

**Dr Oliver Mathematics**  
**Mathematics Standard Grade: Credit Level**  
**2009 Paper 1: Non-Calculator**  
**55 minutes**

The total number of marks available is 38.

You must write down all the stages in your working.

1. Evaluate (2)

$$(846 \div 30) - 1.09.$$

2. Evaluate (2)

$$4\frac{1}{3} - 1\frac{1}{2}.$$

3. Given that

$$f(x) = x^2 + 3,$$

- (a) evaluate  $f(-4)$ , (2)

- (b) find  $t$  when  $f(t) = 52$ . (2)

4. (a) Factorise (1)

$$x^2 - 4y^2.$$

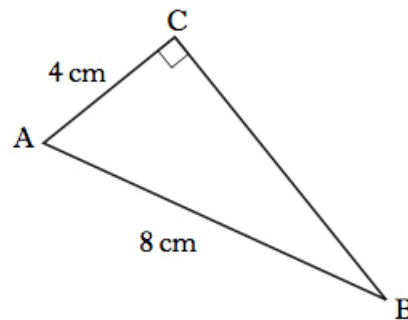
- (b) Expand and simplify (1)

$$(2x - 1)(x + 4).$$

- (c) Expand (2)

$$x^{\frac{1}{2}}(3x + x^{-2}).$$

5. In triangle  $ABC$ , angle  $ACB = 90^\circ$ ,  $AB = 8$  centimetres, and  $AC = 4$  centimetres. (3)



Calculate the length of  $BC$ .

Give your answer as a surd in its simplest form.

6. There are 4 girls and 14 boys in a class. (3)  
A child is chosen at random and is asked to roll a die, numbered 1 to 6.  
Which of these is more likely?

A: the child is female.

**OR**

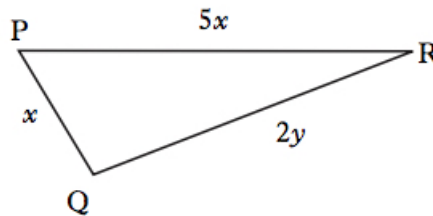
B: the child rolls a 5.

**Justify your answer.**

7. This year, Ben paid £260 for his car insurance. (3)  
This is an increase of 30% on last year's payment.

How much did Ben pay last year?

8. In triangle  $PQR$ ,  $PQ = x$  centimetres,  $PR = 5x$  centimetres, and  $QR = 2y$  centimetres.



The perimeter of the triangle is 42 centimetres.

- (a) Write down an equation in  $x$  and  $y$  to illustrate this information. (2)

$PR$  is 2 centimetres longer than  $QR$ .

- (b) Write down another equation in  $x$  and  $y$  to illustrate this information. (2)  
(c) Hence calculate the values of  $x$  and  $y$ . (3)

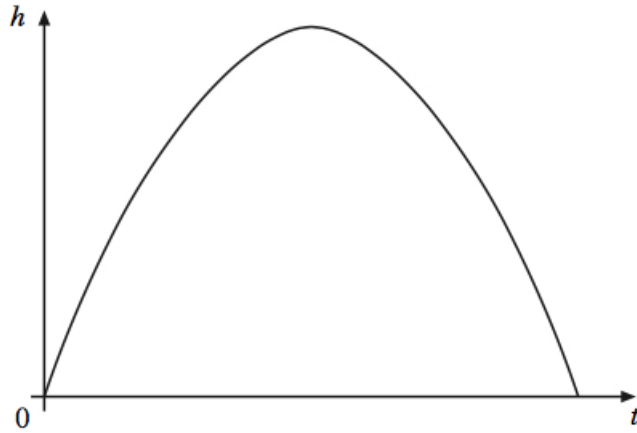
9. A formula used to calculate the flow of water in a pipe is (3)

$$f = \frac{kd^2}{20}.$$

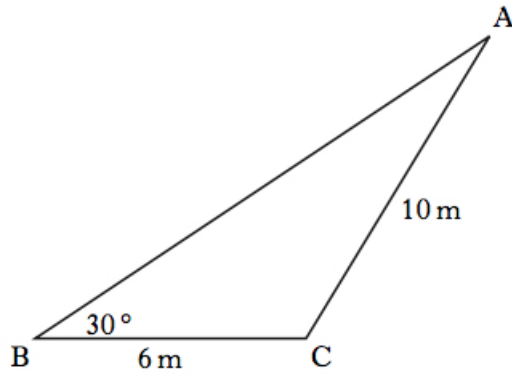
Change the subject of the formula to  $d$ .

10. The diagram below shows the path of a rocket which is fired into the air.  
The height,  $h$  metres, of the rocket after  $t$  seconds is given by

$$h(t) = -2t(t - 14).$$



- (a) For how many seconds is the rocket in flight? (2)
- (b) What is the maximum height reached by the rocket? (2)
11. In triangle  $ABC$ ,  $PQ = 6$  metres,  $AC = 10$  metres, and angle  $ABC = 30^\circ$ . (3)



Given that  $\sin 30^\circ = 0.5$ , show that  $\sin BAC = 0.3$ .