Euclid's Lemma

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Let a and b and c be

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Let a and b and c be given integers.

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Euclid's Lemma:

Let a and b and c be given integers. If bc is divisible

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Let a and b and c be given integers. If bc is divisible by a and the greatest common divisor of a and b is 1

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Let a and b and c be given integers. If bc is divisible by a and the greatest common divisor of a and b is 1 , then

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$$a|bc$$

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proof

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proof

Start

▸ Start

$\exists x,$

Start

$\exists x, \; y$

Start

$\exists x,\ y \in$

Start

$\exists x,\ y \in \mathbb{Z}$

Start

$\exists x,\ y \in \mathbb{Z}$ such that

Start

$\exists x,\ y \in \mathbb{Z}$ such that 1

Start

$\exists x,\ y \in \mathbb{Z}$ such that $1 =$

Start

$\exists x,\ y \in \mathbb{Z}$ such that $1 = ax$

▸ Start

$\exists x,\ y \in \mathbb{Z}$ such that $1 = ax +$

▸ Start

$\exists x,\ y \in \mathbb{Z}$ such that $1 = ax + by$ ($\because$

▸ Start

$\exists x,\ y \in \mathbb{Z}$ such that $1 = ax + by \ (\because gcd(a, b) = 1)$

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c

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$c = 1$

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$c = 1 \times$

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$c = 1 \times c$

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$\exists x,\ y \in \mathbb{Z}$ such that $1 = ax + by \ (\because gcd(a, b) = 1)$

$c = 1 \times c = (ax + by)$

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$c = 1 \times c = (ax + by)c$

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$\exists x,\ y \in \mathbb{Z}$ such that $1 = ax + by$ ($\because gcd(a, b) = 1$)

$c = 1 \times c = (ax + by)c = acx$

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$c = 1 \times c = (ax + by)c = acx +$

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$\exists x,\ y \in \mathbb{Z}$ such that $1 = ax + by$ ($\because gcd(a, b) = 1$)

$$c = 1 \times c = (ax + by)c = acx + bcy$$

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$\exists x,\ y \in \mathbb{Z}$ such that $1 = ax + by$ ($\because gcd(a, b) = 1$)

$c = 1 \times c = (ax + by)c = acx + bcy$

a

▸ Start

$\exists x,\ y \in \mathbb{Z}$ such that $1 = ax + by$ ($\because gcd(a, b) = 1$)

$c = 1 \times c = (ax + by)c = acx + bcy$

$a|$

Start

$\exists x,\ y \in \mathbb{Z}$ such that $1 = ax + by$ ($\because gcd(a, b) = 1$)

$c = 1 \times c = (ax + by)c = acx + bcy$

$a|(acx + bcy)$

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$a|(acx + bcy)$ ($\because a|ac,\ a|bc$)

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$\exists x,\ y \in \mathbb{Z}$ such that $1 = ax + by\ (\because gcd(a, b) = 1)$

$c = 1 \times c = (ax + by)c = acx + bcy$

$a|(acx + bcy)\ (\because a|ac,\ a|bc)$

$\therefore$

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$a|(acx + bcy)$ $(\because a|ac,\ a|bc)$

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$a|(acx + bcy)$ ($\because a|ac,\ a|bc$)

$\therefore a|c$

Github:
https://min7014.github.io/math20201211001.html

Click or paste URL into the URL search bar, and you can see a picture moving.