



### Real Numbers Ex 1.2 Q3

**Answer :**

(i) We need to find the H.C.F. of 963 and 657 and express it as a linear combination of 963 and 657.

By applying Euclid's division lemma  $963 = 657 \times 1 + 306$ .

Since remainder  $\neq 0$ , apply division lemma on divisor 657 and remainder 306

$$657 = 306 \times 2 + 45.$$

Since remainder  $\neq 0$ , apply division lemma on divisor 306 and remainder 45

$$306 = 45 \times 6 + 36.$$

Since remainder  $\neq 0$ , apply division lemma on divisor 45 and remainder 36

$$45 = 36 \times 1 + 9.$$

Since remainder  $\neq 0$ , apply division lemma on divisor 36 and remainder 9

$$36 = 9 \times 4 + 0.$$

Therefore, H.C.F. = 9.

Now,

$$\begin{aligned} 9 &= 45 - 36 \times 1 \\ &= 45 - [306 - 45 \times 6] \times 1 \\ &= 45 - 306 \times 1 + 45 \times 6 \\ &= 45 \times 7 - 306 \times 1 \\ &= [657 - 306 \times 2] \times 7 - 306 \times 1 \\ &= 657 \times 7 - 306 \times 14 - 306 \times 1 \\ &= 657 \times 7 - 306 \times 15 \\ &= 657 \times 7 - [963 - 657 \times 1] \times 15 \\ &= 657 \times 7 - 963 \times 15 + 657 \times 15 \\ &= [657 \times 22 - 963 \times 15]. \end{aligned}$$

(ii) We need to find the H.C.F. of 592 and 252 and express it as a linear combination of 592 and 252.

By applying Euclid's division lemma

$$592 = 252 \times 2 + 88$$

Since remainder  $\neq 0$ , apply division lemma on divisor 252 and remainder 88

$$252 = 88 \times 2 + 76$$

Since remainder  $\neq 0$ , apply division lemma on divisor 88 and remainder 76

$$88 = 76 \times 1 + 12$$

Since remainder  $\neq 0$ , apply division lemma on divisor 76 and remainder 12

$$76 = 12 \times 6 + 4$$

Since remainder  $\neq 0$ , apply division lemma on divisor 12 and remainder 4

$$12 = 4 \times 3 + 0.$$

Therefore, H.C.F. = 4.

Now,

$$\begin{aligned} 4 &= 76 - 12 \times 6 \\ &= 76 - [88 - 76 \times 1] \times 6 \\ &= 76 - 88 \times 6 + 76 \times 6 \\ &= 76 \times 7 - 88 \times 6 \\ &= (252 - 88 \times 2) \times 7 - 88 \times 6 \\ &= 252 \times 7 - 88 \times 14 - 88 \times 6 \\ &= 252 \times 7 - 88 \times 20 \\ &= 252 \times 7 - [592 - 252 \times 2] \times 20 \\ &= 252 \times 7 - 592 \times 20 + 252 \times 40 \\ &= 252 \times 47 - 592 \times 20 \\ &= [252 \times 47 + 592 \times (-20)] \end{aligned}$$

(iii) We need to find the H.C.F. of 506 and 1155 and express it as a linear combination of 506 and 1155.

By applying Euclid's division lemma

$$1155 = 506 \times 2 + 143.$$

Since remainder  $\neq 0$ , apply division lemma on divisor 506 and remainder 143

$$506 = 143 \times 3 + 77.$$

Since remainder  $\neq 0$ , apply division lemma on divisor 143 and remainder 77

$$143 = 77 \times 1 + 66.$$

Since remainder  $\neq 0$ , apply division lemma on divisor 77 and remainder 66

$$77 = 66 \times 1 + 11.$$

Since remainder  $\neq 0$ , apply division lemma on divisor 66 and remainder 11

$$66 = 11 \times 6 + 0.$$

Therefore, H.C.F. = 11.

Now,

$$\begin{aligned} 11 &= 77 - 66 \times 1 \\ &= 77 - [143 - 77 \times 1] \times 1 \\ &= 77 - 143 \times 1 + 77 \times 1 \\ &= 77 \times 2 - 143 \times 1 \\ &= [506 - 143 \times 3] \times 2 - 143 \times 1 \\ &= 506 \times 2 - 143 \times 6 - 143 \times 1 \\ &= 506 \times 2 - 143 \times 7 \\ &= 506 \times 2 - [1155 - 506 \times 2] \times 7 \\ &= 506 \times 2 - 1155 \times 7 + 506 \times 14 \\ &= \boxed{506 \times 16 - 1155 \times 7}. \end{aligned}$$

(iv) We need to find the H.C.F. of 1288 and 575 and express it as a linear combination of 1288 and 575.

By applying Euclid's division lemma

$$1288 = 575 \times 2 + 138.$$

Since remainder  $\neq 0$ , apply division lemma on divisor 506 and remainder 143

$$575 = 138 \times 4 + 23.$$

Since remainder  $\neq 0$ , apply division lemma on divisor 143 and remainder 77

$$138 = 23 \times 6 + 0.$$

Therefore, H.C.F. = 23.

Now,

$$\begin{aligned} 23 &= 575 - 138 \times 4 \\ &= 575 - [1288 - 575 \times 2] \times 4 \\ &= 575 - 1288 \times 4 + 575 \times 8 \\ &= \boxed{575 \times 9 - 1288 \times 4}. \end{aligned}$$

#### Real Numbers Ex 1.2 Q4

**Answer :**

We need to express the H.C.F. of 468 and 222 as  $468x + 222y$

Where  $x, y$  are integers in two different ways.

Given integers are 468 and 222, where  $468 > 222$

By applying Euclid's division lemma, we get  $468 = 222 \times 2 + 24$ .

Since the remainder  $\neq 0$ , so apply division lemma on divisor 222 and remainder 24

$$222 = 24 \times 9 + 6.$$

Since the remainder  $\neq 0$ , so apply division lemma on divisor 24 and remainder 6

$$24 = 6 \times 4 + 0.$$

We observe that remainder is 0. So the last divisor 6 is the H.C.F. of 468 and 222 from we have

$$\begin{aligned} 6 &= 222 - 24 \times 9 \\ \Rightarrow 6 &= 222 - (468 - 222 \times 2) \times 9 && \text{[Substituting } 24 = 468 - 222 \times 2 \text{]} \\ \Rightarrow 6 &= 222 - 468 \times 9 + 222 \times 18 \\ \Rightarrow 6 &= 222 \times 19 - 468 \times 9 \\ \Rightarrow \boxed{6 = 222y + 468x}, && \text{where } x = -9 \text{ and } y = 19. \end{aligned}$$

\*\*\*\*\* END \*\*\*\*\*

