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THE PERSE

UPPER SCHOOL

CAMBRIDGE

Year 9 Entrance Exams

Maths

Specimen Paper 2

Instructions to candidates

Time allowed: 1 hour

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. Answer and working should be written on the exam paper in the spaces provided.

5. Calculating aids are **NOT** permitted.

1. Calculate

(a) 197 + 798

Answer: (a) _____

(b) 603 - 158

Answer: (b) _____

(c) 67 x 3

Answer: (c) _____

(d) 170 ÷ 5

Answer: (d) _____

2. Simplify each of the following expressions:

(a) $6a^2 + a^2$

Answer: (a) _____

(b) $6a^2 \times a^2$

Answer: (b) _____

(c) $6a^2 \div a^2$

Answer: (c) _____

(d) $\frac{4a + 2a}{6a^2}$

Answer: (d) _____

3. On my calculator, $\frac{5}{6}$ is shown as

0	●	8	3	3	3	3	3	3	3	3

[i.e. an 11 digit display]

What would my calculator show for $\frac{5}{60}$?

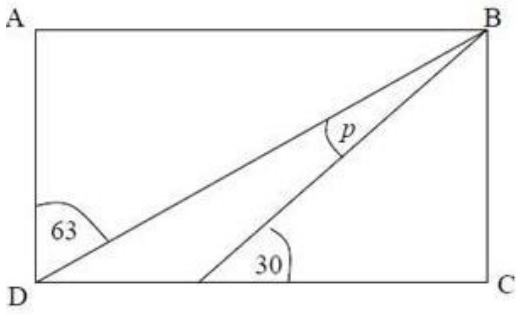
Answer:

4. Fill in the missing numbers in the boxes below, using only negative numbers:

☐ - ☐ = 6

☐ - ☐ = -6

5. The diagram below (not drawn to scale) is a rectangle ABCD.



Work out the size of angle *p*

Answer: *p* = _____

6. 630 is divided in the ratio 2 : 5.

   The smaller part is then divided in the ratio 1 : 4.

   What is the smallest part of the three parts?

Answer: _____

7. Solve $7\chi - 3 = 2\chi + 32$

Answer: χ = _____

8. Write 203.7983 correct to:

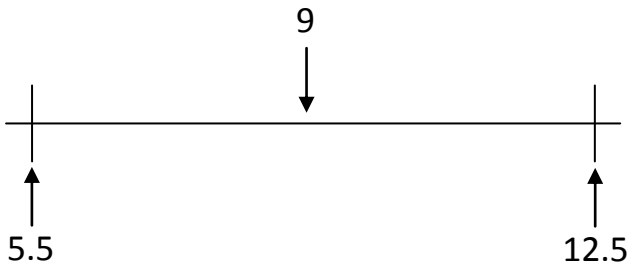
   (a) 2 decimal places

Answer: (i) _____

   (b) 2 significant figures

Answer: (ii) _____

9. The number 9 is always halfway between 5.5 and 12.5



Fill in the missing number below:

   (a) the number 8 is halfway between 2.8 and _____

   (b) the number 5 is halfway between –11 and _____

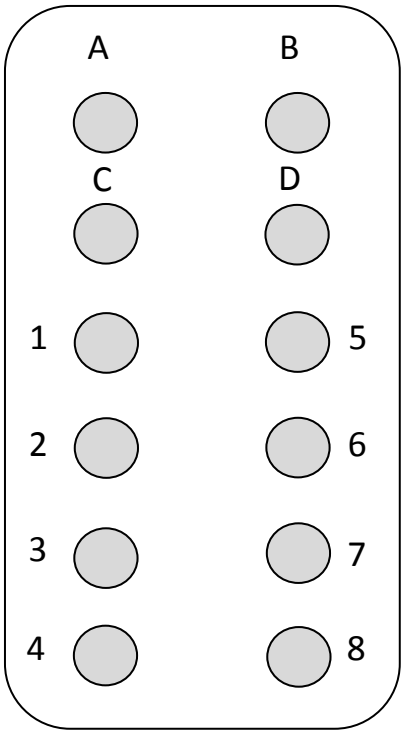
   (c) calculate the number which is halfway between 55 x 57 and 125 x 57

Answer: (c) _____

10. A safe has a security lock (as shown). To open the safe, you must press the correct buttons.

The code is single digit followed by a letter.

For example 5C



(a) How many different codes are there?

(show your working)

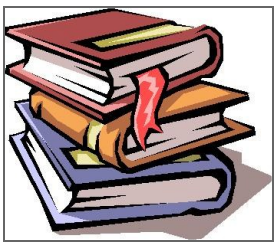
Answer: (a) _____

(b) I know that the correct code ends with an A.

I guess a single digit and then press A. What is the probability that I open the safe?

Answer: (b) _____

11. A teacher has a large pile of books.



An expression for the total number of books is $8n + 12$

(a) The teacher puts the books into two piles. The number of books on the first pile is $3n + 4$. Work out an expression for the number of books in the second pile.

