

5.4 Number machines

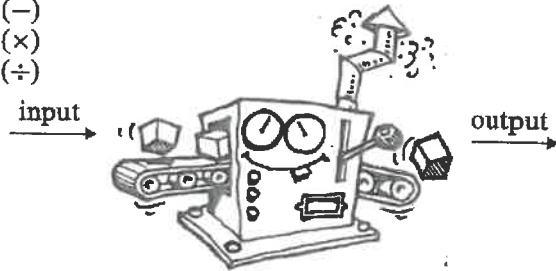
• A number machine performs an *operation* on numbers.

• 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	→ × 6 →	■	■ = 18	(3 × 6 = 18)

Exercise 1

Find the outputs from these number machines.

- | | | | | | | | | | |
|-----|-----|--|---|----|-----|----|--|---|-----|
| 1. | 4 | → + 5 → | 😊 | 9 | 2. | 7 | → + 11 → | ▲ | 18 |
| 3. | 10 | → - 3 → | ♣ | 7 | 4. | 14 | → - 9 → | ■ | 5 |
| 5. | 6 | → × 7 → | 🐟 | 42 | 6. | 8 | → × 2 → | 🐟 | 16 |
| 7. | 25 | → ÷ 5 → | ? | 5 | 8. | 24 | → ÷ 4 → | 😊 | 6 |
| 9. | 39 | → + 13 → | ■ | 52 | 10. | 7 | → × 9 → | ▲ | 63 |
| 11. | 64 | → - 46 → | 🎲 | 18 | 12. | 66 | → ÷ 6 → | 📏 | 11 |
| 13. | 8 | → × 9 → | 🐟 | 72 | 14. | 73 | → + 37 → | ⊗ | 110 |
| 15. | 45 | → ÷ 5 → | ♣ | 9 | 16. | 51 | → - 15 → | ■ | 36 |
| 17. | 33 | → × 3 → | ▲ | 99 | 18. | 8 | → × 8 → | 🌲 | 64 |
| 19. | 120 | → ÷ 20 → | π | 6 | 20. | 52 | → ÷ 4 → | ⊘ | 13 |

Exercise 2

Find the output.

1. $6 \rightarrow +5 \rightarrow +2 \rightarrow ?$ 13
2. $3 \rightarrow +6 \rightarrow +8 \rightarrow \bullet$ 17
3. $13 \rightarrow -9 \rightarrow -3 \rightarrow \blacktriangle$ 1
4. $17 \rightarrow -8 \rightarrow -5 \rightarrow \blacklozenge$ 4
5. $4 \rightarrow \times 2 \rightarrow \times 5 \rightarrow \pi$ 40
6. $3 \rightarrow \times 3 \rightarrow \times 3 \rightarrow \emptyset$ 27
7. $20 \rightarrow \div 5 \rightarrow \div 2 \rightarrow \blacktriangleleft$ 2
8. $48 \rightarrow \div 4 \rightarrow \div 6 \rightarrow \blacktriangleright$ 2
9. $17 \rightarrow +71 \rightarrow -8 \rightarrow \blacksquare$ 80
10. $34 \rightarrow +43 \rightarrow -70 \rightarrow \downarrow$ 7
11. $5 \rightarrow +4 \rightarrow \times 3 \rightarrow \text{fish}$ 27
12. $7 \rightarrow +9 \rightarrow \times 0 \rightarrow \text{smiley}$ 0
13. $12 \rightarrow +6 \rightarrow \div 6 \rightarrow \blacklozenge$ 3
14. $39 \rightarrow +13 \rightarrow \div 4 \rightarrow \text{wavy}$ 13
15. $89 \rightarrow -15 \rightarrow +4 \rightarrow \text{wavy}$ 78
16. $73 \rightarrow -5 \rightarrow +9 \rightarrow \text{bar}$ 77
17. $42 \rightarrow -38 \rightarrow \times 7 \rightarrow \downarrow$ 28
18. $100 \rightarrow -81 \rightarrow \times 3 \rightarrow \blacksquare$ 57
19. $85 \rightarrow -58 \rightarrow \div 9 \rightarrow \text{triangle}$ 3
20. $76 \rightarrow -67 \rightarrow \div 9 \rightarrow \text{dice}$ 1

In Questions 21 to 25 there are several operations.

21. $5 \rightarrow \times 3 \rightarrow -10 \rightarrow \times 2 \rightarrow \div 10 \rightarrow \text{umbrella}$ 1
22. $7 \rightarrow \times 9 \rightarrow \times 2 \rightarrow -66 \rightarrow \div 12 \rightarrow \text{arc}$ 5
23. $50 \rightarrow \times 10 \rightarrow -123 \rightarrow +13 \rightarrow \div 10 \rightarrow \div 13 \rightarrow \uparrow$ 3
24. $17 \rightarrow \times 5 \rightarrow +25 \rightarrow \div 11 \rightarrow \times 13 \rightarrow \div 2 \rightarrow +7 \rightarrow \text{flag}$ 72
25. $13 \rightarrow +84 \rightarrow \times 0 \rightarrow +14 \rightarrow \times 5 \rightarrow -15 \rightarrow \div 11 \rightarrow \text{exclamation}$ 5