

# Factorize Fractions

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Eg1  $\frac{\cancel{15}^3}{\cancel{10}^2} \quad \text{HCF} = 5 \quad \text{Ans} \quad \frac{3}{2}$

Eg2  $\frac{\cancel{7}^1 x}{\cancel{35}^5} \quad \text{HCF} = 7 \quad \text{Ans} = \frac{1x}{5} \text{ OR } \frac{x}{5}$

Eg3  $\frac{\cancel{9}^{3x} x^2}{\cancel{3x}^1} \quad \text{HCF} = 3x \quad \text{Ans} = \frac{3x}{1} = 3x$

Eg4)  $\frac{4a-8b}{3(a-2b)} = \text{HCF is } 4 = \frac{4(\cancel{a-2b})}{3(\cancel{a-2b})} = \frac{4}{3}$

Class work pg 29 Q 1+Q2.



T&T2 2.5  
Simplifying...

## Factors

chapter

2

29

### Section 2.5 Using factors to simplify algebraic fractions

### Example 1

Simplify

(i)  $\frac{3n - 12}{n - 4}$

(ii)  $\frac{3x^2 - 5x - 2}{x - 2}$

### Exercise 2.5

1. Simplify each of the following:

(i)  $\frac{14}{35}$

HCF  
7

$$\frac{2}{5}$$

(ii)  $\frac{7x}{14}$

HCF  
7

$$\frac{1x}{2}$$

(iii)  $\frac{9x^2}{3x}$

(iv)  $\frac{8p^2}{2p}$

HCF  
2p

$$\frac{4p}{1} = 4p$$

(v)  $\frac{9x^2y}{3xy}$

HCF  
3xy

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

2. Simplify each of the following:

(i)  $\frac{4x + 4y}{4}$

HCF  
4

OR  $\frac{1x+1y}{x+y}$

(ii)  $\frac{12(a+b)}{3(a+b)}$

$\frac{12}{3} = 4$

(iii)  $\frac{3x + 12}{x(x + 4)}$

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

$= \frac{3}{x}$

(iv)  $\frac{4a - 8b}{3(a - 2b)}$

Simplify each of the following, using factors where necessary:

3.  $\frac{(x-1)(x+3)}{x+3}$

$(x-1)$

4.  $\frac{2(y-1)(y+3)}{y-1}$

$= 2(y+3)$

5.  $\frac{x^2 + 8x + 7}{x+1}$  Quadratic

$(x+7)(x+1)$   
 $\begin{array}{r} x^2 \quad 7 \\ \diagdown \quad \diagup \\ x \quad x \quad 7 \quad 1 \end{array}$ 
 $\begin{array}{r} + 1x \\ + 7x \\ \hline + 8x \end{array}$

$\frac{(x+7)(x+1)}{x+1} = x+7$

Simplify each of the following, using factors where necessary:

$$6. \frac{x-4}{x^2-6x+8} = \frac{1}{x-2}$$

$(x-4)(x-2)$   
 $(x-4)(x-2)$   
 $\begin{array}{r} x^2 & +8 & -2x \\ x & \times & 4 & 2 \\ \hline & & -4x & \end{array}$

$$7. \frac{x-2}{x^2+5x-14} = \frac{1}{x+7}$$

$(x+7)(x-2)$   
 $\begin{array}{r} x^2 & -14 & -2x \\ x & \times & 7 & 2 \\ \hline & & +7x & \end{array}$

$$8. \frac{3x-3}{x^2-2x+1} = \frac{3(x-1)}{(x-1)(x-1)} = \frac{3}{x-1}$$

HCF

$(x-1)(x-1)$   
 $\begin{array}{r} x^2 & & 1 & -1x \\ x & \times & 1 & -1x \\ \hline & & 1 & -2x \end{array}$

Class work  
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Simplify each of the following, using factors where necessary:

Hiw

$$9. \frac{2x-6}{x^2+x-12}$$

Hiw

$$10. \frac{x^2+x-30}{x-5}$$

Hiw

$$11. \frac{a^2+2ab}{3a+6b}$$

Simplify each of the following, using factors where necessary:

12.  $\frac{x^2 - 9}{x - 3}$

13.  $\frac{a^2 - 16}{3a - 12}$

14.  $\frac{n + 9}{n^2 + 18n + 81}$

Simplify each of the following, using factors where necessary:

15.  $\frac{4x - 8}{x^2 - 4}$

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

17.  $\frac{2x^2 + 11x + 15}{2x + 5}$

Simplify each of the following, using factors where necessary:

18.  $\frac{ab - ac}{b - c}$

19.  $\frac{5 - x}{x - 5}$

20.  $\frac{3a + 9}{a^2 - 1} \div \frac{a + 3}{a - 1}$

## Answers

### Exercise 2.5

1. (i)  $\frac{2}{5}$  (ii)  $\frac{x}{2}$  (iii)  $3x$  (iv)  $4p$  (v)  $3x$   
2. (i)  $x + y$  (ii)  $4$  (iii)  $\frac{3}{x}$  (iv)  $\frac{4}{3}$   
3.  $x - 1$  4.  $2(y + 3)$  5.  $x + 7$   
6.  $\frac{1}{x - 2}$  7.  $\frac{1}{x + 7}$  8.  $\frac{3}{x - 1}$   
9.  $\frac{2}{x + 4}$  10.  $x + 6$  11.  $\frac{a}{3}$   
12.  $x + 3$  13.  $\frac{a + 4}{3}$  14.  $\frac{1}{n + 9}$   
15.  $\frac{4}{x + 2}$  16.  $x + 3$  17.  $x + 3$   
18.  $a$  19.  $-1$  20.  $\frac{3}{a + 1}$