SOLVING QUADRATICS BY FACTORISING

Task 1 – Solve the following quadratics through factorisation.

1) $x^2 + 5x + 6 = 0$

$$(x + 3)(x + 2) = 0$$

$$x + 3 = 0 \quad x + 2 = 0$$

$$\boldsymbol{x = -3 \ \ or \ \ x = -2}$$

2) $y^2 + 6y + 5 = 0$

$$(y + 1)(y + 5) = 0$$

$$y + 1 = 0 \quad y + 5 = 0$$

$$\boldsymbol{y = -1 \ \ or \ \ y = -5}$$

3) $b^2 + 7b + 12 = 0$

$$(b + 3)(b + 4) = 0$$

$$b + 3 = 0 \quad b + 4 = 0$$

$$\boldsymbol{b = -3 \ \ or \ \ b = -4}$$

4) $x^2 + 9x + 14 = 0$

$$(x + 2)(x + 7) = 0$$

$$x + 2 = 0 \quad x + 7 = 0$$

$$\boldsymbol{x = -2 \ \ or \ \ x = -7}$$

5) $k^2 - 4k + 4 = 0$

$$(k - 2)(k - 2) = 0$$

$$k - 2 = 0$$

$$\boldsymbol{k = 2}$$

6) $a^2 + a - 72 = 0$

$$(a + 9)(a - 8) = 0$$

$$a + 9 = 0 \quad a - 8 = 0$$

$$\boldsymbol{a = -9 \ \ or \ \ a = 8}$$

7) $c^2 - 3c - 28 = 0$

$$(c + 4)(c - 7) = 0$$

$$c + 4 = 0 \quad c - 7 = 0$$

$$\boldsymbol{c = -4 \ \ or \ \ c = 7}$$

8) $n^2 - 10n + 24 = 0$

$$(n - 4)(n - 6) = 0$$

$$n - 4 = 0 \quad n - 6 = 0$$

$$\boldsymbol{n = 4 \ \ or \ \ n = 6}$$

9) $u^2 + 8u + 16 = 0$

$$(u + 4)(u + 4) = 0$$

$$u + 4 = 0$$

$$\boldsymbol{u = -4}$$

10) $t^2 - 2t - 8 = 0$

$$(t - 4)(t + 2) = 0$$

$$t - 4 = 0 \quad t + 2 = 0$$

$$\boldsymbol{t = 4 \ \ or \ \ t = -2}$$

11) $f^2 + 16f + 63 = 0$

$$(f + 7)(f + 9) = 0$$

$$f + 7 = 0 \quad f + 9 = 0$$

$$\boldsymbol{f = -7 \ \ or \ \ f = -9}$$

12) $j^2 + 4j - 10 = -6j - 31$

$$j^2 + 10j + 21 = 0$$

$$(j + 7)(j + 3) = 0$$

$$j + 7 = 0 \quad j + 3 = 0$$

$$\boldsymbol{j = -7 \ \ or \ \ j = -3}$$

13) $p^2 - 81 = 0$

$$(p + 9)(p - 9) = 0$$

$$p + 9 = 0 \quad or \quad p - 9 = 0$$

$$\boldsymbol{p = -9 \quad or \quad p = 9}$$

14) $m^2 - 100 = 0$

$$(m + 10)(m - 10) = 0$$

$$m + 10 = 0 \quad m - 10 = 0$$

$$\boldsymbol{m = -10 \quad or \quad m = 10}$$

15) $m^2 - 16 = 0$

$$(m + 4)(m - 4) = 0$$

$$m + 4 = 0 \quad m - 4 = 0$$

$$\boldsymbol{m = -4 \quad or \quad m = 4}$$

16) $x^2 - 2x = 0$

$$x(x - 2) = 0$$

$$x = 0 \quad x - 2 = 0$$

$$\boldsymbol{x = 0 \quad or \quad x = 2}$$

17) $u^2 + 6u = 0$

$$u(u + 6) = 0$$

$$u = 0 \quad u + 6 = 0$$

$$\boldsymbol{u = 0 \quad or \quad u = -6}$$

18) $2x^2 + 7x + 6 = 0$

$$(2x + 3)(x + 2) = 0$$

$$2x + 3 = 0 \quad x + 2 = 0$$

$$\boldsymbol{x = -\frac{3}{2} \quad or \quad x = -2}$$

19) $2y^2 + 9y + 4 = 0$

$$(2y + 1)(y + 4) = 0$$

$$2y + 1 = 0 \quad y + 4 = 0$$

$$\boldsymbol{y = -\frac{1}{2} \quad or \quad y = -4}$$

20) $3l^2 + 13l + 4 = 0$

$$(3l + 1)(l + 4) = 0$$

