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| **Topic/Skill**  | **Definition/Tips****Topic: Iteration**  | **Example** |
| 1. Iteration | The act of **repeating a process** over and over again, often with the aim of **approximating** a desired result more closely.**Recursive** Notation: $x\_{n+1}=\sqrt{3x\_{n}+6}$ | $$x\_{1}=4$$$$x\_{2}=\sqrt{3×4+6}=4.242640…$$$$x\_{3}=\sqrt{3×4.242640…+6}=4.357576…$$ |
| 2. Iterative Method | To create an iterative formula, **rearrange** an equation with more than one x term to **make one of the x terms the subject**.You will be given the first value to substitute in, often called $x\_{1}$.**Keep substituting in your previous answer** until your answers are the same to a certain degree of accuracy. This is called converging to a limit.Use the ‘ANS’ button on your calculator to keep substituting in the previous answer. | Use an iterative formula to find the positive root of $x^{2}-3x-6=0$ to 3 decimal places.$x\_{1}=4$ Answer:$$x^{2}=3x+6$$$$x=\sqrt{3x+6}$$So $x\_{n+1}=\sqrt{3x\_{n}+6}$$$x\_{1}=4$$$$x\_{2}=\sqrt{3×4+6}=4.242640…$$$$x\_{3}=\sqrt{3×4.242640…+6}=4.357576…$$Keep repeating…$$x\_{7}=4.372068..=4.372 \left(3dp\right)$$$$x\_{8}=4.372208…=4.372 (3dp)$$So answer is $x=4.372 (3dp)$ |

**Knowledge Organiser**