Now check through your work carefully!