

## Revision Sheet 1 - Worked Solutions

Q1.  $45a^2 - 20$   
 $= 5(9a^2 - 4)$   
 $= 5[(3a)^2 - (2)^2]$   
 $= \boxed{5(3a+2)(3a-2)}$

Q2. 
$$\begin{array}{r} x^2 - x - 1 \\ 2x - 3 \overline{) 2x^3 - 5x^2 + x + 3} \\ \underline{-2x^3 + 3x^2} \phantom{+ 3} \\ -2x^2 + x \phantom{+ 3} \\ \underline{+2x^2 - 3x} \phantom{+ 3} \\ -2x + 3 \\ \underline{+2x - 3} \\ 0 \end{array}$$

As Rem = 0  
 $\Rightarrow 2x - 3$  is a factor

Q3.  $\frac{2x^2 - 7x - 4}{3x^2 - 13x + 4}$   
 $= \frac{(2x+1)(x-4)}{(3x-1)(x-4)}$   
 $= \boxed{\frac{2x+1}{3x-1}}$

Q4.  $3(x^2 - 9y^2)$   
 $3[(x)^2 - (3y)^2]$   
 $= \boxed{3(x+3y)(x-3y)}$

Q5.  $5x^3 + 40y^3$   
 $= 5(x^3 + 8y^3)$   
 $= 5[(x)^3 + (2y)^3]$   
 $= \boxed{5(x+2y)(x^2 - 2xy + 4y^2)}$

Q6.  $\frac{x^2+4}{x^2-4} - \frac{x}{x+2}$   
 $= \frac{x^2+4}{(x-2)(x+2)} - \frac{x}{x+2}$

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

$= \frac{x^2+4 - x^2+2x}{(x-2)(x+2)}$

$= \frac{2x+4}{(x-2)(x+2)}$

$= \frac{2(x+2)}{(x-2)(x+2)}$

$= \boxed{\frac{2}{x-2}}$

Q7.  $\frac{12x^2 - 17xy + 5y^2}{(12x - 5y)(x - y)}$

Q8.  $\frac{5}{x^2-3x-10} - \frac{3}{x+2}$

$= \frac{5}{(x+2)(x-5)} - \frac{3}{x+2}$

$= \frac{5(1) - 3(x-5)}{(x+2)(x-5)}$

$= \frac{5 - 3x + 15}{(x+2)(x-5)}$

$= \boxed{\frac{20 - 3x}{(x+2)(x-5)}}$

Q9. Same as Q2!

$$= \frac{20x^2 - 2x - 6}{12x^2 + 2x - 4}$$

Q10.  $\frac{x^2 - 2x - 15}{x + 5} \div \frac{x^2 - 9x + 20}{3x + 15}$

$$= \frac{2(10x^2 - x - 3)}{2(6x^2 + x - 2)}$$

Flip 2<sup>nd</sup> fraction & multiply:

$$= \frac{(x-5)(x+3)}{x+5} \times \frac{3(x+5)}{(x-5)(x-4)}$$

$$= \boxed{\frac{10x^2 - x - 3}{6x^2 + x - 2}}$$

$$= \frac{3(x+3)}{x-4}$$

$$= \boxed{\frac{3x+9}{x-4}}$$

Q11.  $5 - \frac{1}{2x-1}$   
 $3 + \frac{1}{2x+1}$

Q12.  $\frac{x^2 - 36}{5x - 10} \times \frac{x-2}{x+6}$

$$\frac{(x-6)(x+6)}{5(x-2)} \times \frac{x-2}{x+6}$$

$$= \boxed{\frac{x-6}{5}}$$

$$= \frac{5(2x-1) - 1}{2x-1}$$
$$\frac{3(2x+1) + 1}{2x+1}$$

Q13.  $x^4 - y^4$   
 $= (x^2)^2 - (y^2)^2$   
 $= (x^2 + y^2)(x^2 - y^2)$   
 $= (x^2 + y^2)(x+y)(x-y)$   
 $= \boxed{(x^2 + y^2)(x+y)(x-y)}$

$$= \frac{10x - 5 - 1}{2x - 1}$$

$$\frac{6x + 3 + 1}{2x + 1}$$

$$= \frac{10x - 6}{2x - 1}$$

$$\frac{6x + 4}{2x + 1}$$

$$= \frac{10x - 6}{2x - 1} \times \frac{2x + 1}{6x + 4}$$

Q14.  $x^2 - 3x + 2$   
 $x-2 \overline{) x^3 - 5x^2 + 8x - 4}$   
 $\underline{-(x^3 + 2x^2)}$   
 $-3x^2 + 8x$   
 $\underline{+(3x^2 + 6x)}$   
 $2x - 4$   
 $\underline{-(2x + 4)}$   
 $0$

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

$\Rightarrow$  Other factors:  $\boxed{(x-2) \text{ and } (x-1)}$

$$= \frac{20x^2 - 12x + 10x - 6}{12x^2 - 6x + 8x - 4}$$

$$\text{Q15. } \frac{4x+6}{x^2+2x-35} \times \frac{x-5}{2x+3}$$

$$= \frac{2(2x+3)}{(x+7)\cancel{(x-5)}} \times \frac{\cancel{x-5}}{2x+3}$$

$$= \boxed{\frac{2}{x+7}}$$

$$\text{Q16. } \frac{1}{3x} - 1 \times \frac{3x}{3x}$$

$$= \frac{3x\left(\frac{1}{3x}\right) - 3x(1)}{3x\left(\frac{1}{x}\right) - 3x(3)}$$

$$= \frac{1 - 3x}{3 - 9x}$$

$$= \frac{1 - 3x}{3(1 - 3x)}$$

$$= \boxed{\frac{1}{3}}$$