National 4 Mathematics: Homework 1

§ 1 Algebra and Common Factors

1   Simplify:

(a) $2x - 5x + 9x$ (b) $3a + a + 4a$ (c) $11x - 4x + 8x$

(d) $4b + 5c + 7b - 2c$ (e) $7w + 3v + 3w - 5v$ (f) $5d - d - 4e + 2d$

2   Simplify:

(a) $2x - 5x$ (b) $-3a + a$ (c) $7x - 4x$ (d) $5p + (-8p)$

(e) $-2e + 7e$ (f) $-d - 3d$ (g) $4h + (-2h)$ (h) $-9a + (-a)$

(i) $4k - (-2k)$ (j) $-4p - (-2p)$ (k) $-m - m$ (l) $-5y - (-8y)$

3   Evaluate each of the following expressions when $a = 2$, $b = -4$ and $c = -3$.

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

(e) bc (f) $b - c$ (g) $a + 2c$ (h) $3b + 6a$

(i) $2c - 2b$ (j) b^2 (k) $3c^2$ (l) $(2b)^2$

(m) $a^2 - c^2$ (n) $7a + 3c$ (o) $2c - 3b$ (p) $(2b - 4c)^2$

4   Expand the following:

(a) $2(x + 2)$ (b) $5(a + 3)$ (c) $3(x - 4)$ (d) $4(p - 9)$

(e) $7(e + 7)$ (f) $11(2d - 3)$ (g) $4(3h + 5)$ (h) $2(5 - 4a)$

5   Expand and simplify the following:

(a) $6 + 2(x + 2)$ (b) $2(g + 4) - 5$ (c) $4(z - 2) + 10$

(d) $7(q + 5) + 3q$ (e) $8(e + 1) - 13$ (f) $3(2d - 3) - 7d$

6   Factorise:

(a) $2x + 20$ (b) $12a + 15$ (c) $9x - 6$ (d) $4k - 18$

(e) $15e + 25$ (f) $16d - 36$ (g) $14h + 21$ (h) $28 - 42a$

(i) $9j + 81$ (j) $24t - 18$ (k) $20u - 80$ (l) $26r + 39$

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§2 Statistics

1   For each set of numbers below, calculate :   i)   the **range**;   ii)   the **mean**.

(a)   5   7   3   8   8   5   3   9

(b)   23   53   21   34   87   64

(c)   1·4   4·7   7·1   12·2   4·6   13·1   20·2   11·8   5·0

2   For each set of numbers below, establish the **median** and state the **mode**:

(a)   2   3   3   3   4   4   5   7   7   8   8

(b)   32   45   33   17   22   54   45

(c)   6·3   1·7   8·8   1·2   8·6   4·1   10·7   6·3   6·3

(d)   8   12   56   24   36   12   24   24

3   The mean height of eight tomato plants is 42cm. A ninth plant is added to the group and the mean height of all nine plants is 43cm. Establish the height of the ninth plant.

§3 Mixed

1   Calculate each of the following.

(a) $4 - 7$ (b) $-3 + 8$ (c) $5 + (-3)$ (d) $2 + (-7)$

(e) $-3 - 6$ (f) $-1 - 4$ (g) $-9 + 5$ (h) $-2 + (-5)$

(i) $2 - (-4)$ (j) $-6 - (-3)$ (k) $-2 - (-4)$ (l) $-7 - (-7)$

2   The rail distance from Manchester to Glasgow is 357km.
If a high speed train averages 140 km/h, find the time taken in hours and minutes.

3   Susan Marshall is paid an hourly rate of £12.40.

She works a basic 36 hour week.
In addition any overtime she works is paid at time-and-a-half.

Calculate her total pay for a week in which she works 42 hours

4   Calculate 35% of £360.