[P6] Excess and Shortage

Understanding the concept

I have 10 game tickets to give to 3 friends. (This is actually hidden information in the question.)

If I give them 3 game tickets each, I have 1 game ticket left. This is excess.

If I give them 5 game tickets each, I need 5 game tickets more. This is shortage.

How does it work?

In order to give my 3 friends 2 more game tickets, I need 6 more game tickets (3 × 2 = 6). Since I have 1 extra game ticket left, I only need 5 more.

Therefore, **add the excess and shortage**, to find exactly how many game tickets are needed to be able to give away more game tickets.

After getting this number, divide it by the increase in the number of game tickets each friend receive (in this case 2), to find the number of friends I have.
Process

Step 1: **Add the excess and shortage.** (This is the additional number of materials required.)

Step 2: **Find the increase.** (This is what caused the increase in additional number of materials.)

Step 3: **Divide the sum by the increase.** (This will give us the constant in the question, for example, number of people.)

Step 4: **Use the given information in the question** to find the answer required.

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**Example 1**

Melvin bought some flour to bake cupcakes for his sister’s birthday party. If he baked 10 cupcakes, he would have 280 g of flour left. If he baked 15 cupcakes using the same amount of flour, he would need another 20 g. How much flour did Melvin buy?

Step 1: Add the excess and shortage. (This is the additional amount of flour needed.)

280 + 20 = 300 g of flour

Step 2: Find the increase. (This is what caused the increase in additional amount of flour.)

15 – 10 = 5 more cupcakes

Step 3: Divide the sum by the increase. (This will give us the constant in the question, i.e. amount of flour used for each cupcake.)

In order to make 5 more cupcakes, Melvin needs 300 g of flour.

300 ÷ 5 = 60 g

Each cupcake needs 60 g of flour.

Step 4: Use the given information in the question to find the answer required.

1 cupcake → 60 g of flour

10 cupcakes → 10 × 60

= 600 g of flour

Mass of flour Melvin bought = 600 + 280

= 880 g (Ans)

Alternatively

1 cupcake → 60 g of flour

15 cupcakes → 15 × 60

= 900 g of flour

Mass of flour Melvin bought = 900 – 20 = 880 g (Ans)
Example 2
Joy and her friends share some sweets among themselves. If each girl takes 11 sweets, the last girl will only have 8 sweets. If each girl takes 10 sweets, there will be 16 sweets remaining.
(a) How many girls are there altogether?
(b) How many sweets are shared between them?

(a) Step 1: Add the excess and shortage. (This is the additional number of sweets needed.)
Shortage = 11 – 8 = 3 sweets
Excess + Shortage = 16 + 3 = 19 sweets

Step 2: Find the increase. (This is what caused the increase in additional number of sweets.)
11 – 10 = 1 sweet

Step 3: Divide the sum by the increase. (This will give us the constant in the question, i.e. number of girls)
In order for each girl to have 1 more sweet, 19 more sweets are needed
19 ÷ 1 = 19
Number of girls = 19 (Ans)

(b) Step 4: Use the given information in the question to find the answer required.
1 girl → 10 sweets
19 girls → 19 × 10
= 190 sweets
Number of sweets shared = 190 + 16
= 206 (Ans)
Alternatively
1 girl → 11 sweets
19 girls → 19 × 11
= 209 sweets
Number of sweets shared = 209 + 3
= 206 (Ans)
[P6] Excess and Shortage

1. A box of apples was shared among the pupils in a class. If each pupil received 2 apples, there would be 12 apples left. If each pupil received 3 apples, there would be a shortage of 27 apples.
   (a) How many pupils were there?
   (b) How many apples were there?

Step 1: Add the excess and shortage. (This is the additional number of apples needed.)

Step 2: Find the increase. (This is what caused the increase in additional number of apples.)

Step 3: Divide the sum by the increase. (This will give us the constant in the question, i.e. number of pupils)

Step 4: Use the given information in the question to find the answer required.

Ans: (a) _______________
     (b) _______________
2. A shopkeeper wants to pack a bag of sugar into smaller packets. If each packet of sugar is 5 kg, he will have 4 kg of sugar left. If each packet of sugar is 6 kg, he will need 5 kg of sugar more.
(a) How many packets of sugar does he pack?
(b) What is the original mass of the bag of sugar?

Step 1: Add the excess and shortage. (This is the additional amount of sugar needed.)

Step 2: Find the increase. (This is what caused the increase in additional amount of sugar.)

Step 3: Divide the sum by the increase. (This will give us the constant in the question, i.e. number of packets of sugar)

Step 4: Use the given information in the question to find the answer required.

Ans: (a) _______________
(b) _______________
3. Jack planted 5 beans each in some flower pots, and he had 9 beans left. If he planted 6 beans in each flower pot instead, he would need 5 more beans.
   (a) How many flower pots did he have?
   (b) How many beans did he have?

   Ans: (a) _______________
   (b) _______________

4. Mrs Low gave some children 8 cookies each and had 10 cookies left. If she gave them 10 cookies each, she would need 2 more cookies.
   (a) How many children were there?
   (b) How many cookies did she have?

   Ans: (a) _______________
   (b) _______________
5. Joyce has some pieces of chocolate. If she gives her friends 5 pieces each, she will have 6 pieces left. If she gives her friends 7 pieces each instead, she will need 18 pieces more.
   (a) How many friends are there?
   (b) How many pieces of chocolate does she have?

   Ans: (a) _______________
   (b) _______________

6. Roy gave 3 pencils each to his classmates and had 4 pencils left. If he gave them 6 pencils each instead, he would need 92 pencils more.
   (a) How many classmates were there?
   (b) How many pencils did he have?

   Ans: (a) _______________
   (b) _______________
7. Mary has some ice cream sticks. If she bundles them into groups of 7, she will not have any ice cream stick left over. If she bundles them into groups of 11, she will need 100 more ice cream sticks. How many ice cream sticks does she have?

Ans: _______________

8. Jacqueline plans to put some stalks of rose into her vases. If she puts 4 stalks of rose in each vase, the last vase will only have 1 stalk. If she puts 7 stalks of rose in each vase, she will need 48 more stalks. How many stalks of rose does Jacqueline have?

Ans: _______________
9. Mr Lim plans to reserve some buses for a school excursion. If he arranges for 35-seater buses, 5 pupils will not be able to board the bus. If he arranges for 40-seater buses, he can reserve 1 less bus.

(a) How many 40-seater buses should Mr Lim reserve?
(b) How many pupils are going for the excursion?

Ans: (a) _______________
     (b) _______________

10. Some workers are changing the rail tracks of the MRT line. It takes them 8 more days to complete the project if they change 140 m of tracks every day. If they change 180 m of tracks every day instead, they will complete the project 6 days in advance.

(a) How many days of work are scheduled for this project?
(b) How long is rail tracks to be changed for this project?

Ans: (a) _______________
     (b) _______________