Q1. Simplify these expressions:

(a) $-5x^3 \times 3p^2 \times \left(-4xp^2\right)$

(b) $\left(-5a^3b^5\right)^2 \div a^4b^3$

(c) $-6b + (-2a) - (-8b)$

(d) $5a^2b \times \left(-6a^5b^7\right) \div 2a^2b^2$

(e) $63x^7y^5 \div \left(-7xy^2\right) \times 4x^4y^2$

(f) $9xy \div 3x \times 2y^2 \times 4x^3$

(g) $7x + 3 \times 2x^2 - 10x \div 5$

(h) $8x^4 \times \left(-4y^2\right) \div 6x^3y^3$

(i) $18m^2 - 10n^2 \times 4m^4n^5 \div mn$

(j) $\dfrac{6a^2b^3 \times 2ab^4 \times \left(-3a^2\right)}{4a^7 \times 2b^5 \times 8ab}$

(k) $\dfrac{5xy \times \left(-3x^2y^5\right) \times 2xy^4}{3x^2 \times 2x^4 \times (-3)}$

(l) $\dfrac{3x^2 \times \left(-2x^5y\right) \times 5x^4}{\left(-6x^3\right) \times (2x)^2}$

Q2. Expand and simplify:

(a) $5(x+3) - 3(x+6)$

(b) $7(5x+6) - 5(6x+9)$

(c) $5x(x^2 + 3x^3 - 5x)$

(d) $3a(a^2 - 3a) + 6(a^3 + a^2)$

(e) $15y(3 + 2y^2) - (y^2 - y^3)$

(f) $9ab(4a^2b + 3ab^2 - 2ba^2)$

(g) $3x(2x + 3y) + 5x(x - y)$

(h) $5ab(2a + b^2) + 7b(a^2 - 3b)$

(i) $3a(5a - 2b) - b(a + 6b)$

Q3. Factorise:

(a) $15 + 5x - 35x^2$

(b) $6 - 3y^2 + 15yx$

(c) $3b + 5b^2 - ab$

(d) $9a^2 - 3ab + 12a$

(e) $8a^3 + 18a^4 + 4a^5$

(f) $4abc + 2ab + 16a^2c$

(g) $6xy + 3x^2y + 12x^2y^2$

(h) $a^2b^2 + a^2b - ab^2$

(i) $12mn + 4mp - 6mnp$

Q4. Simplify the following:

(a) $\dfrac{a-5}{4} + \dfrac{4+a}{3}$

(b) $\dfrac{x+4}{2} - \dfrac{8+x}{5}$

(c) $\dfrac{5+m}{3} + \dfrac{6+m}{7}$

(d) $\dfrac{b-3}{5} + \dfrac{b+9}{4}$

(e) $\dfrac{x+1}{3} - \dfrac{x-3}{4}$

(f) $\dfrac{5+2m}{5} + \dfrac{3m-1}{6}$

(g) $\dfrac{2x+1}{4} - \dfrac{3x+5}{6}$

(h) $\dfrac{5x-2}{3} + \dfrac{5+4x}{8}$

(i) $\dfrac{6x+5}{6} + \dfrac{4x+8}{7}$

Q5. Expand and simplify the following:

(a) $(6x + 5)(7 - 3x)$

(b) $(9 + 5x)(8x + 3)$

(c) $(12x + 5)(3x - 7)$

(d) $(4x + 3)(3x + 2)$

(e) $3(2x - 5)(2x + 4)$

(f) $2(5 - 7x)^2$

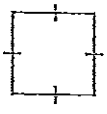
(g) $(2x - 9)(2x + 9)$

(h) $5(6 - 4x)(6 + 4x)$

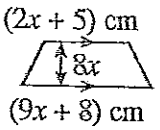
(i) $(2x + 1)^2 - (2x - 1)^2$

Q6. Find a simple expression for the area of each figure below:

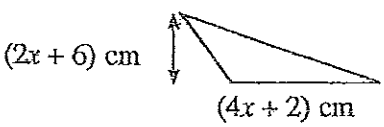
(a)



(b)



(c)



Level 4 — Algebra (ANSWERS)

Q1. (a) $60x^4p^4$ (b) $-25a^2b^7$ (c) $2b-2a$ (d) $-15a^5b^6$

(e) $-36x^{10}y^5$ (f) $24y^3x^3$ (g) $5x+6x^2$ (h) $-\frac{16x}{3y}$

(i) $18m^2-40m^3n^6$ (j) $-\frac{9b}{16a^3}$ (k) $\frac{5y^{10}}{3x^2}$ (l) $\frac{5x^6y}{4}$

Q2. (a) $2x-3$ (b) $5x-3$ (c) $5x^3+15x^4-25x^2$

(d) $9a^3-3a^2$ (e) $45y-y^2+31y^3$ (f) $18a^3b^2+27a^2b^3$

(g) $11x^2+4xy$ (h) $17a^2b+5ab^3$ (i) $15a^2-7ab-6b^2$

Q3. (a) $5(3+x-7x^2)$ (b) $3(2-y^2+5yx)$ (c) $b(3+5b-a)$

(d) $3a(3a-b+4)$ (e) $2a^3(4+9a+2a^2)$ (f) $2a(2bc+b+8ac)$

(g) $3xy(2+x+4xy)$ (h) $ab(ab+a-b)$ (i) $2m(6n+2p-3np)$

Q4. (a) $\frac{7a+1}{12}$ (b) $\frac{3x+4}{10}$ (c) $\frac{53+10m}{21}$ (d) $\frac{9b+33}{20}$ (e) $\frac{x+13}{12}$

(f) $\frac{25+27m}{30}$ (g) $-\frac{7}{12}$ (h) $\frac{52x-1}{24}$ (i) $\frac{66x+83}{42}$

Q5. (a) $27x-18x^2+35$ (b) $40x^2+87x+27$ (c) $36x^2-69x-35$

(d) $12x^2+17x+6$ (e) $12x^2-6x-60$ (f) $98x^2-140x+50$

(g) $4x^2-81$ (h) $180-80x^2$ (i) $8x$

Q6. (a) $A=81x^2+36x+4$ (b) $A=44x^2+52x$ (c) $A=4x^2+14x+6$