

Q1. Solve each of the following sets of simultaneous linear congruences.

(i).

$$\begin{aligned}x &\equiv 4 \pmod{11} \\x &\equiv 3 \pmod{17}\end{aligned}$$

(ii).

$$\begin{aligned}x &\equiv 1 \pmod{2} \\x &\equiv 2 \pmod{3} \\x &\equiv 3 \pmod{5}\end{aligned}$$

(iii).

$$\begin{aligned}x &\equiv 0 \pmod{2} \\x &\equiv 0 \pmod{3} \\x &\equiv 1 \pmod{5} \\x &\equiv 6 \pmod{7}\end{aligned}$$

(iv).

$$\begin{aligned}x &\equiv 1 \pmod{8} \\x &\equiv 3 \pmod{9}\end{aligned}$$

(v).

$$\begin{aligned}x &\equiv 2 \pmod{5} \\x &\equiv 4 \pmod{7} \\x &\equiv 1 \pmod{9}\end{aligned}$$

(vi).

$$\begin{aligned}x &\equiv 2 \pmod{4} \\x &\equiv 3 \pmod{5} \\x &\equiv 4 \pmod{7}\end{aligned}$$

(vii).

$$\begin{aligned}x &\equiv 1 \pmod{3} \\x &\equiv 0 \pmod{4} \\x &\equiv 2 \pmod{5}\end{aligned}$$

(viii).

$$\begin{aligned}x &\equiv 2 \pmod{5} \\x &\equiv 3 \pmod{6} \\x &\equiv 2 \pmod{7}\end{aligned}$$

(ix).

$$\begin{aligned}x &\equiv 3 \pmod{4} \\x &\equiv 5 \pmod{7} \\x &\equiv 6 \pmod{9}\end{aligned}$$

(x).

$$\begin{aligned}x &\equiv 32 \pmod{83} \\x &\equiv 70 \pmod{112} \\x &\equiv 30 \pmod{135}\end{aligned}$$

Answers:

Q1. The solutions are:

- (i). $37 \pmod{187}$
- (ii). $23 \pmod{30}$
- (iii). $6 \pmod{210}$
- (iv). $57 \pmod{72}$
- (v). $172 \pmod{315}$
- (vi). $18 \pmod{140}$
- (vii). $52 \pmod{60}$
- (viii). $177 \pmod{210}$
- (ix). $159 \pmod{252}$
- (x). $271110 \pmod{1254960}$