Answer: (a) _____

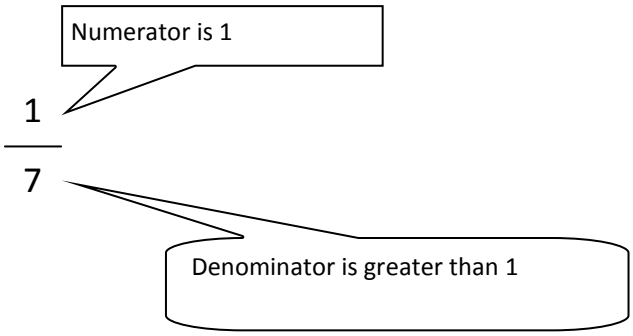
(b) The teacher puts all the books together again and uses them to make two new piles. There are $2n + 3$ books in the first pile. He counts the number of books in this first pile and finds there are 17. How many books are in the second pile? Show all your working.

Answer: (b) _____

12. $\frac{1}{4}, \frac{1}{5}, \frac{1}{9}$ are all examples of unit fractions.

All unit fractions have a numerator that is 1 and denominator that is greater than 1.

The ancient Egyptians used only unit fractions.



For $\frac{7}{10}$ they wrote $\frac{1}{2} + \frac{1}{5}$

(a) For what fraction did they write the sum $\frac{1}{3} + \frac{1}{4}$?

Answer: (a) _____

(b) They wrote $\frac{11}{30}$ as the sum of two unit fractions. One of these was $\frac{1}{5}$, what was the other?

Answer: (b) _____

(c) They wrote $\frac{16}{63}$ as the sum of two unit fractions. What are they?

Answer: (c) _____

(d) What is the biggest fraction you can made by adding two **different** unit fractions?

Answer: (d) _____

13. What is the smallest positive whole number which is divisible by 3, 4, 5, 6 and 7?

Answer: _____

14. When $a = 2$, $b = -3$ and $c = 5$, find the value of each of the following:

(a) $3a - 2b$

Answer: (a) _____

(b) b^2a

Answer: (b) _____

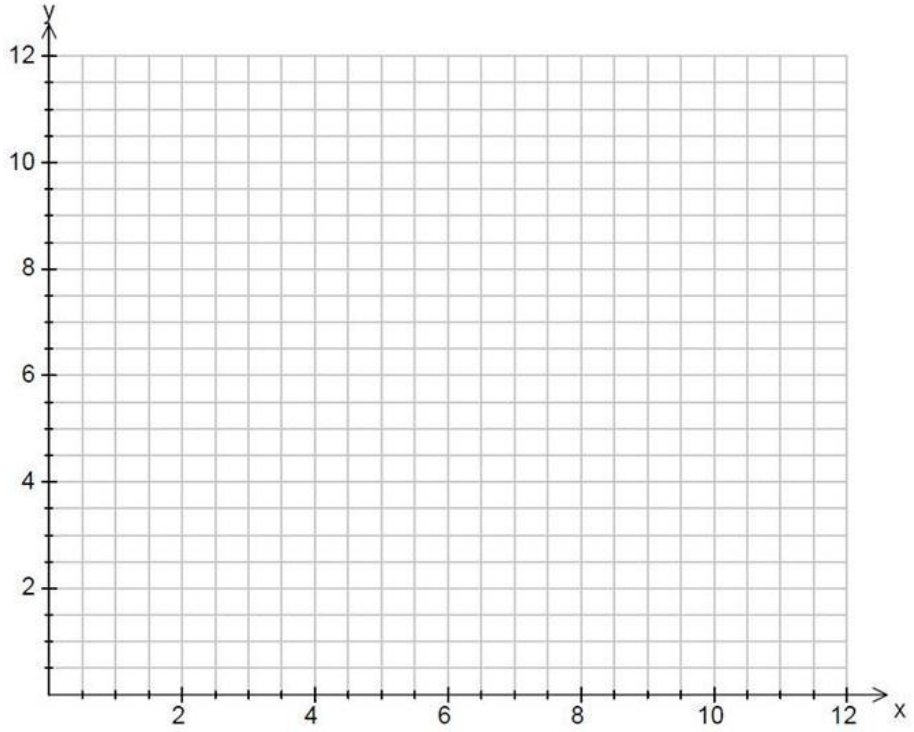
(c) $ab - 4c$

Answer: (c) _____

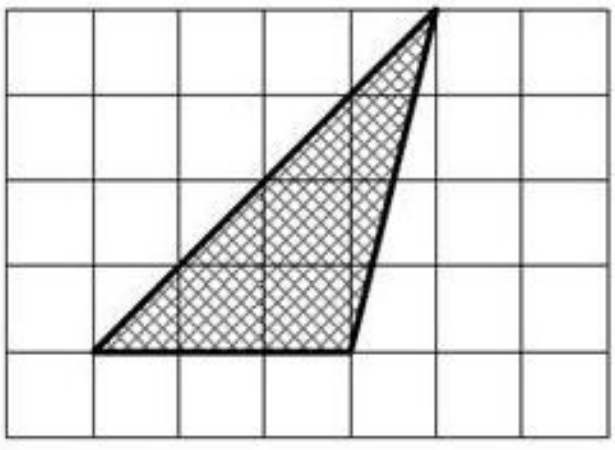
(d) $(b - a)^3$

Answer: (d) _____

15. Each point on the straight line $\chi + y = 9$ has an χ coordinate and a y coordinate that add together to make 9. Draw the graph of $\chi + y = 9$ on the graph below:

