

What We Know

- Two masses attract each other.
 - The force is:
 - **Directly proportional** to the **product of their masses**.
 - **Inversely proportional** to the **square of the distance** between them.
-

Derivation

Let's say we have:

- Masses: m_1 and m_2
- Distance between them: r
- Gravitational force: F

So, based on proportionality:

$$F \propto \frac{m_1 m_2}{r^2}$$

To turn this proportionality into an equation, we introduce the **gravitational constant G** :

$$F = G \cdot \frac{m_1 m_2}{r^2}$$

Where:

- F : Force of gravity (in newtons)
 - G : Gravitational constant $= 6.674 \times 10^{-11} \text{ Nm}^2/\text{kg}^2$
 - m_1, m_2 : Masses in kg
 - r : Distance between the centers of the masses in meters
-

Why Inverse Square?

The inverse square nature ($\frac{1}{r^2}$) arises from geometry:

- Think of a point mass radiating “influence” (like gravity or light) equally in all directions.
- The surface area of a sphere grows as $4\pi r^2$, so the “influence” per unit area drops with $\frac{1}{r^2}$.

This makes gravitational force **weaker with distance** — but **never zero**.

Final Formula

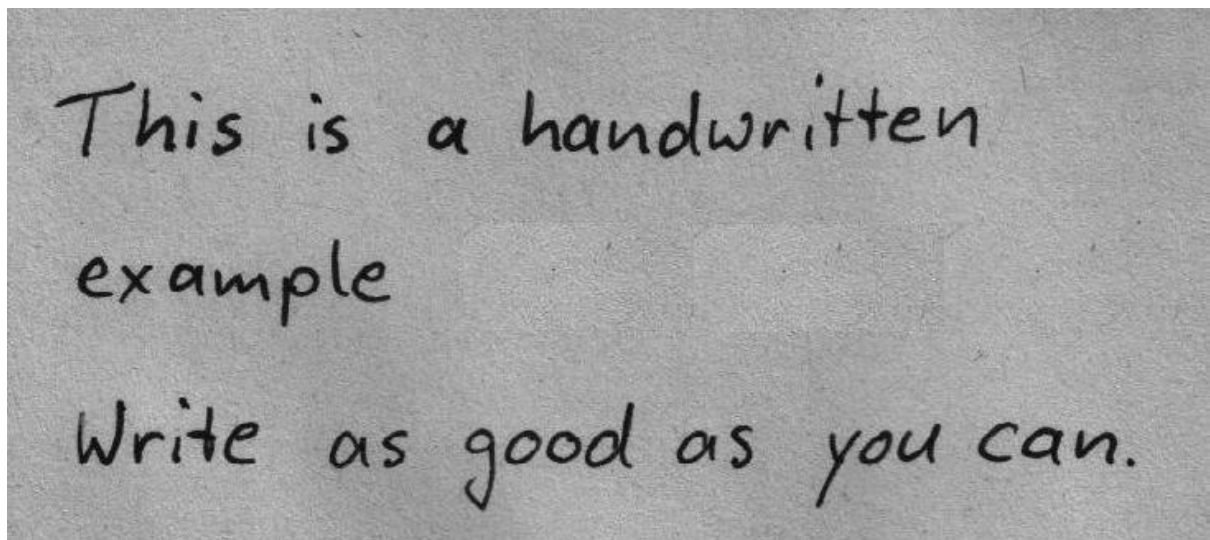
$$\boxed{F = G \cdot \frac{m_1 m_2}{r^2}}$$

This is Newton's Universal Law of Gravitation — clean, simple, and still used in modern astrophysics and orbital mechanics.

Below is table showing work status

Sr No	Main Task	Sub Task	Status
1	Firestore Push Notifications	Merchant Implementation	Complete
		Customer Implementation	Complete
		Admin Implementation	Complete
2	Ratings and Reviews	Merchant Implementation	Complete
		Customer Implementation	Complete
		Admin Implementation	Complete
3	Regional Manager: Role Based Access	Set up access for RM and Admins	Complete
4	Advertisement Management	Manage Ads for Customer and merchant App	Complete

Here is the first image below:



This is second image below:

This is a lot of 12 point text to test the ocr code and see if it works on all types of file format.

The quick brown dog jumped over the lazy fox. The quick brown dog jumped over the lazy fox. The quick brown dog jumped over the lazy fox. The quick brown dog jumped over the lazy fox.

This is final image below:

Cedric himself knew nothing whatever about it. It had never been even mentioned to him. He knew that his papa had been an Englishman, because his mamma had told him so; but then his papa had died when he was so little a boy that he could not remember very much about him, except that he was big, and had blue eyes and a long mustache, and that it was a splendid thing to be carried around the room on his shoulder.

the document concludes here.