

Q1 Solve $\frac{1}{2x-1} + \frac{3}{x-1} = 1$

Give your answer in the form $\frac{p \pm \sqrt{q}}{2}$ where p and q are integers.

Q2 Simplify $\frac{2}{x+3} + \frac{3}{x+4} =$

Q3 Simplify $\frac{4}{2x+5} + \frac{5}{3x-2}$

Q4 The centre of a circle is the point $(-1,4)$.

The point A with the co-ordinates $(6,9)$ lies on the circle.

Find the equation of the tangent to the circle at A.

Give your answer in the form $ax + by + c = 0$.

Q5 y is directly proportional to the square root of t .

$y=21$ when $t=9$

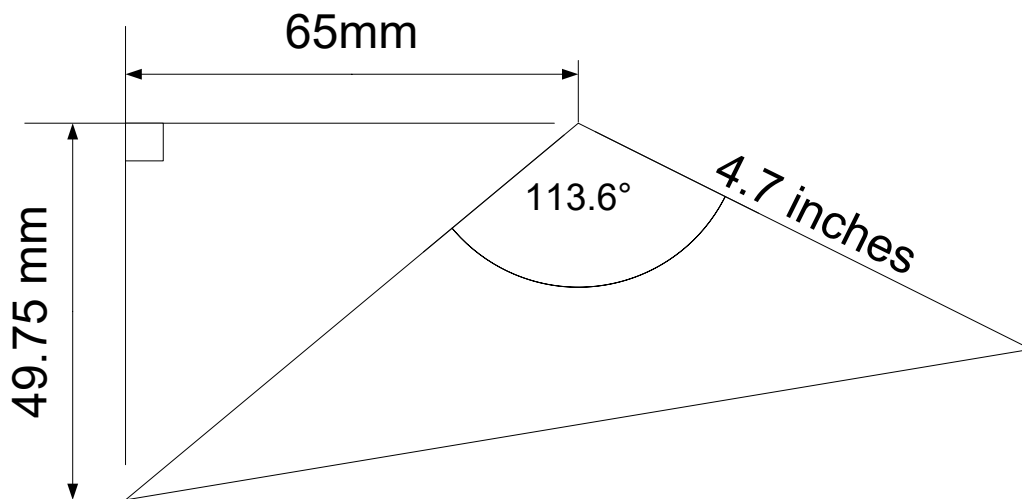
t is inversely proportional to the cube of x .

$t=27$ when $x=3$.

Find a formula for y in terms of x .

Give your answer in its simplest form.

Q6 Here is a triangle.



$$2.54\text{cm} = 1 \text{ inch}$$

Calculate the area of the triangle.

Q7 $f(x) = \sqrt[3]{x}$

$$g(x) = 2x + 3$$

$$h(x) = fg(x)$$

a Find $h^{-1}(x)$

b Find $hg(5)$

Q8 A circle has the equation $x^2 + y^2 = 12.25$

The point P lies on the circle.

The co-ordinates of the P are (2.1,2.8)

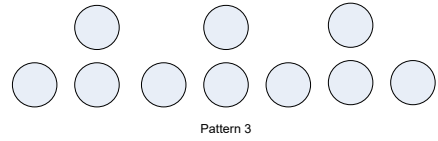
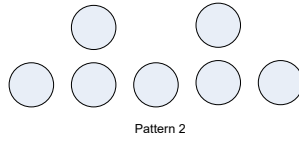
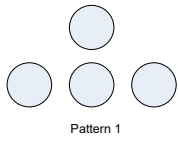
The line L is the tangent to the circle at point P.

Find the equation of L.

Give your answer in the form $ax + by = c$ where a, b and c are integers.

Q9 Solve $6x^2 + 5x - 6 = 0$

Q10 Below is a pattern of counters.



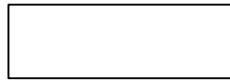
a Find an expression in terms of n for the number of counters in pattern n .

Liam has 90 counters.

b Can Liam make a pattern in this sequence using all 90 of his counters?

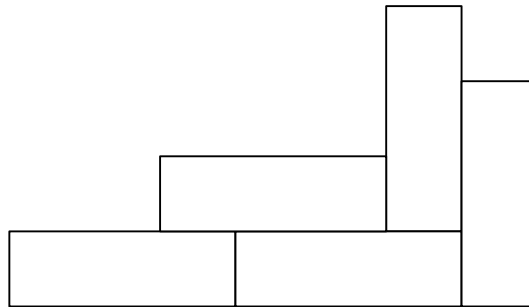
You must show how you get your answer.

Q11 Here is an oblong.



The length of the oblong is 7cm longer than the width.

Here is a shape made up of oblongs.



The perimeter of the shape is 72cm.

Work out the area.

Q12 The functions f , g and h are such that

$$f(x) = x + 7 \qquad g(x) = \sqrt[3]{2x - 5} \qquad h(x) = \frac{2}{x+6}$$

a Find $g(16)$

b Find $fhg^{-1}(x)$

c Find $hf^{-1}g(64)$