

MATH2301 Assignment 3

(1) The units digit of a perfect square can only be 0, 1, 4, 5, 6 or 9.
What are the possible units digits of

(a) perfect cubes?

$$0^3 = 0$$

$$1^3 = 1$$

$$2^3 = 8$$

$$3^3 = 27$$

$$4^3 = 64$$

$$5^3 = 125$$

$$6^3 = 216$$

$$7^3 = 343$$

$$8^3 = 512$$

$$9^3 = 729$$

So all of the digits are possible.

(b) perfect fourth powers?

$$0^4 = 0$$

$$1^4 = 1$$

$$2^4 = 16$$

$$3^4 = 81$$

$$4^4 = 256$$

$$5^4 = 625$$

$$6^4 = 1296$$

$$7^4 = 2401$$

$$8^4 = 4096$$

$$9^4 = 6561$$

So the possible digits are 0, 1, 5, 6

This is because when considering the units digit of a power you are effectively working with modulo 10 so it is sufficient to check only the results for $[0, 9]$.