1 The points A, B, C and D lie in order on a straight line.

$$AB : BD = 1 : 5$$
$$AC : CD = 7 : 11$$

Work out $AB : BC : CD$

..... : ..... : .....

(Total for Question 1 is 3 marks)

2 There are some small cubes and some large cubes in a bag.
The cubes are red or the cubes are yellow.

The ratio of the number of small cubes to the number of large cubes is 4 : 7

The ratio of the number of red cubes to the number of yellow cubes is 3 : 5

(a) Explain why the least possible number of cubes in the bag is 88

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.....

.....

(1)

All the small cubes are yellow.

(b) Work out the least possible number of large yellow cubes in the bag.

.....

(3)

(Total for Question 2 is 4 marks)

3 There are four types of cards in a game.

Each card has a black circle or a white circle or a black triangle or a white triangle.

number of cards with a black shape : number of cards with a white shape = 3 : 5

number of cards with a circle : number of cards with a triangle = 2 : 7

Express the total number of cards with a black shape as a fraction of the total number of cards with a triangle.

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(Total for Question 3 is 3 marks)

4 Given that

$$x^2 : (3x + 5) = 1 : 2$$

find the possible values of x.

.....

(Total for Question 4 is 4 marks)

5 The ratio $(y + x) : (y - x)$ is equivalent to $k : 1$

Show that $y = \dfrac{x(k + 1)}{k - 1}$

(Total for Question 5 is 3 marks)

6 White shapes and black shapes are used in a game.
Some of the shapes are circles.
All the other shapes are squares.

The ratio of the number of white shapes to the number of black shapes is 3 : 7

The ratio of the number of white circles to the number of white squares is 4 : 5

The ratio of the number of black circles to the number of black squares is 2 : 5

Work out what fraction of all the shapes are circles.

.....

(Total for Question 6 is 4 marks)

7 p and q are two numbers such that $p > q$

When you subtract 5 from p and subtract 5 from q the answers are in the ratio $5 : 1$
When you add 20 to p and add 20 to q the answers are in the ratio $5 : 2$

Find the ratio $p : q$
Give your answer in its simplest form.

.....

(Total for Question 7 is 5 marks)

8 The ratio of Marta's hourly pay to Khalid's hourly pay is 6 : 5

Both Marta and Khalid get an increase of £1.50 in their hourly pay.
The ratio of Marta's hourly pay to Khalid's hourly pay after this increase is 13 : 11

Work out the hourly pay before the increase for Marta and for Khalid.

Marta £.....

Khalid £.....

(Total for Question 8 is 4 marks)

9 $5c + d = c + 4d$

(a) Find the ratio $c : d$

(2)

$6x^2 = 7xy + 20y^2$ where $x > 0$ and $y > 0$

(b) Find the ratio $x : y$

(3)

(Total for Question 9 is 5 marks)

10 $2a : 5c = 6 : 25$
$4b : 7c = 20 : 21$

Show that $a + b : b + c = 17 : 20$

(Total for Question 10 is 3 marks)

11 Given that

$$2x - 1 \ : \ x - 4 \ = \ 16x + 1 \ : \ 2x - 1$$

find the possible values of x.

.....

(Total for Question 11 is 5 marks)

12

Given that $\frac{2x^2 + y^2}{4x^2 - y^2} = \frac{43}{11}$ where $x > 0$ and $y > 0$

find, in its simplest form, the ratio $x : y$

.....

(Total for Question 12 is 4 marks)

13 There is a total of y counters in a box.

There are x pink counters and 5 blue counters in the box.
The rest of the counters are green.

$$x : y = 1 : 3$$

Freda takes at random two counters from the box.

Find, in terms of x, an expression for the probability that Freda takes two counters of the same colour.

Give your answer as a fraction in the form $\frac{ax^2 + bx + c}{dx^2 + ex}$ where a, b, c, d and e are integers.

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(Total for Question 13 is 5 marks)