

1. Expand:

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

(b) $(x+4)(x-6)$

(c) $(x-10)(x-3)$

(d) $(x+3)(x-3)$

(e) $(x-7)^2$

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

(g) $2(x+4)^2$

(Total 15 marks)

2. Factorise fully:

(a) $x^2 + 2x$

(b) $x^2 + 5x + 6$

(c) $x^2 - 7x + 10$

(d) $x^2 - 4x - 12$

(e) $x^2 - 16$

(Total 10 marks)3. Solve for x :

(a) $x^2 + 5x + 6 = 0$

(b) $x^2 - 7x + 12 = 0$

(c) $x^2 + x - 2 = 0$

(d) $x^2 + 2x = 15$

(e) $x^2 + 8x = 20$

(f) $x^2 - 8x + 12 = 0$

(g) $x^2 - 14x - 15 = 0$

(h) $x^2 + 5x = 14$

(i) $11x = x^2 + 30$

(j) $9x - x^2 = 18$

(Total 30 marks)

4. Without a calculator, evaluate the following. Leave your answer as a mixed fraction in its lowest terms, as appropriate:

(a) $3\frac{1}{4} + 2\frac{1}{6}$

(b) $2\frac{5}{9} - 1\frac{4}{5}$

(c) $\frac{4}{7} \times \frac{3}{5}$

(d) $2\frac{2}{7} \times 1\frac{3}{8}$

(e) $\frac{5}{6} \div \frac{2}{3}$

(f) $3\frac{2}{7} \div 1\frac{1}{2}$

(Total 15 marks)

5. Without a calculator, evaluate:

(a) $16^{\frac{3}{2}}$

(b) $36^{\frac{1}{2}}$

(c) 5^{-1}

(d) 3×4^{-2}

(e) $64^{\frac{1}{2}}$

(f) $32^{\frac{1}{5}}$

(g) $\left(\frac{8}{27}\right)^{-\frac{2}{3}}$

(Total 15 marks)

6. Rearrange the equations to make the letter in brackets the subject:

(a) $y = 3x + 4$

(x)

(b) $A = \pi r^2$

(r)

(c)

$V = \sqrt{w+x}$

(x)

(d) $P = 4f - 3s$

(f)

(e) $p = \frac{q^3}{r} - s$

(q)

(Total 15 marks)**TOTAL: 100 marks**

Answers (marks awarded for each question shown in square brackets)

1.

- a) $x^2 + 9x + 18$ [2] b) $x^2 - 2x - 24$ [2] c) $x^2 - 13x + 30$ [2]
 d) $x^2 - 9$ [2] e) $x^2 - 14x + 49$ [2] f) $6x^2 + 7x - 20$ [2]
 g) $2x^2 + 16x + 32$ [3]

2.

- a) $x(x+2)$ [2] b) $(x+2)(x+3)$ [2] c) $(x-2)(x-5)$ [2]
 d) $(x-6)(x+2)$ [2] e) $(x+4)(x-4)$ [2]

3.

- a) $x = -2, x = -3$ [3] b) $x = 3, x = 4$ [3] c) $x = -2, x = 1$ [3]
 d) $x = -5, x = 3$ [3] e) $x = -10, x = 2$ [3] f) $x = 6, x = 2$ [3]
 g) $x = 15, x = -1$ [3] h) $x = -7, x = 2$ [3] i) $x = 6, x = 5$ [3]
 j) $x = 6, x = 3$ [3]

4.

- a) $5\frac{5}{12}$ [2] b) $\frac{34}{45}$ [3] c) $\frac{12}{35}$ [2] d) $3\frac{1}{7}$ [3]
 e) $1\frac{1}{4}$ [2] f) $2\frac{4}{21}$ [3]

5.

- a) 64 [2] b) 6 [2] c) $\frac{1}{5}$ [2] d) $\frac{3}{16}$ [2]
 e) 8 [2] f) 2 [2] g) $2\frac{1}{4}$ [3]

6.

- a) $x = \frac{y-4}{3}$ [3] b) $r = \sqrt{\frac{A}{\pi}}$ [3] c) $x = V^2 - w$ [3]
 d) $f = \frac{P+3s}{4}$ [3] e) $q = \sqrt[3]{r(p+s)}$ [3]