Solutions Programme F.1 Arithmetic

Solutions to exercises from the book Engineering Mathematics 7th edition. The book is divided into frames and the numbers of the exercises refers to these frames.

2. The numbers -10, 4, 0, -13 are of a type called integers.

3. **(a)** $-3 > -6$
(b) $2 > -4$
(c) $-7 < 12$

5. **(a)** $8 + (-3) = 8 - 3 = 5$
(b) $9 - (-6) = 9 + 6 = 15$
(c) $(-14) - (-7) = -14 + 7 = -7$

7. **(a)** $(-5) \times 3 = -15$
(b) $12 \div (-6) = -2$
(c) $(-2) \times (-8) = 16$
(d) $(-14) \div (-7) = 2$

9. $34 + 10 \div (2 - 3) \times 5 = 34 + 10 \div (-1) \times 5 = 34 - 10 \times 5 = 34 - 50 = -16$

13. Some numbers and the rounding of these numbers to the nearest 10, 100 and 1000.

(a) $1846, 1850, 1800, 2000$
(b) $-638, -640, -600, -1000$
(c) $445, 450, 400, 0$

14. **(a)** $18 \times 21 - 19 \div 11 \approx 20 \times 20 - 20 \div 10 = 398$
(b) $99 \div 101 - 49 \times 8 \approx 100 \div 100 - 50 \times 10 = -499$

17. This frame holds multiple review exercises that follow below.

1. **(a)** $-1 > -6$
(b) $5 > -29$
(c) $-14 < 7$

2. **(a)** $16 - 12 \times 4 + 8 \div 2 = 16 - 48 + 4 = -28$
(b) $(16 - 12) \times (4 + 8) \div 2 = 4 \times 12 \div 2 = 24$
(c) $9 - 3(17 + 5[5 - 7]) = 9 - 3(17 - 10) = 9 - 21 = -12$
(d) $8(3[2+4]-2[5+7]) = 8(3\times6-2\times12) = 8(18-24) = 8(-6) = -48$

3. **(a)** Show that:
$6 - (3 - 2) \neq (6 - 3) - 2$
Proof:
$LHS = 6 - (3 - 2) = 6 - 1 = 5$
$RHS = (6 - 3) - 2 = 3 - 2 = 1$
$LHS \neq RHS$

(b) Show that:
$100 \div (10 \div 5) \neq (100 \div 10) \div 5$
Proof:
$LHS = 100 \div (10 \div 5)) = 100 \div 2 = 50$
$RHS = (100 \div 10) \div 5 = 10 \div 5 = 2$
$LHS \neq RHS$

(c) Show that:
$24 \div (2 - 6) \neq 24 \div 2 - 24 \div 6$
Proof:
$LHS = 24 \div (2 - 6) = 24 \div (-4) = -6$
$RHS = 24 \div 2 - 24 \div 6 = 12 - 4 = 8$
$LHS \neq RHS$

4. Some numbers and the rounding of these numbers to the nearest 10, 100 and 1000.

(a) $2562, 2560, 2600, 3000$

(b) $1500, 1500, 1500, 2000$

(c) $-3451, -3450, -3500, -3000$

(d) $-14525, -14530, -14500, -15000$