Factorisation

11. 1

Solution – 1

(i) $8xy^3 + 12x^2y^2$

H.C.F of $8xy^3$ and $12x^2y^2$ is $4xy^2$

∴ Divide each expression by $4xy^2$ and keep $4xy^2$ outside the bracket.

$\Rightarrow 4xy^2 (2y + 3x)$

$\therefore 8xy^3 + 12x^2y^2 = 4xy^2 (2y + 3x)$

(ii) $15ax^3 - 9ax^2$

H.C.F of expression $15ax^3$ and $9ax^2$ is $3ax^2$

$\therefore 15ax^3 - 9ax^2 = 3ax^2 (5x - 3)$

Solution – 2

(i) $21py^2 - 56py$

H.C.F of $21py^2$ and $56py$ is $7py$.

$\therefore 21py^2 - 56py \Rightarrow 7py (3y - 8)$

(ii) $4x^3 - 6x^2$

H.C.F of $4x^3$ and $6x^2$ is $2x^2$

$\therefore 4x^3 - 6x^2 \Rightarrow 2x^2 (2x - 3)$

Solution - 3

(i) $25abc^2 - 15a^2b^2c$

H.C.F of $25abc^2$ and $15a^2b^2c$ is $5abc$

$\therefore 25abc^2 - 15a^2b^2c \Rightarrow 5abc\,(5c - 3ab)$

(ii) $x^2yz + xy^2z + xyz^2$

H.C.F of x^2yz, xy^2z and xyz^2 is xyz.

$\therefore xyz\,(x + y + z)$.

Solution - 4 :

(i) $8x^3 - 6x^2 + 10x$

H.C.F of $8x^3$, $6x^2$ and $10x$ is $2x$.

