1. Factorise:

(a) $x^2-2x-15$ (b) x^2-6x+9
(c) x^2-64 (d) x^2-4y^2
(e) $2x^2+3x+1$ (f) $2x^2-5x+2$
(g) $3y^2+5y+2$ (h) $4a^2+4a+1$
(i) $3p^2-11p+6$ (j) $3k^2+2k-1$
(k) $3x^2+7x-6$ (l) $9-4x^2$

2. Expand brackets and simplify:

(a) $(2x-1)(3x-4)$ (b) $(3y+2)(y-4)$
(c) $(2x-3y)(3x+4y)$ (d) $(2x-5)^2$
(e) $(2+3k)(3-4k)$ (f) $(3x-2y)(x+7y)$
(g) $(x-2)(x^2+3x-4)$ (h) $(a+1)^3$

3. Remove brackets and simplify:

(a) $(2x+3)(x-1)-4x$ (b) $(3-y)(2-y)+3(1-y)$
(c) $(x+4)(2x^2+3x-1)$ (d) $(x-3)(x^2+5x-2)$

4. Factorise:

(a) $2x^2-5x-3$ (b) $5a^2-7a+2$
(c) $4x^2-y^2$ (d) $4p^2-5p+1$
(e) $2x^2+5x-7$ (f) $9-t^2$

5. Factorise fully. Remember to take out a common factor first.

(a) $2x^2-18$ (b) x^3-x
(c) x^3+4x^2+3x (d) $3y^2+18y+27$

6. Express each of the following in the form $a\sqrt{b}$.

(a) $\sqrt{12}$ (b) $\sqrt{27}$ (c) $\sqrt{50}$ (d) $\sqrt{18}$
(e) $\sqrt{45}$ (f) $\sqrt{162}$ (g) $\sqrt{75}$ (h) $\sqrt{147}$

7. $2^{3x}=\frac{1}{8}$. Find the value of x.

8. It can be shown that $1^2 + 2^2 + 3^2 + \cdots\cdots + n^2 = \frac{1}{6}n(n+1)(2n+1)$. Using this formula,

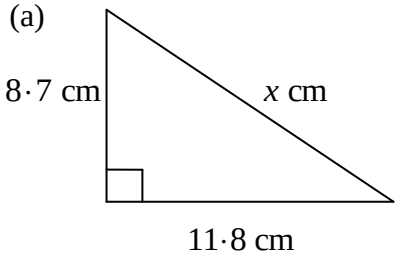
(a) (i) Calculate $1^2 + 2^2 + 3^2 + \cdots\cdots + 10^2$.

(ii) Calculate $11^2 + 12^2 + 13^2 + \cdots\cdots + 20^2$.

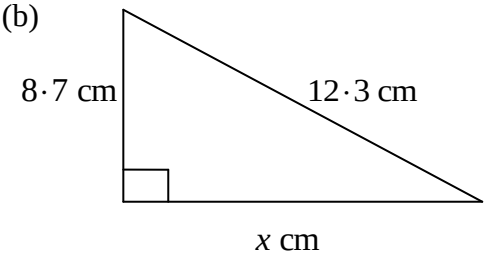
(b) Find a formula for $1^2 + 2^2 + 3^2 + \cdots\cdots + (2n)^2$.

9. Find the length of the third side in each of these triangles.

(a)

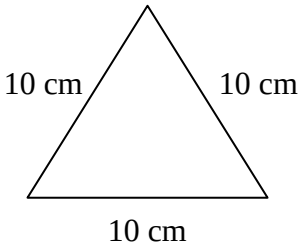


(b)

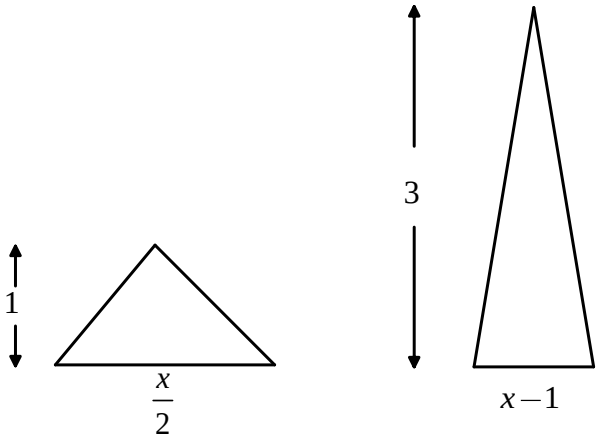


10. (a) Find the length of the altitude of the equilateral triangle sketched below.

(b) Find the area of the triangle.



11. If the triangles sketched below have the same area, find the value of x.



12. Tom and Samia are paid the same hourly rate.

Harry is paid $\frac{1}{3}$ more per hour than Tom.

Tom worked 15 hours, Samia worked 8 hours and Harry worked 12 hours.
They were paid a total of £429.

How much was Tom paid?