

MATHSDIY

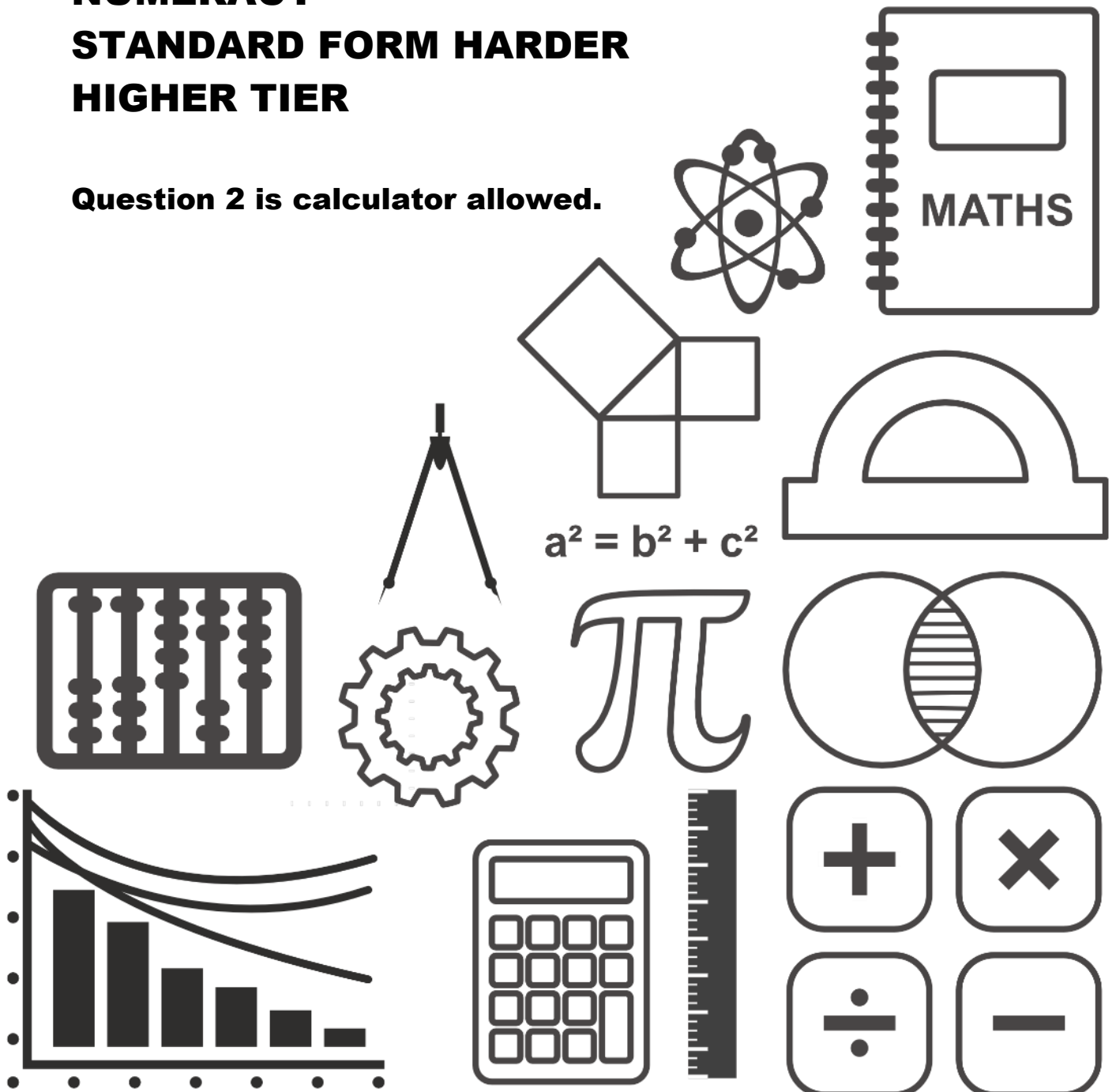
GCSE TOPIC BOOKLET

NUMERACY

STANDARD FORM HARDER

HIGHER TIER

Question 2 is calculator allowed.



1. Astronomers use astronomical units (AU) to describe distances in our solar system. The distance between the Sun and the Earth is 1 AU. 1 AU is 1.496×10^8 km, correct to 4 significant figures.

(a) The distance of Pluto from the Sun is 5.913×10^9 km, correct to 4 significant figures.

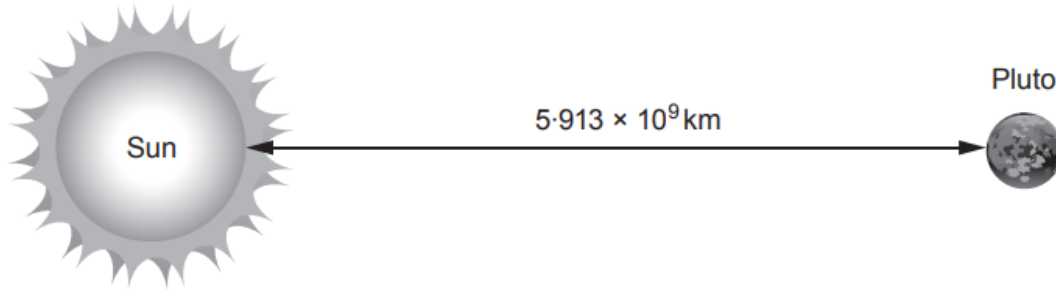


Diagram not drawn to scale

Siôn says that the distance of Pluto from the Sun is less than 50 AU.

Using **suitable** approximations, estimate the distance of Pluto from the Sun, in AU, to show that Siôn is correct.

You must show all your working.

[2]

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(b) A light year is the distance light travels in one year.

1 light year is approximately 63 000 AU.

Estimate the length of a light year in km.

Give your answer in standard form.

[3]

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2. Heledd is the captain of a cargo ship. She is planning her next voyage.



Heledd has been employed to deliver 3×10^5 tonnes of sand.

Heledd needs to know the volume of the sand before the sand can be loaded on to the ship.

She has been given the following information about the sand:

Mass of a grain of sand	Volume of a grain of sand
1.2×10^{-3} grams	0.32 mm^3

(i) Calculate the number of grains of sand in 3×10^5 tonnes of sand. Give your answer in standard form. [3]

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(ii) Calculate the volume of the 3×10^5 tonnes of sand in m^3 . [3]

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..... m^3