$\Rightarrow 2x\,(4x^2 - 3x + 5)$

(ii) $14mn + 22m - 62p$

H.C.F of $14mn$, $22m$ and $62p$ is 2

$\Rightarrow 2\,(7mn + 11n - 31p)$

Solution - 5

(i) $18p^2q^2 - 24pq^2 + 30p^2q$

H.C.F of $18p^2q^2$, $24pq^2$ and $30p^2q$ is $6pq$

$\Rightarrow 6pq\,(3pq - 4q + 5p)$

(ii) $27a^3b^3 - 18a^2b^3 + 75a^3b^2$

H.C.F of $27a^3b^3$, $18a^2b^3$ and $75a^3b^2$ is $3a^2b^2$

$\Rightarrow 3a^2b^2\,(9ab - 6b + 25a)$

Solution - 6

(i) $15a\,(2p - 3q) - 10b\,(2p - 3q)$

H.C.F of $15a\,(2p-3q)$ and $10b\,(2p-3q)$ is

$5\,(2p - 3q)$

$\Rightarrow 5\,(2p - 3q)\,(3a - 2b)$

(ii) $3a\,(x^2+y^2) + 6b\,(x^2+y^2)$

H.C.F of $3a\,(x^2+y^2)$ and $6b\,(x^2+y^2)$ is $3(x^2+y^2)$

$\therefore \Rightarrow 3(x^2+y^2)\,(a + 2b)$

Solution - 7

(i) $6(x+2y)^3 + 8(x+2y)^2$

H.C.F of $6(x+2y)^3$ and $8(x+2y)^2$ is $2(x+2y)^2$

$\therefore \quad 2(x+2y)^2 \left(3(x+2y) + 4\right)$

$\rightarrow \quad 2(x+2y)^2 \left(3x + 6y + 4\right)$

(ii) $14(a-3b)^3 - 21p(a-3b)$

H.C.F of $14(a-3b)^3$ and $21p(a-3b)$ is

$7(a-3b)$

$\therefore \rightarrow \quad 7(a-3b)\left[2(a-3b)^2 - 3p\right]$

Solution - 8

(i) $10a(2p+q)^3 - 15b(2p+q)^2 + 35(2p+q)$

H.C.F of $10a(2p+q)^3$, $15b(2p+q)^2$ and $35(2p+q)$ is $5(2p+q)$

$\rightarrow 5(2p+q)(2a - 3b + 7)$

EXERCISE – 11.2

Solution - 1

(i) $x^2+xy-x-y$

$\Rightarrow x(x+y)-1(x+y)$

$\Rightarrow (x+y)(x-1)$

(ii) $y^2-yz-5y+5z$

$\Rightarrow y(y-z)-5(y-z)$

$\Rightarrow (y-z)(y-5)$

Solution - 2

(i) $5xy+7y-5y^2-7x$

$\Rightarrow 5xy-5y^2+7y-7x$

$\Rightarrow 5xy-5y^2-7x+7y$

$\Rightarrow 5y(x-y)-7(x-y)$

$\Rightarrow (x-y)(5y-7)$

(ii) $5p^2-8pq-10p+16q$

$5p^2-10p-8pq+16q$

$5p(p-2)-8q(p-2)$

$(p-2)(5p-8q)$

Solution - 3

(i) $a^2b - ab^2 + 3a - 3b$

$\Rightarrow ab(a-b) + 3(a-b)$

$\Rightarrow (a-b)(ab+3)$

(ii) $x^3 - 3x^2 + x - 3$

$\Rightarrow x^2(x-3) + 1(x-3)$

$\Rightarrow (x-3)(x^2+1)$

Solution - 4 :

(i) $6xy^2 - 3xy - 10y + 5$

$\Rightarrow 3xy(2y-1) - 5(2y-1)$

$\Rightarrow (2y-1)(3xy-5)$

(ii) $3ax - 6ay - 8by + 4bx$

$\Rightarrow 3a(x-2y) + 2b(-2y+x)$

$\Rightarrow 3a(x-2y) + 2b(x-2y)$

$\Rightarrow (x-2y)(3a+2b)$

Solution – 5

(i) $x^2+xy(1+y)+y^3$

$\rightarrow x^2+xy+xy^2+y^3$

$\rightarrow x(x+y)+y^2(x+y)$

$\rightarrow (x+y)(x+y^2)$

(ii) $y^2-xy(1-x)-x^3$

$\rightarrow y^2-xy+x^2y-x^3$

$\rightarrow y(y-x)+x^2(y-x)$

$\rightarrow (y-x)*(y+x^2)$

Solution – 6

(i) $ab^2+(a-1)b-1$

$\rightarrow ab^2+ab-b-1$

$\rightarrow ab(b+1)-1(b+1)$

$\rightarrow (b+1)(ab-1)$

(ii) $2a-4b-xa+2bx$

$\rightarrow 2(a-2b)-x(a-2b)$

$\rightarrow (a-2b)(2-x)$

Solution – 7

(i) $5ph - 10qk + 2rph - 4qrk$

$\rightarrow 5(ph - 2qk) + 2r(ph - 2qk)$

$\rightarrow (ph - 2qk)(5 + 2r)$

(ii) $x^2 - x(a + 2b) + 2ab$

$\rightarrow x^2 - xa - 2bx + 2ab$

$\rightarrow x(x - a) - 2b(x - a)$

$\rightarrow (x - a)(x - 2b)$

Solution – 8 :

(i) $ab(x^2 + y^2) - xy(a^2 + b^2)$

$\rightarrow abx^2 + aby^2 - xya^2 - xyb^2$

$\rightarrow ax(bx - ay) + by(ay - bx)$

$\rightarrow ax(bx - ay) - by(bx - ay)$

$\rightarrow (bx - ay)(ax - by)$

(ii) $(ax + by)^2 + (bx - ay)^2$

$a^2x^2 + b^2y^2 + 2axby + b^2x^2 + a^2y^2 - 2bxay$

$\Rightarrow x^2(a^2 + b^2) + y^2(a^2 + b^2)$

$\Rightarrow (a^2 + b^2)(x^2 + y^2)$

Solution – 9 :

