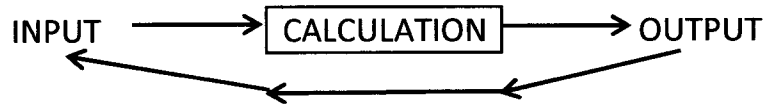
ITERATION

ITERATION



The sequence will CONVERGE to a number.
This is the answer.

This is an iteration formula $u_{n+1} = \frac{u_n}{3} + 4$ n stands for the nth term. Like sequences.

u_1 is the first term. Put this in the formula.The answer is called u_2

u_2 is the second term. Put this in the formula.The answer is called u_3

u_3 is the third term. Put this in the formula.The answer is called u_4

$u_1 =$ 7

$u_1 = 7$

n=1 $u_2 = \frac{u_1}{3} + 4 = \frac{7}{3} + 4 =$ $6.\dot{3}$

n=2 $u_3 = \frac{u_2}{3} + 4 = \frac{6.\dot{3}}{3} + 4 =$ $6.\dot{1}$

n=3 $u_4 = \frac{u_3}{3} + 4 = \frac{6.\dot{1}}{3} + 4 =$ $6.\dot{0}3\dot{7}$

n=4 $u_5 = \frac{u_4}{3} + 4 = \frac{6.\dot{0}3\dot{7}}{3} + 4 =$ 6.0123

n=5 $u_6 = \frac{u_5}{3} + 4 = \frac{6.0123}{3} + 4 =$ 6.0041

n=6 $u_7 = \frac{u_6}{3} + 4 = \frac{6.0041}{3} + 4 =$ 6.0014

to 4 dp.

Iteration

1) $x_{n+1} = \sqrt{20 - x_n}$

On your calculator

1) 5 =

2) $\sqrt{20 - Ans}$

3) = (also SD if answer not a decimal)

4) Repeat pressing =

x_1	5	Round to 4 d.p
x_2	3·8730	
x_3	4·0158	
x_4	3·9980	
x_5	4·0002	
x_6	4·0000	

The answer is x = 4·00 to 2p.

This is the solution to the equation $x^2 + x = 20$. Show this is true. $4·00^2 + 4·00$ true.
$16 + 4 = 20$

2) $x_{n+1} = \sqrt[3]{3x_n + 25}$

On your calculator

1) 4 =

2) $\sqrt[3]{3 \times Ans + 25}$

3) = (also SD if answer not a decimal)

4) Repeat pressing =

x_1	4	Round to 4 d.p.
x_2	3·3322	
x_3	3·2710	
x_4	3·2652	
x_5	3·2647	
x_6	3·2646	
x_7	3·2646	

The answer is x = 3·26 to 2 d.p.

This is the solution to the equation $x^3 - 3x = 25$. Show this is true. $3·26^3 - 3 \times 3·26 = 24.87$
Nearly 25

3) $x_{n+1} = \frac{1}{x_n} + 3$

On your calculator

1) 3 =

2) $\frac{1}{Ans} + 3$

3) = (also SD if answer not a decimal)

4) Repeat pressing =

x_1	3	round to 4 d.p.
x_2	3·3	
x_3	3·3	
x_4	3·3030	
x_5	3·3028	
x_6	3·3028	
x_7	3·3028	

The answer is x = 3·30 to 2 d.p.

This is the solution to the equation $x^2 - 3x - 1 = 0$. Show this is true. $3·30^2 - 3 \times 3·30 - 1 = -0·01$
This is approximately 0