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Changing your Tomorrow

REAL NUMBERS

PPT-2

SUBJECT : MATHEMATICS
CHAPTER NUMBER: 01
CHAPTER NAME : REAL NUMBERS

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PREVIOUS KNOWLEDGE TEST :

- An algorithm is a series of well defined steps which gives a procedure for solving a type of problem
- A lemma is a proven statement used for proving another statement.
- Theorem 1.1 (Euclid's Division Lemma) : Given positive integers a and b, there exist unique integers q and r satisfying $a = bq + r$, $0 \leq r < b$.

LEARNING OUTCOME

1. Students will be able to **define** Algorithm.
2. Students will be able to **Explain** Euclid's division algorithm.
3. Students will be able to **Find** the HCF of numbers using Euclid's division algorithm.

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Algorithm

- An algorithm is a series of well defined steps which gives a procedure for solving a type of problem.
- The word algorithm comes from the name of the 9th century Persian Mathematician al-Khwarizmi. In fact, even the word ‘algebra’ is derived from a book, he wrote, called Hisab al-jabr w’al-muqabala.

Euclid's division algorithm

- To obtain the HCF of two positive integers, say c and d, with c > d, follow the steps below:
- Step 1 : Apply Euclid's division lemma, to c and d. So, we find whole numbers, q and r such that $c = dq + r$, $0 \leq r < d$.
- Step 2 : If $r = 0$, d is the HCF of c and d. If $r \neq 0$, apply the division lemma to d and r.
- Step 3 : Continue the process till the remainder is zero. The divisor at this stage will be the required HCF.

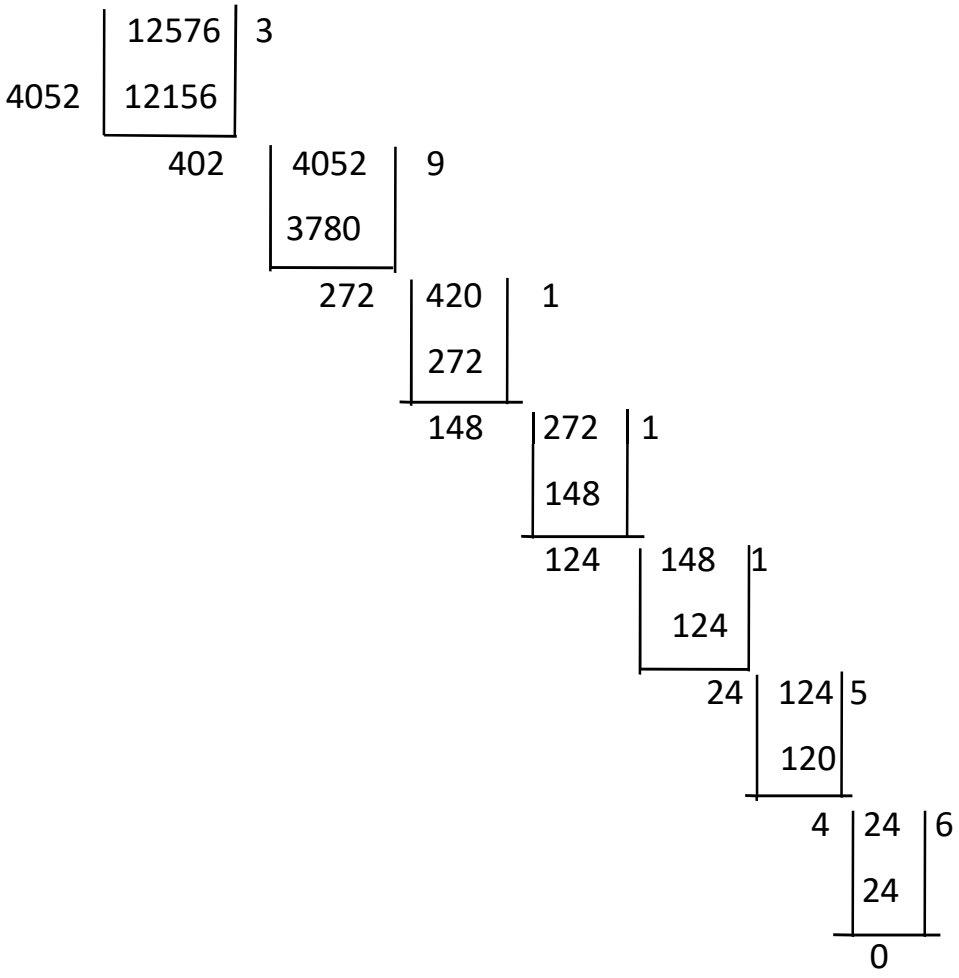
Muhammad ibn Musa al-Khwarizmi (C.E. 780 – 850) 2018-1

Use Euclid's algorithm to find the HCF of 4052 and 12576.

- Solution : Step 1 : Since 12576 > 4052, we apply the division lemma to 12576 and 4052, to get 12576 = 4052 × 3 + 420
- Step 2 : Since the remainder 420 ≠ 0, we apply the division lemma to 4052 and 420, to get 4052 = 420 × 9 + 272
- Step 3 : We consider the new divisor 420 and the new remainder 272, and apply the division lemma to get 420 = 272 × 1 + 148
- We consider the new divisor 272 and the new remainder 148, and apply the division lemma to get 272 = 148 × 1 + 124
- We consider the new divisor 148 and the new remainder 124, and apply the division lemma to get 148 = 124 × 1 + 24
- We consider the new divisor 124 and the new remainder 24, and apply the division lemma to get 124 = 24 × 5 + 4
- We consider the new divisor 24 and the new remainder 4, and apply the division lemma to get 24 = 4 × 6 + 0

The remainder has now become zero, so our procedure stops. Since the divisor at this stage is 4, the HCF of 12576 and 4052 is 4.

Use Euclid's algorithm to find the HCF of 4052 and 12576.



- Find HCF of 135 and 225 using Euclid's division algorithm
- https://www.youtube.com/watch?v=gj4FiSRlHbo
- A sweetseller has 420 kaju barfis and 130 badam barfis. She wants to stack them in such a way that each stack has the same number, and they take up the least area of the tray. What is the number that can be placed in each stack for this purpose?

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A sweet seller has 420 kaju barfis and 130 badam barfis. She wants to stack them in such a way that each stack has the same number, and they take up the least area of the tray. What is the number of that can be placed in each stack for this purpose?

- we find HCF (420, 130). Then this number will give the maximum number of barfis in each stack and the number of stacks will then be the least. The area of the tray that is used up will be the least. Now, let us use Euclid's algorithm to find their HCF. We have : 420 = 130 × 3 + 30 130 = 30 × 4 + 10 30 = 10 × 3 + 0 So, the HCF of 420 and 130 is 10. Therefore, the sweet seller can make stacks of 10 for both kinds of barfi.

Home assignment

- Ex. 1.1 Q. No 1 & 3

1. Use Euclid's division algorithm to find the HCF of 441, 567, 693
2. Using Euclid's division algorithm, find the largest number that divides 1251, 9377 and 15628 leaving remainders 1, 2 and 3, respectively.
3.The numbers 525 and 3000 are both divisible only by 3, 5, 15, 25 and 75. What is HCF (525, 3000)? Justify your answer.
4.Find the least number of the square tiles which can cover the floor of a rectangular shaped room having length 16m and breadth 12m.

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THANKING YOU

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