(i) $a^3 + ab(1-2a) - 2b^2$

$\rightarrow a^3 + ab - 2a^2b - 2b^2$

$\rightarrow a(a^2+b) - 2b(a^2+b)$

$\rightarrow (a^2+b)(a-2b)$

(ii) $3x^2y - 3xy + 12x - 12$

$\rightarrow 3xy(x-1) + 12(x-1)$

$\rightarrow (x-1)(3xy+12)$

$\rightarrow (x-1) \cdot 3 \cdot (xy+4)$

$\therefore 3(x-1)(xy+4)$

Solution – 10 :

(i) $a^2b + ab^2 - abc - b^2c + axy + bxy$

$\rightarrow (a^2b + ab^2) - (abc + b^2c) + (axy + bxy)$

$\rightarrow ab(a+b) - bc(a+b) + xy(a+b)$

$\rightarrow (a+b)(ab - bc + xy)$

(ii) $ax^2 - bx^2 + ay^2 - by^2 + az^2 - bz^2$

$x^2(a-b) + y^2(a-b) + z^2(a-b)$

$(a-b)(x^2+y^2+z^2)$

Solution – 11

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

$= 1(x-1)-(x-1)^2+a(x-1)$

$= (x-1)\quad(1-(x-1)+a)$

$= (x-1)\quad(1-x+1+a)$

$= (x-1)\quad(2-x+a)$

(ii) $ax+a^2x+aby+by-(ax+by)^2$

$ax+by+a^2x+aby-(ax+by)^2$

$1(ax+by)+a(ax+by)-(ax+by)^2$

$(a+by)\quad(1+a-ax-by)$

EXERCISE - 11.3

Solution- 1 :

(i) $x^2 - 12x + 36$

$\Rightarrow (x)^2 - 2 \cdot 6 \cdot x + (6)^2$

by using $a^2 - 2ab + b^2 = (a-b)^2$

$\therefore (x-6)^2$

(ii) $36p^2 - 60pq + 25q^2$

$\Rightarrow (6p)^2 - 2 \cdot 6p \cdot 5q + (5q)^2$

$\Rightarrow (6p - 5q)^2$

(iii) $9x^2 + 66xy + 121y^2$

$(3x)^2 + 2 \cdot 3x \cdot 11y + (11y)^2$

$\Rightarrow (3x + 11y)^2$

(iv) $a^4 + 6a^2b^2 + 9b^4$

$(a^2)^2 + 2 \cdot a^2 \cdot 3b^2 + (3b^2)^2$

$\Rightarrow (a^2 + 3b^2)^2$

(v) $x^2 + \frac{1}{x^2} + 2$

$\rightarrow (x)^2 + 2 \cdot x \cdot \frac{1}{x} + \left(\frac{1}{x}\right)^2$

$\Rightarrow \left(x + \frac{1}{x}\right)^2$

(vi) $x^2 + x + \frac{1}{4}$

$\Rightarrow (x)^2 + 2 \cdot x \cdot \frac{1}{2} + \left(\frac{1}{2}\right)^2$

$\Rightarrow \left(x + \frac{1}{2}\right)^2$

Solution - 8 :

(i) $4p^2 - 9$

$\rightarrow (2p)^2 - 3^2$

by using $a^2 - b^2 = (a+b)(a-b)$

$\therefore \Rightarrow (2p+3)(2p-3)$

(ii) $4x^2 - 169y^2$

$\rightarrow (2x)^2 - (13y)^2$

$\rightarrow (2x + 13y)(2x - 13y)$

Solution - 3

(i) $9x^2y^2 - 25$

$\rightarrow (3xy)^2 - 5^2$

$\rightarrow (3xy + 5)(3xy - 5)$

(ii) $16x^2 - \frac{1}{144}$

$(4x)^2 - \left(\frac{1}{12}\right)^2$

$\rightarrow \left(4x^2 + \frac{1}{12}\right)\left(4x - \frac{1}{12}\right)$

Solution - 4 :

