**Q1.** $j$ and $k$ stand for two numbers.    Double $j$ equals half of $k$.

Write numbers to complete the sentence below.

When $j$ is [ ] then $k$ is [ ]

**Q2.**  Here is an equation.

$m - 2n = 10$

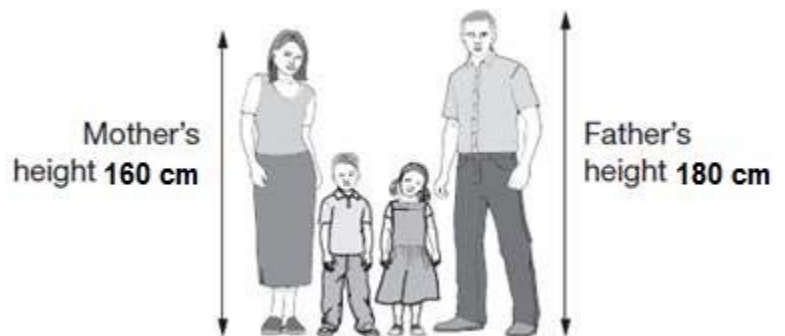When $n = 20$ what is the value of $m$?          $m =$ _____

When $m = 20$ what is the value of $n$?          $n =$ _____

**Q3.**  Here are Alfie and Emma with their parents.

You can use the table below to predict how tall children will be when they are adults.

There is one formula for boys and a different one for girls:

Mother's height **160 cm**          Father's height **180 cm**

| Boy's predicted height | Girl's predicted height |
|---|---|
| **0.4(x + y) + 42** | **0.4(x + y) + 29** |
| $x$ is the father's height in cm. $y$ is the mother's height in cm. | |

(a)   Calculate the predicted height of Alfie when he is an adult.

[ ] **cm**

(b)   When Emma is an adult, she is predicted to be taller than her mother.

How much taller?

[ ] **cm**

**Q4.**  (a)  There are **n** counters in Alfie's bag.

Alfie puts **3** more counters in the bag.

Write an expression for the number of counters that are in the bag now.

(b)  Megan has two boxes.   There are **m** counters in each box.

She puts all her counters together in a pile, then removes **5** of them.

Write an expression for the number of counters that are in the pile now.

**Q5.**   Here are an equilateral triangle and a regular pentagon.

Each side of the triangle is 10 cm
Each side of the pentagon is $d$ cm

The perimeter of the pentagon is 4 cm
more than the perimeter of the triangle.

What number does $d$ represent?

10 cm         $d$ cm

Show
your
method

**Q6.** Here is a pattern of number pairs.

| $a$ | $b$ |
|---|---|
| 1 | 9 |
| 2 | 19 |
| 3 | 29 |
| 4 | 39 |

Complete the **rule** for the number pattern.

$$b = \boxed{\phantom{XX}} \times a - \boxed{\phantom{XX}}$$

1 mark

**Q7.** Here is an equation. $k = 100 - 4n$

(a) Find the value of $k$ when $n = 60$

1 mark

(b) Find the value of $n$ when $k = 99$

$$n = \boxed{\phantom{XXXXXX}}$$

1 mark

**Q8.** $n = 22$

What is $2n + 9$?

$$\boxed{\phantom{XXXXXX}}$$

1 mark

$2q + 4 = 100$

Work out the value of $q$.

$$q = \boxed{\phantom{XXXXXX}}$$

1 mark