Year 9 (13+) Entrance Assessments

Sample Maths Paper 2

SOLUTIONS

1. Calculate

    (a) 197 + 798

    Answer: (a) __996__

    (b) 603 - 158

    Answer: (b) __445__

    (c) 67 x 3
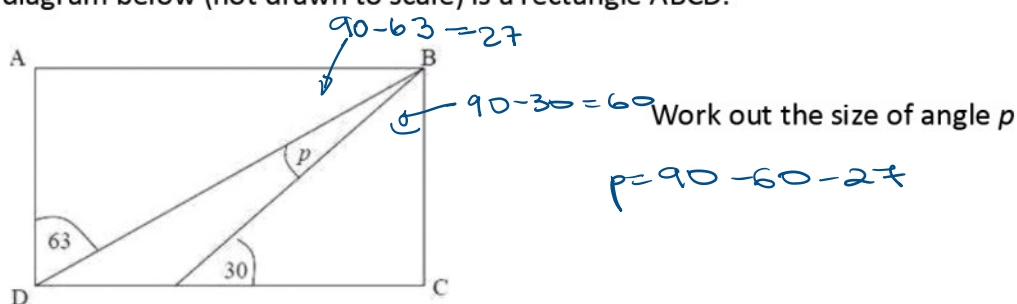
    Answer: (c) __201__

    (d) 170 ÷ 5

    Answer: (d) __34__

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

    $\boxed{-1}$ - $\boxed{-7}$ = 6   *Other examples are possible.*

    $\boxed{-7}$ - $\boxed{-1}$ = -6

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

90 − 63 = 27

90 − 30 = 60 Work out the size of angle *p*

p = 90 − 60 − 27

Answer: *p* = __*3°*__

4.   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?

$$\frac{630}{7} = 90, \quad \text{smaller part} = 180$$

$$\frac{180}{5} = 36$$

Answer: __*36*__

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

$$5x = 35$$

$$x = 7$$

Answer: χ = __*7*__
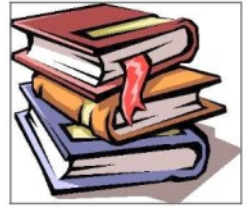
6.   Write 203.7983 correct to:

(a) 2 decimal places

Answer: (i) __*203.80*__

(b) 2 significant figures

Answer: (ii) __*200*__

7. 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.

$$(8n + 12) - (3n + 4)$$

Answer: (a) $\underline{5n + 8}$

(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.

$$8n + 12$$

$2n + 3 = 17$ $6n + 9$
$2n = 14$
$n = 7$ → $6 \times 7 + 9$

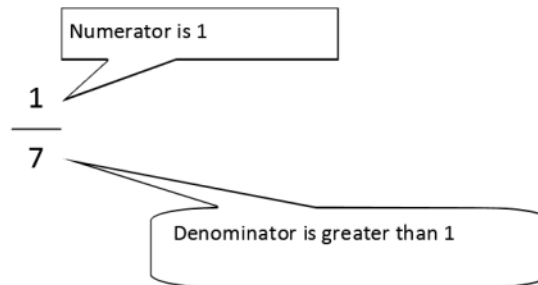or : $n = 7$ so total $= 8 \times 7 + 12$ Answer: (b) $\underline{51}$
$= 68$

second pile : $68 - 17 = 51$

8. $\frac{1}{4}$, $\frac{1}{5}$, $\frac{1}{9}$ 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.