(i) $20x^2 - 45y^2$

$\rightarrow 5(4x^2 - 9y^2)$

$\rightarrow 5\left((2x)^2 - (3y)^2\right)$

$\rightarrow 5(2x + 3y)(2x - 3y)$

(ii) $\frac{9}{16} - 25a^2b^2$

$\left(\frac{3}{4}\right)^2 - (5ab)^2$

$\rightarrow \left(\frac{3}{4} + 5ab\right)\left(\frac{3}{4} - 5ab\right)$

Solution – 5

(i) $(2a+3b)^2 - 16c^2$

$\Rightarrow (2a+3b)^2 - (4c)^2$

$\Rightarrow (2a+3b-4c)(2a+3b+4c)$

(ii) $1-(b-c)^2$

$\Rightarrow 1^2 - (b-c)^2$

$\Rightarrow (1+b-c)(1-b-c)$

Solution – 6 :

(i) $9(x+y)^2 - x^2$

$\Rightarrow 3^2(x+y)^2 - x^2$

$\Rightarrow (3(x+y))^2 - x^2$

$\Rightarrow (3(x+y)+x)(3(x+y)-x)$

$\Rightarrow (3x+3y+x)(3x+3y-x)$

$\Rightarrow (4x+3y)(2x+3y)$

(ii) $(2m+3n)^2 - (3m+2n)^2$

$\Rightarrow (2m+3n+3m+2n)(2m+3n-3m-2n)$

$\Rightarrow (5m+5n)(n-m)$

Solution – 7

(i) $25(a+b)^2 - 16(a-b)^2$

$5^2(a+b)^2 - 4^2(a-b)^2$

$(5a+5b)^2 - (4a-4b)^2$

$\Rightarrow (5a+5b+4a-4b)(5a+5b-4a+4b)$

$\Rightarrow (9a-b)(a+9b)$

(ii) $9(3x+2)^2 - 4(2x-1)^2$

$3^2(3x+2)^2 - 2^2(2x-1)^2$

$(9x+6)^2 - (4x-2)^2$

$(9x+6+4x-2)(9x+6-4x+2)$

$(13x+4)(5x+7)$

Solution – 8

(i) $x^3 - 25x$

$\Rightarrow x(x^2-25)$

$\Rightarrow x(x^2-5^2)$

$\Rightarrow x((x+5)(x-5))$

(ii) $63p^2q^2 - 7$

$7\ (9p^2q^2 - 1)$

$7\ ((3pq)^2 - 1^2)$

$7\ ((3pq+1)(3pq-1))$

Solution -9

(i) $32a^2b - 72b^3$

$8b\ (4a^2 - 9b^2)$

$8b\ ((2a)^2 - (3b)^2)$

$8b\ ((2a+3b)(2a-3b))$

(ii) $9(a+b)^3 - 25(a+b)$

$(a+b)\ (3^2(a+b)^2 - 5^2)$

$(a+b)\ ((3a+3b)^2 - 5^2)$

$(a+b)\ (3a+3b+5)(3a+3b-5)$ //.

