

HCF and LCM

2, 3, 5, 7

Ex 1 Find HCF and LCM of 48 and 60

$$\begin{array}{r} 2 \mid 48 \\ 2 \mid 24 \\ 2 \mid 12 \\ 2 \mid 6 \\ 3 \mid 3 \\ \hline 1 \end{array}$$

$$\begin{array}{r} 2 \mid 60 \\ 2 \mid 30 \\ 3 \mid 15 \\ 5 \mid 5 \\ \hline 1 \end{array}$$

$$48 = 2 \times 2 \times 2 \times 2 \times 3 = 2^4 \times 3$$

$$60 = 2 \times 2 \times 3 \times 5 = 2^2 \times 3 \times 5$$

HCF

$$48 = \textcircled{2} \times \textcircled{2} \times 2 \times 2 \times \textcircled{3} \quad \text{HCF} = 2 \times 2 \times 3$$

$$60 = \textcircled{2} \times \textcircled{2} \times \textcircled{3} \times 5 \quad = 12$$

LCM

$$48 = 2 \times 2 \times 2 \times 2 \times 3 \quad \text{LCM} = 2 \times 2 \times 2 \times 2 \times 3 \times 5$$

$$60 = 2 \times 2 \times 3 \times 5 \quad = 240$$

All factors of both numbers

Alternative Method for LCM on calculator exam

$$\begin{array}{cccccc} 48 & 96 & 144 & 192 & 240 \\ 60 & 120 & 180 & 240 & 300 \end{array}$$

Write out multiplication tables and identify
the first number to occur in both lists

Exercise Find HCF and LCM of
84 and 120

$$\begin{array}{r} 2 | 84 \\ 2 | 42 \\ 3 | 21 \\ 7 | 7 \\ \hline 1 \end{array}$$

$$\begin{array}{r} 2 | 120 \\ 2 | 60 \\ 2 | 30 \\ 3 | 15 \\ 5 | 5 \\ \hline 1 \end{array}$$

$$84 = 2 \times 2 \times 3 \times 7$$

$$120 = 2 \times 2 \times 2 \times 3 \times 5$$

$$\text{HCF} = 2 \times 2 \times 3 = 12$$

$$\begin{array}{r} 120 \\ 7 \times \\ \hline 840 \end{array}$$

$$\text{Lcm} = 2 \times 2 \times 2 \times 3 \times 5 \times 7 = 840$$

Solving Inequalities (Linear and Quadratic)

Linear

Solve just like linear equations.

Inequality sign only changes if you multiply or divide by a negative number.

Examples

$$\begin{array}{l} 1) \quad 2x + 3 \leq 11 \\ \quad \quad 2x \leq 11 - 3 \\ \quad \quad 2x \leq 8 \end{array} \quad \left| \begin{array}{l} 2) \quad 5x + 3 < 7x + 21 \\ \quad \quad 5x - 7x < 21 - 3 \\ \quad \quad -2x < 18 \end{array} \right.$$

$$\begin{array}{c|c} x \leq \frac{8}{2} & x > \frac{18}{-2} \\ \hline x \leq 4 & x > -9 \end{array}$$

Exercise

1) $3x - 9 > 21$

$$3x > 21 + 9$$

$$3x > 30$$

$$x > \frac{30}{3}$$

$$x > 10$$

2) $4x - 8 \leq 5x - 27$

$$4x - 5x \leq -27 + 8$$

$$-x \leq -19$$

$$x \geq \frac{-19}{-1}$$

$$x \geq 19$$

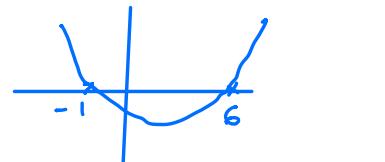
Quadratic Inequalities

Examples

1) $x^2 - 5x - 6 < 0$

$$(x - 6)(x + 1) < 0$$

$$-1 < x < 6$$

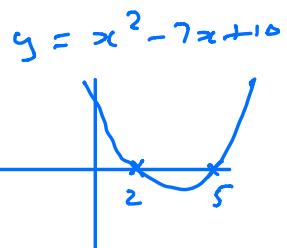


2)

$$x^2 - 7x + 10 > 0$$

$$(x - 2)(x - 5) > 0$$

Either $x \leq 2$ or $x \geq 5$

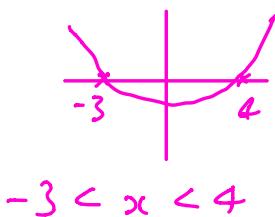


Exercise

1) $x^2 - x - 12 < 0$

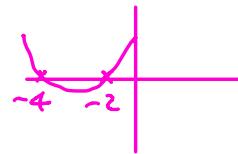
2) $x^2 + 6x + 8 > 0$

$$(x+3)(x-4) < 0$$



$$-3 < x < 4$$

$$(x+2)(x+4) \geq 0$$



$$\begin{aligned} \text{Either } x &\leq -4 \\ \text{or } x &\geq -2 \end{aligned}$$

Trinomials - Expand and Simplify

$$\text{Ex1} \quad (x+1)(x+2)(x+3)$$

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

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

$$\begin{aligned} &= x^3 + 3x^2 + 2x \\ &\quad + 3x^2 + 9x + 6 \\ &= \frac{x^3 + 6x^2 + 11x + 6}{} \end{aligned}$$

$$\text{Ex2} \quad (2x-3)(x+2)(3x-1)$$

$$= (2x^2 - 3x + 4x - 6)(3x-1)$$

$$= (2x^2 + x - 6)(3x-1)$$

$$\begin{aligned} &= 6x^3 + 3x^2 - 18x \\ &\quad - 2x^2 - x + 6 \\ &= \frac{6x^3 + x^2 - 19x + 6}{} \end{aligned}$$

Exercise Expand

$$\begin{aligned}
 & (3x+2)(x-5)(3x+4) \\
 = & (3x^2 + 2x - 15x - 10)(3x+4) \\
 = & (3x^2 - 13x - 10)(3x+4) \\
 = & \frac{9x^3 - 39x^2 - 30x}{+12x^2 - 52x - 40} \\
 = & 9x^3 - 27x^2 - 82x - 40
 \end{aligned}$$
