

Solution: Let the costs of amethyst necklace, diamond brooch, ruby bracelet, sapphire earrings, emerald pin and topaz ring be a, b, c, d, e and f \$ respectively. Then we have

$$a+b=2700, \quad \dots(1)$$

$$b+c=4300, \quad \dots(2)$$

$$c+d=3100, \quad \dots(3)$$

$$d+e=2900, \quad \dots(4)$$

and $e+f=2300. \quad \dots(5)$

From above equations $a+f=900. \quad \dots(6)$

Now if we take $a=1300$ then from (6), we get $f=-400$ which is not possible.

If we take $b=1300$ then from (1), we get $a=1400$ and therefore from (6) we get $f=-500$ which is not possible.

If we take $c=1300$ then from (2), we get $b=3000$ and therefore from (1) we get $a=-300$ which is not possible.

If we take $e=1300$ then from (5), we get $f=1000$ and therefore from (6) we get $a=-100$ which is not possible.

If we take $f=1300$ then from (6), we get $a=-400$ which is not possible.

But if we take $d=1300$ then $e=1600, c=1800, b=2500, a=200$ and $f=700$. All are positive. Thus he has to purchase sapphire earrings.

From:

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