Solution–10

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

$\rightarrow x^2 - (y^2 + 2y + 1)$ $\quad a^2 + b^2 + 2ab = (a+b)^2$

$\rightarrow x^2 - (y+1)^2$ $\quad (a+b)(a-b) = a^2 - b^2$

$\rightarrow (x + y + 1)(x - y - 1)$

(ii) $p^2 - 4pq + 4q^2 - r^2$

$\rightarrow (p^2 - 2 \cdot p \cdot 2q + (2q)^2) - r^2$

$\rightarrow (p - 2q)^2 - r^2$

$\rightarrow (p - 2q + r)(p - 2q - r)$

Solution – 11

(i) $9x^2 - y^2 + 4y - 4$

$\rightarrow (3x)^2 - (y^2 - 2 \cdot y \cdot 2 + 2^2)$

$\rightarrow (3x)^2 - (y - 2)^2$

$\rightarrow (3x + y - 2)(3x - y + 2)$

(ii) $4a^2 - 4b^2 + 4a + 1$

$\rightarrow (2a)^2 + 2 \cdot 2a \cdot 1 + (1)^2 - (2b)^2$

$\rightarrow (2a + 1)^2 - (2b)^2$

$\rightarrow (2a + 1 + 2b)(2a + 1 - 2b)$

Solution- 12 :

(i) $625 - p^4$

$\Rightarrow (25)^2 - (p^2)^2$

$\Rightarrow (25 + p^2)(25 - p^2)$

(ii) $5y^5 - 405y$

$\Rightarrow 5y(y^4 - 81)$

$\Rightarrow 5y((y^2)^2 - 9^2)$

$\Rightarrow 5y(y^2+9)(y^2-9)$

Solution-13 :

(i) $x^4 - y^4 + x^2 - y^2$

$\Rightarrow (x^4 - y^4) + (x^2 - y^2)$

$\Rightarrow ((x^2)^2 - (y^2)^2) + (x^2 - y^2)$

$\Rightarrow (x^2+y^2)(x^2-y^2) + (x^2 - y^2)$

$\Rightarrow (x^2 - y^2)(x^2+y^2+1)$

(ii) $64a^2 - 9b^2 + 42bc - 49c^2$

$\Rightarrow (8a)^2 - (3b)^2 + 7c(6b - 7c)$

$\Rightarrow (8a + 3b)(8a - 3b) + 7c(6b - 7c)$

EXERCISE - 11.4

Solution - 1

(i) $x^2 + 3x + 2$

$1 \times 2 = 2$ → $+2$, $+1$

$\Rightarrow x^2 + 2x + x + 2$

$\Rightarrow x(x+2) + 1(x+2)$

$\Rightarrow (x+1)(x+2)$.

(ii) $z^2 + 10z + 24$

$1 \times 24 = 24$ → $+6$, $+4$

$\Rightarrow z^2 + 6z + 4z + 24$

$\Rightarrow z(z+6) + 4(z+6)$

$\Rightarrow (z+6)(z+4)$

Solution - 2 :

(i) $y^2 - 7y + 12$

$1 \times 12 = 12$ → -4, -3

$\Rightarrow y^2 - 4y - 3y + 12$

$\Rightarrow y(y-4) - 3(y-4)$

$\Rightarrow (y-4)(y-3)$

(ii) $m^2 - 23m + 42$

$1 \times 42 = 42$ → -21, -2.

$\Rightarrow m^2 - 21m - 2m + 42$

$\Rightarrow m(m-21) - 2(m-21)$

$\Rightarrow (m-21)(m-2)$

Solution - 3

(i) $y^2 - 5y - 24$

$\rightarrow y^2 - 8y + 3y - 24$

$\rightarrow y(y-8) + 3(y-8)$

$\rightarrow (y-8)(y+3)$

$1 \times 24 = 24$

$-8 \quad +3$

(ii) $t^2 + 23t - 108$

$t^2 + 27t - 4t - 108$

$t(t+27) - 4(t+27)$

$(t+27)(t-4)$

$1 \times 108 = 108$

$27 \quad -4$

Solution-4 :

(i) $3x^2 + 14x + 8$

$3x^2 + 12x + 2x + 8$

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

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

$3 \times 8 = 24$

$12 \quad 2$

(ii) $3y^2 + 10y + 8$

$3y^2 + 6y + 4y + 8$

$3y(y+2) + 4(y+2)$

$(y+2)(3y+4)$

$3 \times 8 = 24$

$+6 \quad +4$

Solution–5 :

