OCR B Physics A Level

5.1.4 - Gravitational Fields

Flashcards

What does Newton's Law of Gravitation state?

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The gravitational force between two point masses is proportional to the product of their masses and is inversely proportional to the square of the separation of their centres.

State the defining equation for Newton's Law of Gravitation.

State the defining equation for Newton's Law of Gravitation.

$$F = \frac{-GMm}{r^2}$$

What does ‘G’ represent?

What does ‘G’ represent?

The universal gravitational constant, which is equal to 6.67×10^{-11} N m^2 kg^{-2}.

What is always true about the gravitational force between two masses?

What is always true about the gravitational force between two masses?

It is always an attractive force.

What is a gravitational field?

What is a gravitational field?

A region in which any object with mass will experience a non-contact force.

What is gravitational field strength?

What is gravitational field strength?

The force per unit mass felt by the object.

What is the unit for gravitational field strength?

What is the unit for gravitational field strength?

Nkg^{-1}

State the equation for gravitational field strength.

State the equation for gravitational field strength.

$$g = \frac{GM}{r^2} \quad \text{or} \quad g = \frac{F}{m}$$

What is the gravitational potential at a point?

What is gravitational potential at a point?

The energy transferred per unit mass when moving an object from infinity to that point.

State the equation for gravitational potential.

State the equation for gravitational potential.

$$V = \frac{-GM}{r}$$

State the equation for gravitational potential energy.

State the equation for gravitational potential energy.

$$E = \frac{-GMm}{r}$$

What is an equipotential?

What is an equipotential?

A plane in which all points have the same potential.

What is true when a mass moves along an equipotential?

What is true when a mass moves along an equipotential?

No work is done when moving along an equipotential.

What does the area under a force-separation graph represent?

What does the area under a force-separation graph represent?

Energy

What is escape velocity?

What is escape velocity?

The minimum velocity required for a body to escape the gravitational field of a planet.

What equation is used to calculate escape velocity?

What equation is used to calculate escape velocity?

$$V_{escape} = \sqrt{\frac{2GM}{r}}$$