# Addition and subtraction +Dcuke"Vgej plecrl'O cyj go cvkeu'y kj "Ecrewnwu Rgvgt"M0H0Mwj hkwkpi

## Exercises / Section 5.8 (page 183-185)

- Eqo dkpg"vj g'i kxgp'htcevkqpu'cpf "uko r nkh{0

Rtqdngo "%30 $\dfrac{3}{4} - \dfrac{3}{3:} + \dfrac{7}{;}$.    Rtqdngo "%330 $\dfrac{4}{xy} - \dfrac{3}{x} - \dfrac{y^4 + 4x - 4y}{xy*x - y+}$

Rtqdngo "%450 $\dfrac{a+b}{b} - \dfrac{a^4}{b*a+4b+} + \dfrac{a}{*a+4b+}$    Rtqdngo "%570 $\dfrac{3}{4x^4+5xy+y^4} - \dfrac{3}{x^4+6xy+5y^4} + \dfrac{3}{4x^4+9xy+5y^4}$

Rtqdngo "%; 0 $\dfrac{x+5y}{x-y} - \dfrac{x-5y}{x+y}$    Rtqdngo "%370 $\dfrac{4}{x-5} + \dfrac{3}{x+4} - \dfrac{4x-3}{*x-5+*x+4+}$

Rtqdngo "%4; 0 $\dfrac{5}{(x-y)(x+4y)} - \dfrac{3}{(x+y)(x+4y)} + \dfrac{3}{(y-x)(x+y)}$

*Rtqdngo u'uqnxgf "kp"encuu"%3."33."45."57+      J Y <Rtqdngo "%; ."Rtqdngo "%37."Rtqdngo "%4; .

Rtqdngo  %R3< $\dfrac{3}{x-y}\left(\dfrac{x}{y} - \dfrac{y}{x}\right)$ *Cpuy gt< $\dfrac{x+y}{xy}$ +    Rtqdngo "%R4< $\dfrac{4}{w*w+3+} + \dfrac{5}{w^4}$ *Cpuy gt< $\dfrac{7w+5}{w^4*w+3+}$ +
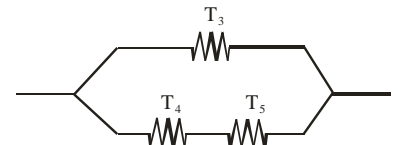
## Exercises / Section 5.9 (page 188-189)

- Uko r nkh{"vj g'eqo r ngz"htcevkqpu0

Rtqdngo "%90 $\dfrac{3 - \dfrac{38}{x^4}}{3 + \dfrac{6}{x}}$.    Rtqdngo "%3; 0 $\dfrac{\dfrac{3}{E-3} + \dfrac{3}{E-4}}{3 + \dfrac{3}{E-4}}$    Rtqdngo "%450 $\dfrac{\dfrac{x}{x-4} - \dfrac{4}{(x-3)(x-4)}}{\dfrac{(x-6)}{(x-3)}}$

Rtqdngo "%53   Vj g"qvcrl'tgukuvcpeg"qh"vj g ekrewkv"uj qy p"kp"vj g"hki wtg"ku"i kxgp d{  $R = \dfrac{3}{\dfrac{3}{R_3} + \dfrac{3}{R_4 + R_5}}$ . uko r nkh{"vj g"gzr tguukqp"hqt "T0



Uko r nkh{"vj g"eqo r ngz"htcevkqpu< Rtqdngo "%70 $\dfrac{5 - \dfrac{3}{x}}{; - \dfrac{3}{x^4}}$    Rtqdngo "%370 $\dfrac{w - \dfrac{w}{w-7}}{w - \dfrac{8}{w-7}}$    Rtqdngo "   %"   43

$\dfrac{\dfrac{k}{k+3} - \dfrac{8}{(k+3)^4}}{3 - \dfrac{;}{(k+3)^4}}$

*Rtqdngo u'uqnxgf "kp"encuu"%9."3; ."45."53+      J Y <Rtqdngo "%7."Rtqdngo "%37."Rtqdngo "%43.

Rtqdngo "%R5< $\dfrac{\dfrac{4}{x-4} + \dfrac{3}{x}}{\dfrac{5x}{x-7} - \dfrac{4}{x-7}}$ *Cpuy gt< $\dfrac{x-7}{x*x-4+}$ +    Rtqdngo "%R6< $4 - \dfrac{m}{3 - \dfrac{3-m}{-m}}$ *Cpuy gt< $4 - m^4$ +

Rtqdngo "%R7< $\dfrac{7 - \dfrac{3}{x+4}}{3 + \dfrac{5}{3 + \dfrac{5}{x}}}$ *Cpuy gt< $\dfrac{(7x+; )(x+5)}{*x+4+(6x+5)}$ +

## 7.1 Introduction to partial fractions

In order to resolve an algebraic expression into partial fractions:

(i)     The denominator must factorise

(ii)     The numerator must be at least one degree less than the denominator. When the degree of numerator is equal to or higher than the degree of the denominator, the numerator must be divided by the denominator (see problem 3 and 4).

### Table 7.1

| Type | Denominator containing | Expression | Form of partial fraction |
|---|---|---|---|
|  | Linear factors (see problem 1 to 4) | $\dfrac{f(x)}{(x+a)(x-b)(x+c)}$ | $\dfrac{A}{(x+a)}+\dfrac{B}{(x-b)}+\dfrac{C}{(x+c)}$ |
| 2 | Repeated linear factors (see problem 5 to 7) | $\dfrac{f(x)}{(x+a)^3}$ | $\dfrac{A}{(x+a)}+\dfrac{B}{(x+a)^2}+\dfrac{C}{(x+a)^3}$ |
| 3 | Quadratic factors (see problem 8 and 9) | $\dfrac{f(x)}{(ax^2+bx+c)(x+d)}$ | $\dfrac{Ax+B}{(ax^2+bx+c)}+\dfrac{C}{(x+d)}$ |

## 7.2    Worked Problems on partial fractions with linear factors

**Problem 1. .** Resolve $\dfrac{11-3x}{x^2+2x-3}$ into partial fractions

**Problem 2.** Convert $\dfrac{2x^2-9x-35}{(x+1)(x-2)(x+3)}$ into the sum of three partial fractions

**Problem 3.** Resolve $\dfrac{x^2+1}{x^2-3x+2}$ into partial fractions

**Problem 4.** Express $\dfrac{x^3-2x^2-4x-4}{x^2+x-2}$ in partial fractions

## 7.3    Worked Problems on partial fractions with repeated linear factors

**Problem 5.** Resolve $\dfrac{2x+3}{(x-2)^2}$ into partial fractions

**Problem 6.** Express $\dfrac{5x^2-2x-19}{(x+3)(x-1)^2}$ as the sum of three partial fractions

**Problem 7.** Resolve $\dfrac{3x^2+16x+15}{(x+3)^3}$ into partial fractions

## 7.4    Worked problems on partial fraction with quadratic factors

**Problem 8.** Express $\dfrac{7x^2+5x+13}{(x^2+2)(x+1)}$ in partial fractions  **Problem 9.** Resolve $\dfrac{3+6x+4x^2-2x^3}{x^2(x^2+3)}$ into partial fractions