(i) $14x^2 - 23x + 8$

$14x^2 - 16x - 7x + 8$

$2x\ (7x-8) - 1(7x-8)$

$(7x-8)\ \ (2x-1)$

$14 \times 8 = 112$

$-16 \quad -7$

(ii) $12x^2 - x - 35$

$12x^2 - 21x + 20x - 35$

$3x\ (4x-7) + 5\ (4x-7)$

$(4x-7)\ \ (3x+5)$

$12 \times 35 = 420$

$-21 \quad +20$

Solution-6 :

(i) $6x^2 + 11x - 10$

$6x^2 + 15x - 4x - 10$

$3x\ (2x+5) - 2\ (2x+5)$

$(2x+5)\ \ (3x-2)$

$6 \times 10 = -60$

$15 \quad -4$

(ii) $5 - 4x - 12x^2$

$5 - 10x + 6x - 12x^2$

$5\ (1-2x) + 6x\ (1-2x)$

$(1-2x)\ \ (5+6x)$

$5 \times 12 = -60$

$-10 \quad +6$

Solution - 7

(i) $1 - 18y - 63y^2$

$1 - 21y + 3y - 63y^2$

$1(1 - 21y) + 3y(1 - 21y)$

$(1 - 21y)(1 + 3y)$

$1 \times -63 = -63$

$-21 \quad +3$

(ii) $3x^2 - 5xy - 12y^2$

$3x^2 - 9xy + 4xy - 12y^2$

$3x(x - 3y) + 4y(x - 3y)$

$(x - 3y)(3x + 4y)$

$3 \times -12 = -36$

$-9 \quad +4$

Solution - 8

(i) $x^2 - 3xy - 40y^2$

$x^2 - 8xy + 5xy - 40y^2$

$x(x - 8y) + 5y(x - 8y)$

$(x - 8y)(x + 5y)$

$1 \times -40 = -40$

$-8 \quad +5$

(ii) $10p^2q^2 - 21pq + 9$

$10p^2q^2 - 15pq - 6pq + 9$

$5pq(2pq - 3) - 3(2pq - 3)$

$(2pq - 3)(5pq - 3)$

$10 \times 9 = 90$

$-15 \quad -6$

Solution-9

(i) $2a^2b^2 + ab - 45$

$2a^2b^2 + 10ab - 9ab - 45$

$2ab\ (ab+5) - 9\ (ab+5)$

$(ab+5)\ (2ab-9)$

$2 \times 45 = 90$

$10 \quad -9$

(ii) $x(12x+7) - 10$

$12x^2 + 7x - 10$

$12x^2 + 15x - 8x - 10$

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

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

$12 \times 10 = -120$

$15 \quad -8$

Solution-10

(i) $(a+b)^2 - 11(a+b) - 42$

$(a+b)^2 - 14(a+b) + 3(a+b) - 42$

$(a+b)\ (a+b-14) + 3\ (a+b-14)$

$(a+b-14)\ (a+b+3)$

$1 \times 42 = -42$

$-14 \quad +3$

(ii) $8 + 6(p+q) - 5(p+q)^2$

$8 + 10(p+q) - 4(p+q) - 5(p+q)^2$

$2\ (4 + 5(p+q)) - (p+q)\ (4 + 5(p+q))$

$(4 + 5(p+q))\ (2 - (p+q))$

$8 \times -5 = -40$

$+10 \quad -4$

Solution-11

(i) $(x-2y)^2 - 6(x-2y) + 5$ $\quad 1 \times 5 = 5$

$(x-2y)^2 - 5(x-2y) - (x-2y) + 5$

$(x-2y)(x-2y-5) - 1(x-2y-5)$

$(x-2y-5)(x-2y-1)$

(ii) $7 + 10(2x-3y) - 8(2x-3y)^2$ $\quad 7 \times 8 = -56$, $14 \quad -4$

