$$3X + 5Y + 2Z = 19$$
$$2X + 3Y + Z = 11$$
$$X + 2Y + 2Z = 11$$

Original

⇨

$$X + 5/3Y + 2/3Z = 19/3$$
$$X + 3/2Y + 1/2Z = 11/2$$
$$X + 2Y + 2Z = 11$$

Step 1: divide equation 1 by 3, equation 2 by 2

⇨

$$X + 5/3Y + 2/3Z = 19/3$$
$$-1/6Y - 1/6Z = -5/6$$
$$1/3Y + 4/3Z = 14/3$$

Step 2: subtract equation 1 from equation 2 and equation 3

⇨

$$X + 5/3Y + 2/3Z = 19/3$$
$$Y + Z = 5$$
$$Y + 4Z = 14$$

Step 3: divide equation 2 by -1/6 and equation 3 by 1/3

⇨

$$X + 5/3Y + 2/3Z = 19/3$$
$$Y + Z = 5$$
$$+ 3Z = 9$$

Step 4: subtract equation 2 from equation 3

⇨

$$X + 5/3Y + 2/3Z = 19/3$$
$$Y + Z = 5$$
$$Z = 3$$

Step 5 : divide equation 3 by 3
Solution for Z!

⇨

$$X + 5/3Y + 2/3Z = 19/3$$
$$Y = 2$$
$$Z = 3$$

Step 6: substitute Z solution into equation 2. Solution for Y!

⇨

$$X = 1$$
$$Y = 2$$
$$Z = 3$$

Step 7: substitute Y and Z into equation 1. Solution for X!