Use order of operations with directed numbers

1 Tom works out 2 + 5 × 4 and says the answer is 28

a) What mistake has Tom made?

He has done the addition first.

b) What is the correct answer?

22

2 Work out the calculations without a calculator.

a) 8 ÷ 4 + 3 = 5   **f)** 30 + 6 × 11 − 11 = 85

b) 5 + (10 ÷ 2) = 10   **g)** 12 + (19 + 2) ÷ 3 = 19

c) 5 + 10 ÷ 2 = 10   **h)** 30 ÷ 10 + 3 × 2 = 9

d) 8 ÷ 2 + 5 × 5 = 29   **i)** $20 ÷ 2^2 + (19 − 12)$ = 12

e) 5 + 3 × 15 + 2 = 52   **j)** $(5^2 + 45) ÷ 5 × 8$ = 112

3 **a)** Circle the calculation that does **not** find the unknown number in the bar model.

20			
5	5	8	?

20 − 8 − 2 × 5   20 − (5 × 2 + 8)

（20 − 2 × 5 + 8）   20 − 2 × 5 − 8

b) Write four different number sentences that find the unknown in this bar model.

35			
?	9	9	4

E.g.   35 − (2 × 9 + 4)   35 − (9 + 9 + 4)

35 − 2 × 9 − 4   35 − 4 − 2 × 9

4 Dani is answering this question.

11 − 12 ÷ −3

Here is her working out.

12 ÷ −3 = −4
11 − 4 = 7

Explain the mistake that Dani has made.

She has ignored the subtraction that's already there.
It should be 11 − (−4)

What is the correct answer?   15

What could Dani use in the future so that she doesn't make the same mistake again?

5 Complete the calculations.

a) $35 + 8 \div -2 = \boxed{31}$

f) $\frac{35 + 8}{-2} = \boxed{-21 \cdot 5}$

b) $-2 - 7^2 = \boxed{-51}$

g) $-(2 - 7)^2 = \boxed{-25}$

c) $(-8)^2 - 5 \times 3 - 17 = \boxed{32}$

h) $-8^2 - 5 \times 3 - 17 = \boxed{-96}$

$\boxed{35}$

d) $-6 \div -2 + -1 \times 9 = \boxed{-6}$

i) $-6 \div (-2 + -1) \times 9 = \boxed{18}$

e) $11 - 2 \times -7 + 4 = \boxed{29}$

j) $11 - 2(-7 + 4) = \boxed{17}$

6 Fill in the missing numbers.
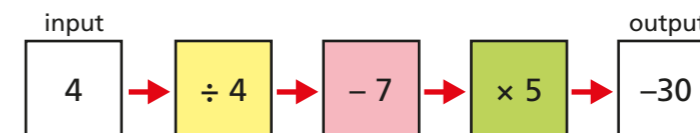
a) $6 + \boxed{7} \times 2 = 20$

c) $42 = \left(\boxed{\pm 4}\right)^2 + 13 \times 2$

b) $-2 \times 5 - \boxed{8} \div 4 = -12$

d) $-3 = 17 - \boxed{6} \times 3 + \boxed{-2}$

Can you find more than one solution for any of the calculations?

7

input output
$4 \rightarrow \boxed{\div 4} \rightarrow \boxed{-7} \rightarrow \boxed{\times 5} \rightarrow -30$

Tick the correct number sentence for the function machine.

$\boxed{4 \div 4 - 7 \times 5 = -30}$

$\boxed{(4 \div 4) - (7 \times 5) = -30}$

$\boxed{4 \div (4 - 7) \times 5 = -30}$

$\boxed{(4 \div 4 - 7) \times 5 = -30}$ ✓

8 Evaluate these expressions when $a = -4$, $b = 6$, $c = 3$ and $d = -8$

a) $d + 2(c - a)$

b) $c + ad$

$\boxed{6}$

$\boxed{35}$

9 Insert brackets into the calculations to make the answers correct.

a) $5 - (20 + 2) \div 11 = 3$

b) $21 = 5 + 4 \times (15 - 11)$

10 Use these numbers, operations and brackets to make each of the numbers.

You can use each one once only per part. You do not need to use them all.

$\boxed{2} \quad \boxed{3} \quad \boxed{4} \quad \boxed{5} \quad \boxed{+} \quad \boxed{-} \quad \boxed{\times} \quad \boxed{\div} \quad \boxed{(} \quad \boxed{)}$

a) 13 ___$5 \times 3 - 2$___

c) -9 ___$-3 \times (5 - 2)$___

b) -1 ___$2 - 3$___

d) 0 ___$5 + 3 - 4 \times 2$___

Can you find more than one answer for each number?