$7 + 14(2x-3y) - 4(2x-3y) - 8(2x-3y)^2$

$7(1 + 2(2x-3y)) - 4(2x-3y)(1+2(2x-3y))$

$(1+2(2x-3y))(7-4(2x-3y))$

$(1+4x-6y)(7-8x+12y)$

EXERCISE – 11.5

Solution – 1

(i) $(35x + 28) \div (5x + 4)$

$$\Rightarrow \frac{35x + 28}{5x + 4}$$

$$\Rightarrow \frac{7(5x + 4)}{5x + 4}$$

$$\Rightarrow 7$$

(ii) $7p^2q^2(9x - 27) \div 63pq(x - 3)$

$$\Rightarrow \frac{7p^2q^2(9x - 27)}{63pq(x - 3)}$$

$$\Rightarrow \frac{7 \cdot p^x q^{2-1} \cancel{9}(x - 3)}{\cancel{63} \cancel{pq}(x - 3)}$$

$$\Rightarrow pq$$

Solution – 2 :

(i) $6(2x + 7)(5x - 3) \div 3(5x - 3)$

$$\Rightarrow \frac{\overset{2}{\cancel{6}}(2x + 7)(5x - 3)}{\cancel{3}(5x - 3)}$$

$$\Rightarrow 2(2x + 7)$$

$$\Rightarrow 4x + 14$$

(ii) $33pq(p+3)(2q-5) \div 11p(2q-5)$

$$\Rightarrow \frac{33pq(p+3)(2q-5)}{11pq(2q-5)}$$

$$\Rightarrow 3(p+3)$$

$$\Rightarrow 3p+9.$$

Solution- 3

(i) $(7x^3-63x) \div 7(x-3)$

$$\Rightarrow \frac{7x^3-63x}{7(x-3)}$$

$$\Rightarrow \frac{7x(x^2-9)}{7(x-3)}$$

$$\Rightarrow \frac{x(x^2-3^2)}{x-3}$$

$$\Rightarrow \frac{x(x+3)(x-3)}{(x-3)}$$

$$\Rightarrow x(x+3)$$

$$\Rightarrow x^2+3x.$$

(ii) $(3p^2 + 17p + 10) \div (p+5)$

$3 \times 10 = 30$

$15 \quad 2$

$$\Rightarrow \frac{3p^2 + 17p + 10}{p+5}$$

$$\Rightarrow \frac{3p^2 + 15p + 2p + 10}{p+5}$$

$$\Rightarrow \frac{3p(p+5) + 2(p+5)}{p+5}$$

$$\Rightarrow \frac{(p+5)(3p+2)}{(p+5)}$$

$$\Rightarrow 3p+2 \text{ //}$$

(iii) $10xy(14y^2 + 43y - 21) \div 5x(7y-3)$

$14 \times 21 = 294$

$-6 \quad 49$

$$\Rightarrow \frac{10xy(14y^2 + 43y - 21)}{5x(7y-3)}$$

$$\Rightarrow \frac{2y(14y^2 - 6y + 49y - 21)}{7y-3}$$

$$\Rightarrow \frac{2y(2y(7y-3) + 7(7y-3))}{7y-3}$$

$$\Rightarrow \frac{2y(7y-3)(2y+7)}{(7y-3)}$$

$$\Rightarrow 2y(2y+7) \text{ //}$$

(iv) $12pqr(6p^2-13pq+6q^2) \div 6pq(2p-3q)$

$$\Rightarrow \frac{2\cancel{12}\,\cancel{p}\cancel{q}r(6p^2-13pq+6q^2)}{\cancel{6}\cancel{p}\cancel{q}(2p-3q)}$$

$$\Rightarrow \frac{2r(6p^2-9pq-4pq+6q^2)}{2p-3q}$$

$$\Rightarrow \frac{2r(3p(2p-3q)-2q(2p-3q))}{2p-3q}$$

$$\Rightarrow \frac{2r(2p-3q)(3p-2q)}{(2p-3q)}$$

$$\Rightarrow 2r(3p-2q)$$