

TRIAL & IMPROVEMENT PROC

①

Explain why $5x^3 + 2x^2 + x = 20$ has a solution between $x = 1.4$ and $x = 1.5$. Show all your calculations.

$x = 1.4 \quad 5(1.4)^3 + 2(1.4)^2 + 1.4 = 19.04$

$x = 1.5 \quad 5(1.5)^3 + 2(1.5)^2 + 1.5 = 22.875$

20 lies between these values, so x must be between 1.4 and 1.5

[2]

②

A solution to the equation $x^3 + x - 1 = 0$ lies between 0 and 1. Use the method of trial and improvement to find this solution correct to one decimal place.

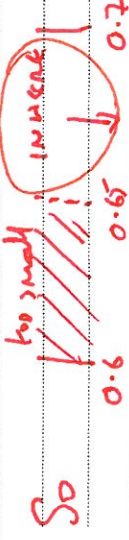
$x = 0.5 \quad 0.5^3 + 0.5 - 1 = -0.375$ too small

$x = 0.7 \quad 0.7^3 + 0.7 - 1 = +0.043$ too big

$x = 0.6 \quad 0.6^3 + 0.6 - 1 = -0.184$ too small

So x is between 0.6 and 0.7

$x = 0.65 \quad 0.65^3 + 0.65 - 1 = -0.075$ too small



rounds to 0.7 to 1 dp.

[4]

③

A solution to the equation

$x^3 + 3x - 8 = 0$

lies between 1.5 and 1.6.

Use the method of trial and improvement to find this solution correct to two decimal places.

$x = 1.55 \quad (1.55)^3 + 3(1.55) - 8 = 0.3738$ too big.

$x = 1.53 \quad (1.53)^3 + 3(1.53) - 8 = 0.17157$ too big

$x = 1.52 \quad (1.52)^3 + 3(1.52) - 8 = 0.141577$ too small

$x = 1.51 \quad (1.51)^3 + 3(1.51) - 8 = -0.0270$

So x is between 1.51 and 1.52

$x = 1.515 \quad (1.515)^3 + 3(1.515) - 8 = 0.222$ too large



rounds to 1.51 to 2 dp.

[4]

④

A solution of the equation $x^3 + 2x - 5 = 0$ lies between $x = 1$ and $x = 2$. Find this solution giving your answer correct to one decimal place.

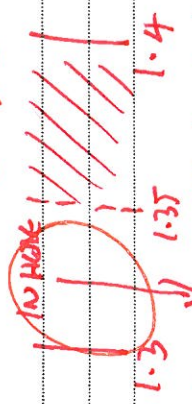
$x = 1.5 \quad 1.5^3 + 2(1.5) - 5 = 1.375$ too large

$x = 1.3 \quad 1.3^3 + 2(1.3) - 5 = -0.203$ too small

$x = 1.4 \quad 1.4^3 + 2(1.4) - 5 = 0.544$ too large

So x is between 1.3 and 1.4

$x = 1.35 \quad 1.35^3 + 2(1.35) - 5 = 0.160375$ too large



rounds to 1.3 to 1 dp.

[4]