Perth Academy **National 5 Relationships** **Homework 7**

1. Solve by factorisation:

   (a) $x^2 - 3x - 10 = 0$ (b) $2x^2 - x - 1 = 0$

2. Solve, giving answers correct to 1 decimal place:

   (a) $2x^2 + 3x - 1 = 0$ (b) $x^2 - x - 1 = 0$

3. Expand and simplify:

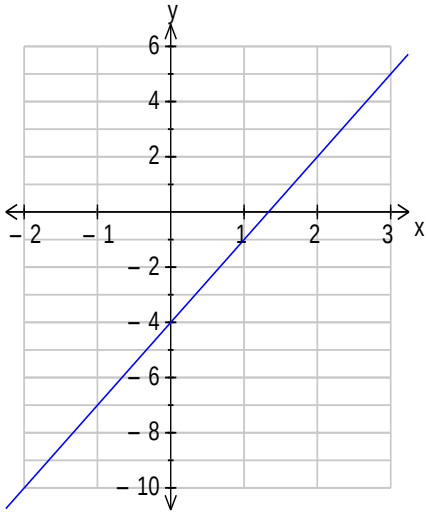
   (a) $(x-1)(x^2 + x + 1)$ (b) $(x+1)^3$

4. Express in their simplest form:

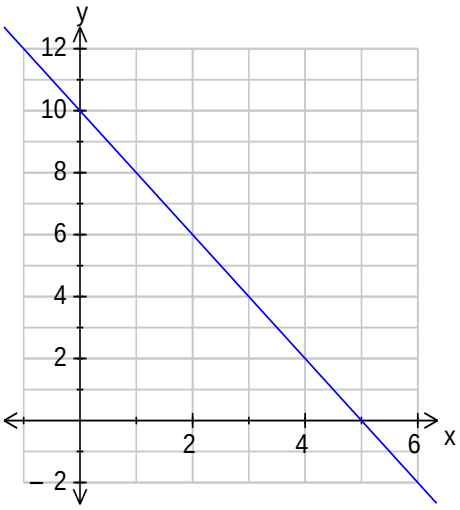
   (a) $\sqrt{45} - 2\sqrt{5}$ (b) $\sqrt{2}\left(\sqrt{6} - \sqrt{2}\right)$

5. Find the equation of each of the straight lines graphed below.

   (a)



   (b)



6. (a) Remove brackets and simplify $a^{1/2}\left(a + \frac{1}{a}\right)$

   (b) $f(x) = x^{2/3}$. Evaluate $f(27)$

   (c) Express as a single fraction $\frac{3}{x+2} - \frac{1}{x-1}$

7. A straight line passes through the points $(5,0)$ and $(11,3)$.
   Find the equation of the line in the form $y = mx + c$.

8. Solve these simultaneous linear equations:

(a) $3x - y = 11$
$2x + 3y = 0$

(b) $5x + 3y = 7$
$2x + 5y = -1$

(c) $3x + 2y = 4$
$-x + 7y = 14$

$2x + y = -2$
$4x - 5y = 17$

9. Seats on flights from London to Edinburgh are sold at two prices, £30 and £50.
On one flight a total of 130 seats was sold.
Let x be the number of seats sold at £30 and y be the number sold at £50.

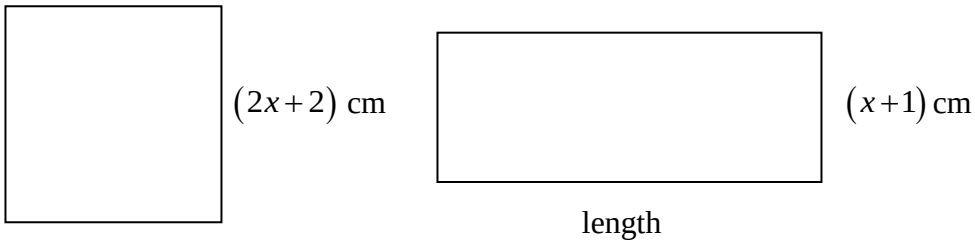
(a) Write down an equation in x and y which satisfies the above condition.

The sale of the seats on this flight totalled £6000.

(b) Write down a second equation in x and y which satisfies this condition.
(c) How many seats were sold at each price?

10. The sum of three numbers is 2009. The sum of the first two numbers is 1004 and the sum of the last two is 1005. What is the product of all three numbers?

11. The square and the rectangle sketched below have equal perimeters.
Show that the length of the rectangle is $3(x+1)$ cm.



12. In the diagram below, CD is the bisector of angle ACB.
Also, BC = CD and AB = AC.
What is the size of angle CDA?