10 (a) A student claims that the cube of an irrational number will always be irrational and gives three correct examples:

$$\pi^3 \qquad e^3 \qquad \left(\sqrt{2}\right)^3 = 2\sqrt{2}$$

Give a counter example to show that the claim is incorrect.

[1 mark]

10 (b) Prove by contradiction that the **cube root** of an irrational number is always irrational.

[4 marks]