

Partial Fractions

If *degree of numerator* < *degree of denominator*, then:

$$\frac{ax + b}{(px + q)(rx + s)} = \frac{A}{px + q} + \frac{B}{rx + s}$$

$$\frac{ax^2 + bx + c}{(px + q)(rx + s)^2} = \frac{A}{px + q} + \frac{B}{rx + s} + \frac{C}{(rx + s)^2}$$

If *degree of numerator* = *degree of denominator*, then:

$$\frac{ax^2 + bx + c}{(px + q)(rx + s)} = A + \frac{B}{px + q} + \frac{C}{rx + s}$$

$$\frac{ax^3 + bx^2 + cx + d}{(px + q)(rx + s)^2} = A + \frac{B}{px + q} + \frac{C}{rx + s} + \frac{D}{(rx + s)^2}$$

If *degree of numerator exceeds degree of denominator by 1*, then:

$$\frac{ax^3 + bx^2 + cx + d}{(px + q)(rx + s)} = Ax + B + \frac{C}{px + q} + \frac{D}{rx + s}$$

$$\frac{ax^4 + bx^3 + cx^2 + dx + e}{(px + q)(rx + s)^2} = Ax + B + \frac{C}{px + q} + \frac{D}{rx + s} + \frac{E}{(rx + s)^2}$$

If degree of numerator exceeds degree of denominator by 2, then:

$$\frac{ax^4 + bx^3 + cx^2 + dx + e}{(px + q)(rx + s)} = Ax^2 + Bx + C + \frac{D}{px + q} + \frac{E}{rx + s}$$

If degree of numerator exceeds degree of denominator by 3, then:

$$\frac{ax^5 + bx^4 + cx^3 + dx^2 + ex + f}{(px + q)(rx + s)} = Ax^3 + Bx^2 + Cx + D + \frac{E}{px + q} + \frac{F}{rx + s}$$

If degree of numerator exceeds degree of denominator by n , then:

$$\frac{ax^{m+n} + bx^{m+n-1} + \dots + jx + k}{(px + q)(rx + s)} = Ax^n + Bx^{n-1} \dots + I + \frac{J}{px + q} + \frac{K}{rx + s}$$