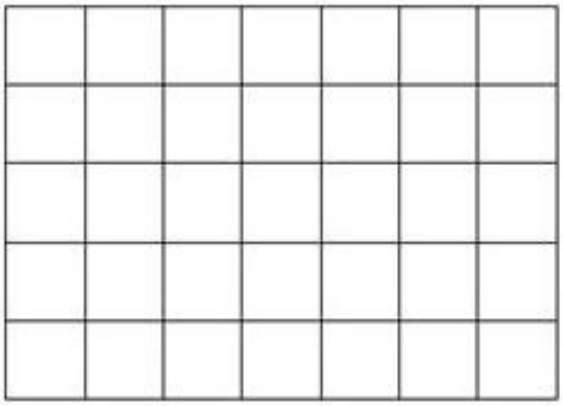


16. (a) Calculate the area of the triangle shown below:



Answer: area = _____

(b) Using the gird below, draw (and shade in) a parallelogram which has the same area as the triangle in (a). It must **NOT** have any right angles.



17. Factorise fully each of the following:

(a) $5a^2 - 6a$

Answer: _____

(b) $5a^2 - 10ab$

Answer: _____

18. My squash club had exactly the same members from 1st April 2001 to 1st April 2002. Complete the table below to show information about the ages of the members:

Age of members of squash club	
Mean (1st April 2001)	42 years 7 months
Range (1st April 2001)	3 years 1 month
Mean (1st April 2002)	
Range (1st April 2002)	

In April 2002, a new member aged 43 years 7 months joined the club. What will happen to the mean age of the members? Tick the correct box.

It will increase by more than 1 year. ☐

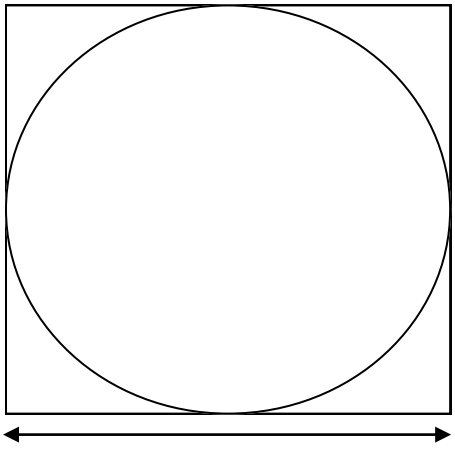
It will increase by exactly 1 year. ☐

It will increase by less than 1 year. ☐

It will stay the same. ☐

It is not possible to say. ☐

19. The diagram shows a circle touching the inside edges of a square. Calculate the area shaded (take π = 3.14)



Answer: _____cm^2

20. Simplify each of the following:

(a) $2\chi(3\chi)^2$

Answer: (a) _____

(b) $\chi(\chi - y) - y(\chi + y)$

Answer: (b) _____

21. (a) One calculation, shown below, gives the answer to the question:

What is 80 increased by 7%?

A. 80 x 0.7 **B.** 80 x 1.7 **C.** 80 x 0.07 **D**. 80 x 1.07 **E.** 80 ÷ 0.93

Write down the letter for the correct calculation.

Answer: _____

(b) Fill in the missing decimal number:

To decrease a number by 17% we multiply by _____

22. A US Centillion is the number 10^{303}

A UK Centillion is the number 10^{600}

(a) How many US Centillions are there in a UK Centillion?

Answer: (a) _____

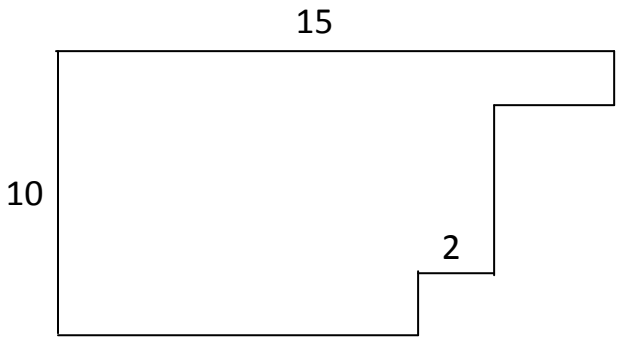
(b) Write the number 50 UK Centillions in standard form.

Answer: (b) _____

23. Alan multiplies a number by 1½ and gets 63. However, he should have divided the number by 1½. What was the correct answer?

Answer: _____

24. What is the perimeter of the figure below (not drawn to scale):



Answer: _____cm^2

25. Calculate 39.942 ÷ 0.07

Answer: _____

26. What is the units digit of the answer to 54 x 79 x 97?

Answer: _____

27. Before going on holiday, Andrew finds that he and Brian have £40 holiday money between them and that he and Christopher have £37 between them. Christopher finds that he and Brian have £25 between them. How much do the boys have altogether?

Answer: £_____

Now check through your work thoroughly!