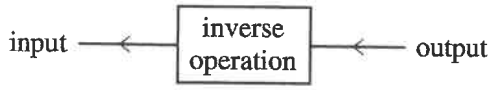
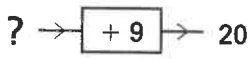
## Inverse operations

- Using the *inverse* (or reverse) we can find the input for any machine, by using the output.




| Operation | Inverse operation |
|---|---|
| +7 | −7 |
| −8 | +8 |
| ×4 | ÷4 |
| ÷6 | ×6 |

- Example: Find the input.

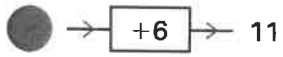


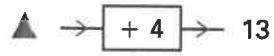

Solution: Change arrows direction and use the inverse operation

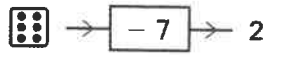

? = 11 since 20 − 9 = 11

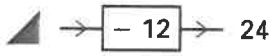
### Exercise 3

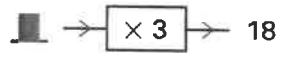
Find the input to these systems

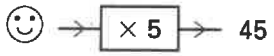
1. 

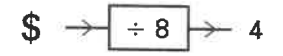

2. 

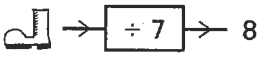

3. 

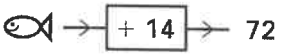

4. 

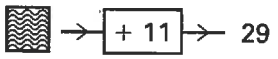

5. 

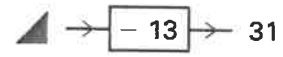

6. 

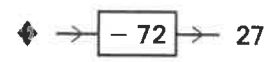

7. 

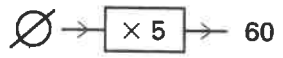

8. 

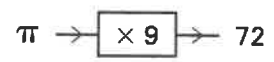

9. 

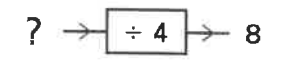

10. 

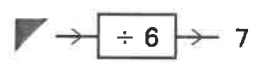

11. 

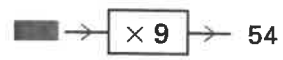

12. 

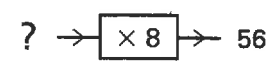

13. 

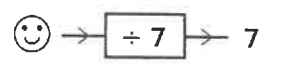

14. 

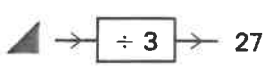

15. 


16. 


17. 


18. 


19. 


20. 

## Exercise 4

Find the input to these machines

1.  → [ + 8 ] → [ + 6 ] → 18

2.  → [ + 2 ] → [ + 5 ] → 14

3.  → [ − 5 ] → [ − 8 ] → 7

4.  → [ − 9 ] → [ − 3 ] → 6

5.  → [ × 3 ] → [ × 3 ] → 36

6.  → [ × 5 ] → [ × 2 ] → 70

7.  → [ ÷ 6 ] → [ ÷ 4 ] → 4

8.  → [ ÷ 2 ] → [ ÷ 5 ] → 13

9.  → [ + 7 ] → [ − 11 ] → 11

10.  → [ + 1 ] → [ − 17 ] → 1

11.  → [ + 3 ] → [ × 2 ] → 16

12.  → [ + 3 ] → [ × 4 ] → 52

13.  → [ + 4 ] → [ ÷ 5 ] → 3

14.  → [ + 7 ] → [ ÷ 9 ] → 2

15.  → [ − 2 ] → [ + 17 ] → 34

16.  → [ − 16 ] → [ + 61 ] → 84

17.  → [ − 11 ] → [ × 8 ] → 40

18.  → [ − 8 ] → [ × 7 ] → 21

19.  → [ − 1 ] → [ ÷ 11 ] → 4

20.  → [ − 6 ] → [ ÷ 8 ] → 32