Planner

Trial and improvement

- Using a trial and improvement method to estimate solutions to an equation

Keywords

You should know

explanation 1a explanation 1b

1 Find the solution to each of these equations.

a $5x - 12 = 3$ **b** $4m - 5 = 7$ **c** $5p + 8 = 11$

d $y - 2 = 2y + 1$ **e** $3a + 7 = a - 5$ **f** $9b - 6 = 2b$

2 Find two solutions to each of these equations.

a $x^2 + 8 = 72$ **b** $y^2 - 10 = 134$ **c** $5x^2 = 125$ **d** $3x^2 - 4 = 44$

3 Solve each of these equations.

Some of the equations have more than one solution. Find them all.

a $x^2 + 7 = 32$ **b** $x^2 - 1 = 35$ **c** $x^2 + 1 = 10$

d $x^3 = 8$ **e** $x^3 - 1 = 26$ **f** $2 - x^2 = -14$

explanation 2a explanation 2b online

4 Use a calculator and trial and improvement to solve these equations to 1 decimal place.

a $t^3 = 30$ **b** $x^3 + x = 11$ **c** $y^3 - y = 40$ **d** $3.25g^3 = 7.1$

e $m^3 - m = 80$ **f** $x^3 + x = 97$ **g** $2y^3 + y = 6$ **h** $2y^3 + 3y = 4$

5 Use a calculator to find a numerical approximation for the solution of each equation. Give your answers to 2 decimal places.

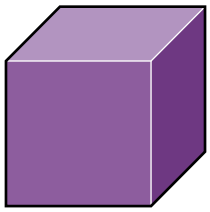
a $e^3 + 2e = 65$ **b** $z^3 - z = 4$ **c** $p^3 + p = 124$ **d** $q(q^2 + 5) = 35$

6 Use a calculator to solve these equations to the given degree of accuracy. Remember to check the next digit after the last one you need for the answer so you can round up or down as needed.

a $s^3 = 15$ (2 d.p.) **b** $x^3 - x + 3 = 0$ (1 d.p.) **c** $a^2 - a = 4$ (2 d.p.)

explanation 3

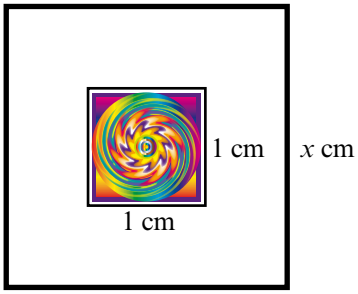
7 Use a calculator to solve this problem.
This cube has volume 50 cm^3.



Work out the length of the side of the cube to 2 decimal places.

[Hint: Let the length of the side be x, then find a formula for the volume in terms of x.]

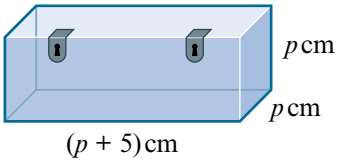
8 A picture frame of side x cm has a small picture of side 1 cm placed in the centre.



a Find an expression, in terms of x, for the white area of the frame.

b By trial and improvement find the value of x for which this area is 10 cm^2. Give your answer to a suitable degree of accuracy and explain your choice.

9 A storage box in the shape of a cuboid is manufactured from Perspex.
Its dimensions are shown on the diagram.
The manufacturer has allowed 1000 cm^2 for each box.



a Find the surface area of the box in terms of p.

b Find, by a numerical method, the value of p for which the surface area is 1000 cm^2 (to 1 d.p.).

10 For each of the equations given below, decide whether an algebraic or numerical method is most efficient for finding the solutions.
Solve each equation (to 2 d.p. where appropriate).

a $4x = 10 - x$ **b** $x^2 = 121$ **c** $x^3 = 64$ **d** $x(x^2 - 1) = 25$