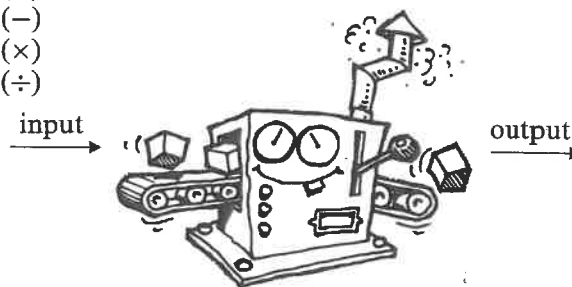


5.4 Number machines

- A number machine performs an *operation* on numbers.
- A simple *operation* could be

add	(+)
subtract	(-)
multiply	(×)
or divide	(÷)

- The *input* number goes into the machine.
- The *output* number comes out of the machine.



Examples

input	machine	output	output solution	reason
1. 5	→ $+ 7$ →	?	? = 12	(5 + 7 = 12)
2. 8	→ $- 3$ →	◆	◆ = 5	(8 - 3 = 5)
3. 3	→ $\times 6$ →	■	■ = 18	(3 × 6 = 18)



















Exercise 1

Find the outputs from these number machines.






- | | |
|-----------------------------|------------------------|
| 1. 4 → $+ 5$ → ☺ | 2. 7 → $+ 11$ → ▲ |
| 3. 10 → $- 3$ → ■ | 4. 14 → $- 9$ → ■ |
| 5. 6 → $\times 7$ → 🌊 | 6. 8 → $\times 2$ → 🐟 |
| 7. 25 → $\div 5$ → ? | 8. 24 → $\div 4$ → ☺ |
| 9. 39 → $+ 13$ → ■ | 10. 7 → $\times 9$ → ▲ |
| 11. 64 → $- 46$ → 🎲 | 12. 66 → $\div 6$ → 📑 |
| 13. 8 → $\times 9$ → 🐟 | 14. 73 → $+ 37$ → ✂ |
| 15. 45 → $\div 5$ → ◆ | 16. 51 → $- 15$ → ■ |
| 17. 33 → $\times 3$ → ▲ | 18. 8 → $\times 8$ → 🌲 |
| 19. 120 → $\div 20$ → π | 20. 52 → $\div 4$ → ⚡ |

Exercise 2

Find the output.

- | | | | | | | |
|-----|-------------------|--------------------|---------------|--------------------|---------------|---|
| 1. | $6 \rightarrow$ | $\boxed{+ 5}$ | \rightarrow | $\boxed{+ 2}$ | \rightarrow | ? |
| 2. | $3 \rightarrow$ | $\boxed{+ 6}$ | \rightarrow | $\boxed{+ 8}$ | \rightarrow |  |
| 3. | $13 \rightarrow$ | $\boxed{- 9}$ | \rightarrow | $\boxed{- 3}$ | \rightarrow |  |
| 4. | $17 \rightarrow$ | $\boxed{- 8}$ | \rightarrow | $\boxed{- 5}$ | \rightarrow |  |
| 5. | $4 \rightarrow$ | $\boxed{\times 2}$ | \rightarrow | $\boxed{\times 5}$ | \rightarrow | π |
| 6. | $3 \rightarrow$ | $\boxed{\times 3}$ | \rightarrow | $\boxed{\times 3}$ | \rightarrow |  |
| 7. | $20 \rightarrow$ | $\boxed{\div 5}$ | \rightarrow | $\boxed{\div 2}$ | \rightarrow |  |
| 8. | $48 \rightarrow$ | $\boxed{\div 4}$ | \rightarrow | $\boxed{\div 6}$ | \rightarrow |  |
| 9. | $17 \rightarrow$ | $\boxed{+ 71}$ | \rightarrow | $\boxed{- 8}$ | \rightarrow |  |
| 10. | $34 \rightarrow$ | $\boxed{+ 43}$ | \rightarrow | $\boxed{- 70}$ | \rightarrow |  |
| 11. | $5 \rightarrow$ | $\boxed{+ 4}$ | \rightarrow | $\boxed{\times 3}$ | \rightarrow |  |
| 12. | $7 \rightarrow$ | $\boxed{+ 9}$ | \rightarrow | $\boxed{\times 0}$ | \rightarrow |  |
| 13. | $12 \rightarrow$ | $\boxed{+ 6}$ | \rightarrow | $\boxed{\div 6}$ | \rightarrow |  |
| 14. | $39 \rightarrow$ | $\boxed{+ 13}$ | \rightarrow | $\boxed{\div 4}$ | \rightarrow |  |
| 15. | $89 \rightarrow$ | $\boxed{- 15}$ | \rightarrow | $\boxed{+ 4}$ | \rightarrow |  |
| 16. | $73 \rightarrow$ | $\boxed{- 5}$ | \rightarrow | $\boxed{+ 9}$ | \rightarrow |  |
| 17. | $42 \rightarrow$ | $\boxed{- 38}$ | \rightarrow | $\boxed{\times 7}$ | \rightarrow |  |
| 18. | $100 \rightarrow$ | $\boxed{- 81}$ | \rightarrow | $\boxed{\times 3}$ | \rightarrow |  |
| 19. | $85 \rightarrow$ | $\boxed{- 58}$ | \rightarrow | $\boxed{\div 9}$ | \rightarrow |  |
| 20. | $76 \rightarrow$ | $\boxed{- 67}$ | \rightarrow | $\boxed{\div 9}$ | \rightarrow |  |

In Questions 21 to 25 there are several operations.

- | | | | | | | | | | | | | | | |
|-----|------------------|---------------------|---------------|--------------------|---------------|--------------------|---------------|---------------------|---------------|---|---------------|---|---------------|---|
| 21. | $5 \rightarrow$ | $\boxed{\times 3}$ | \rightarrow | $\boxed{- 10}$ | \rightarrow | $\boxed{\times 2}$ | \rightarrow | $\boxed{\div 10}$ | \rightarrow |  | | | | |
| 22. | $7 \rightarrow$ | $\boxed{\times 9}$ | \rightarrow | $\boxed{\times 2}$ | \rightarrow | $\boxed{- 66}$ | \rightarrow | $\boxed{\div 12}$ | \rightarrow |  | | | | |
| 23. | $50 \rightarrow$ | $\boxed{\times 10}$ | \rightarrow | $\boxed{- 123}$ | \rightarrow | $\boxed{+ 13}$ | \rightarrow | $\boxed{\div 10}$ | \rightarrow | $\boxed{\div 13}$ | \rightarrow |  | | |
| 24. | $17 \rightarrow$ | $\boxed{\times 5}$ | \rightarrow | $\boxed{+ 25}$ | \rightarrow | $\boxed{\div 11}$ | \rightarrow | $\boxed{\times 13}$ | \rightarrow | $\boxed{\div 2}$ | \rightarrow | $\boxed{+ 7}$ | \rightarrow |  |
| 25. | $13 \rightarrow$ | $\boxed{+ 84}$ | \rightarrow | $\boxed{\times 0}$ | \rightarrow | $\boxed{+ 14}$ | \rightarrow | $\boxed{\times 5}$ | \rightarrow | $\boxed{- 15}$ | \rightarrow | $\boxed{\div 11}$ | \rightarrow |  |