$$3l + 1 = 0 \quad l + 4 = 0$$

$$\boldsymbol{l = -\frac{1}{3} \quad or \quad l = -4}$$

21) $4x^2 + 39x + 56 = 0$

$$(4x + 7)(x + 8) = 0$$

$$4x + 7 = 0 \quad x + 8 = 0$$

$$\boldsymbol{x = -\frac{7}{4} \quad or \quad x = -8}$$

22) $2k^2 - 13k + 18 = 0$

$$(2k - 9)(k - 2) = 0$$

$$2k - 9 = 0 \quad k - 2 = 0$$

$$\boldsymbol{k = \frac{9}{2} \quad or \quad k = 2}$$

23) $5a^2 - 2a - 3 = 0$

$$(5a + 3)(a - 1) = 0$$

$$5a + 3 = 0 \quad a - 1 = 0$$

$$\boldsymbol{a = -\frac{3}{5} \quad or \quad a = 1}$$

24) $2d^2 - d - 15 = 0$

$$(2d + 5)(d - 3) = 0$$

$$2d + 5 = 0 \quad d - 3 = 0$$

$$\boldsymbol{d = -\frac{5}{2} \quad or \quad d = 3}$$

25) $3n^2 - 22n + 24 = 0$

$$(3n - 4)(n - 6) = 0$$

$$3n - 4 = 0 \quad n - 6 = 0$$

$$\boldsymbol{n = \frac{4}{3} \quad or \quad n = 6}$$

26) $25v^2 + 40v + 16 = 0$

$$(5v + 4)(5v + 4) = 0$$

$$5v + 4 = 0$$

$$\boldsymbol{v = -\frac{4}{5}}$$

27) $100y^2 - 81 = 0$

$$(10y + 9)(10y - 9) = 0$$

$$10y + 9 = 0 \ \ or \ \ 10y - 9 = 0$$

$$\boldsymbol{y = -\frac{9}{10} \ \ or \ \ y = \frac{9}{10}}$$

28) $4n^2 - 121 = 0$

$$(2n + 11)(2n - 11) = 0$$

$$2n + 11 = 0 \quad 2n - 11 = 0$$

$$\boldsymbol{n = -\frac{11}{2} \ \ or \ \ n = \frac{11}{2}}$$

29) $9x^2 - 25 = 0$

$$(3m + 5)(3m - 5) = 0$$

$$3m + 5 = 0 \quad 3m - 5 = 0$$

$$\boldsymbol{m = -\frac{5}{3} \ \ or \ \ m = \frac{5}{3}}$$

30) $5v^2 + 20v = 0$

$$5v(v + 4) = 0$$

$$5v = 0 \quad v + 4 = 0$$

$$\boldsymbol{v = 0 \ \ or \ \ v = -4}$$

31) $2y^2 - 4y = 0$

$$2y(y - 2) = 0$$

$$2y = 0 \ \ or \ \ y - 2 = 0$$

$$\boldsymbol{y = 0 \ \ or \ \ y = 2}$$

32) $2q^2 - 6q + 20 = q^2 + 6q - 12$

$$q^2 - 12q + 32 = 0$$

$$(q - 4)(q - 8) = 0$$

$$q - 4 = 0 \quad q - 8 = 0$$

$$\boldsymbol{q = 4 \ \ or \ \ q = 8}$$

Challenge – Solve the following equations by factorising.

33) $p^4 - 9p^2 = 0$

$$p^2(p^2 - 9) = 0$$

$$p^2(p + 3)(p - 3) = 0$$

$$p^2 = 0 \quad p + 3 = 0 \quad p - 3 = 0$$

$$\boldsymbol{p = 0, \ p = -3, \ p = 3}$$

34) $r^7 - 64r^5 = 0$

$$r^5(r^2 - 64)$$

$$r^5(r + 8)(r - 8) = 0$$

$$r^5 = 0 \quad r + 8 = 0 \quad r - 8 = 0$$

$$\boldsymbol{r = 0, \ r = -8, \ r = 8}$$

35) $2w^5 - 162w^3 = 0$

$$2w^3(w^2 - 81)$$

$$2w^3(w + 9)(w - 9) = 0$$

$$2w^3 = 0 \quad w + 9 = 0 \quad w - 9 = 0$$

$$\boldsymbol{w = 0, \ w = -9, \ w = 9}$$

36) $144y^4 - 1600y^2 = 0$

$$16y^2(9y^2 - 100)$$

$$16y^2(3y + 10)(3y - 10) = 0$$

$$16y^2 = 0 \quad 3y + 10 = 0 \quad 3y - 10 = 0$$

$$\boldsymbol{y = 0, \ y = -\frac{10}{3}, \ y = \frac{10}{3}}$$