Question

Five equations:

① $b+c+d+e=4$

② $a+c+d+e=5$

③ $a+b+d+e=1$

④ $a+b+c+e=2$

⑤ $a+b+c+d=0$

Solution

Add all 5 equations together.

$4a+4b+4c+4d+4e=4+5+1+2+0$

$4(a+b+c+d+e)=12$

$a+b+c+d+e=3$

Use equation ① to find a.

$a+b+c+d+e=3$

$a+4=3$

$a=\underline{-1}$

Use equation ② to find b.

$b+a+c+d+e=3$

$b+5=3$

$b=\underline{-2}$

Use equation ③ to find c.

$c+a+b+d+e=3$

$c+1=3$

$c=\underline{2}$

Use equation ④ to find d.

$d+a+b+c+e=3$

$d+2=3$

$d=\underline{1}$

Use equation ⑤ to find e.

$e+a+b+c+d=3$

$e+0=3$

$e=\underline{3}$

$\therefore a=-1,\ b=-2,\ c=2,\ d=1,\ e=3$

Question

Three equations:

① $xy = 1$

② $yz = 4$

③ $zx = 9$

Solution

Multiply the 3 equations.

$$x^2y^2x^2 = 1 \times 4 \times 9$$

$$(xyz)^2 = 36$$

$$xyz = \pm\sqrt{36}$$

$$xyz = \pm 6$$

$$1z = \pm 6$$

$$z = \underline{\pm 6}$$

$$4x = \pm 6$$

$$x = \underline{\pm \frac{3}{2}}$$

$$9y = \pm 6$$

$$y = \underline{\pm \frac{2}{3}}$$

$\therefore x = \frac{3}{2}, y = \frac{2}{3}, z = 6$ or $x = -\frac{3}{2}, y = -\frac{2}{3}, z = -6$

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Question

Five equations:

① $ab=1$

② $bc=2$

③ $cd=3$

④ $de=4$

⑤ $ea=6$

Solution

Multiply the 5 equations.

$$a^2b^2c^2d^2e^2 = 1\times2\times3\times4\times6$$
$$(abcde)^2 = 144$$
$$abcde = \pm\sqrt{144}$$
$$abcde = \pm12$$

$$2\times4a = \pm12$$
$$a = \underline{\underline{\pm\frac{3}{2}}}$$
$$6\times3b = \pm12$$
$$b = \underline{\underline{\pm\frac{2}{3}}}$$
$$1\times4c = \pm12$$
$$c = \underline{\underline{\pm3}}$$
$$6\times2d = \pm12$$
$$d = \underline{\underline{\pm1}}$$
$$1\times3e = \pm12$$
$$e = \underline{\underline{\pm4}}$$

$\therefore$ $a=\frac{3}{2}, b=\frac{2}{3}, c=3, d=1, e=4$ or $a=-\frac{3}{2}, b=-\frac{2}{3}, c=-3, d=-1, e=-4$