Numerator is 1

$$\frac{1}{7}$$

Denominator is greater than 1

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

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

$$\frac{4}{12} + \frac{3}{12} = \frac{7}{12}$$

Answer: (a) $\frac{7}{12}$

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

$$\frac{1}{5} + \boxed{} = \frac{11}{30}$$

$$\frac{6}{3} + \boxed{\frac{5}{30}} = \frac{11}{13}$$

$$\rightarrow = \frac{1}{6}$$

Answer: (b) $\frac{1}{6}$

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

$$\boxed{\begin{array}{l} 63 = 7 \times 9 \\ 16 = 7 + 9 \end{array}}$$

check: $\frac{1}{7} + \frac{1}{9} = \frac{9}{63} + \frac{7}{63}$ ✓

Answer: (c) $\frac{1}{7} + \frac{1}{9}$

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

(a) $3a - 2b$

$6 - (-6)$

Answer: (a) _____12_____

(b) b^2a

9×2

Answer: (b) _____18_____

(c) $ab - 4c$

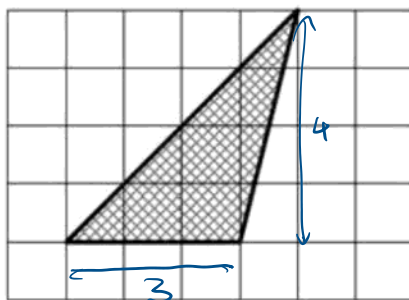$-6 - 20$

Answer: (c) _____-26_____

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

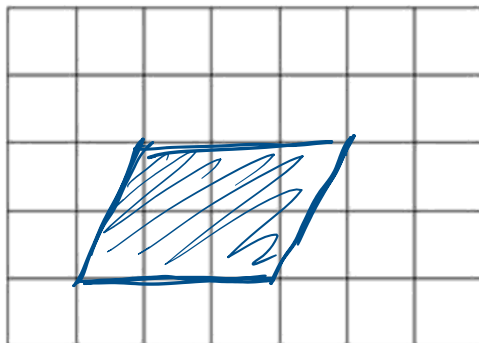$(-3 - 2)^3 = (-5)^3$

Answer: (d) _____-125_____

10.

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

$\dfrac{3 \times 4}{2}$

Answer: area = _____6 units²_____

(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.

e.g.

11. 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)	43 years 7months ← up by 1
Range (1st April 2002)	3 years 1month ← same

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. ☐

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

r=5

10cm

$25 \times 3.14 = \frac{100}{4} \times 3.14$

$= \frac{314}{4}$

$= 78.5$
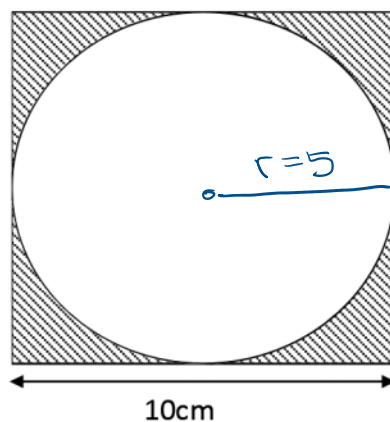
$(10 \times 10) - (3.14 \times 5^2)$

$= 100 - 3.14 \times 25$

$= 100 - 78.5$

Answer: _____21.5_____ cm²

13. 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?

10^{303} to 10^{600} : add 297 zeros

Answer: (a) 10^{297}

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

$50 \times 10^{600} = 5 \times 10^{601}$

Answer: (b) 5×10^{601}

14. Alan multiplies a number by 1½ and gets 63. However, he should have divided the number by 1½. What was the correct answer?
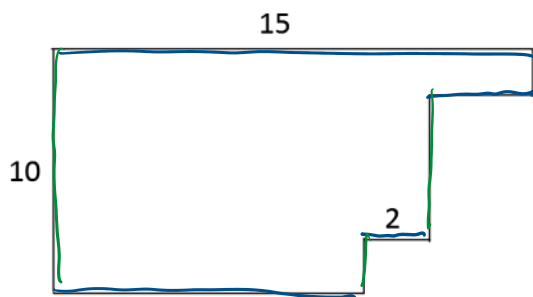
$x \xrightarrow{\times 1\frac{1}{2}} 63$

$\xleftarrow{\div 1\frac{1}{2}}$

$63 \div 1\frac{1}{2} = 63 \times \frac{2}{3} = 42$

$42 \div 1\frac{1}{2} = 42 \times \frac{2}{3} = 28$

Answer: 28

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

$15 + 15 + 10 + 10$

Answer: 50 cm

16. Calculate $39.942 \div 0.07$

$$3994\overset{4}{9}\overset{0}{4}.\overset{4}{2} \div 7 = 570.6$$

Answer: __570.6__

17. What is the units digit of the answer to $54 \times 79 \times 97$?

$$4 \times 9 \times 7$$
$$36 \times 7$$

Answer: __2__

18. 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?

$$A + B = 40$$
$$A + C = 37$$
$$B + C = 25$$

$$2A + 2B + 2C = 102$$
$$A + B + C = 51$$

Answer: £__51__

Now check through your work thoroughly!