

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.** $34 + 10 \div (2 - 3) \times 5 = 34 + 10 \div (-1) \times 5 = 34 - 10 \times 5 = 34 - 50 = -16$
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) $8(3[2+4]-2[5+7]) = 8(3 \times 6 - 2 \times 12) = 8(18 - 24) = 8(-6) = -48$

- [illegible]

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

1. Repeated integer division by increasingly bigger numbers gives the following products of prime factors.

(a) $429 = 3 \times 11 \times 13$

(b) $1820 = 2 \times 2 \times 5 \times 7 \times 13$

(c) $2992 = 2 \times 2 \times 2 \times 2 \times 11 \times 17$

(d) $3185 = 5 \times 7 \times 7 \times 13$

2. (a) The prime factorizations of 63 and 42 are

$$63 = 3 \times 3 \times 7$$

$$42 = 2 \times 3 \times 7$$

The highest common factor of 63 and 42 is hence

$$HCF = 3 \times 7 = 21$$

And the lowest common multiple is

$$LCF = 2 \times 3 \times 3 \times 7 = 126$$

- (b) The prime factorization of 34 and 92 are

$$34 = 2 \times 17$$

$$92 = 2 \times 2 \times 23$$

The highest common factor of 34 and 92 is hence

$$HCF = 2$$

And the lowest common multiple is

$$LCF = 2 \times 2 \times 17 \times 23 = 1564$$

28. An example of a proper fraction is $\frac{-8}{11}$

30. $\frac{5}{9} \times \frac{2}{7} = \frac{5 \times 2}{9 \times 7} = \frac{10}{63}$

33. $\frac{3}{8} \text{ of } \frac{5}{7} = \frac{3}{8} \times \frac{5}{7} = \frac{3 \times 5}{8 \times 7} = \frac{15}{56}$

34. $\frac{7}{5}$ and $\frac{28}{20}$ are equivalent fractions because $\frac{7}{5} \times \frac{4}{4} = \frac{7 \times 4}{5 \times 4} = \frac{28}{20}$