ALGEBRAIC MULTIPLICATION AND DIVISION   TRANSCRIPT

Multiplication of brackets with more than 2 terms:

Ex1

$$(x^2 + 7x - 3)(2x - 5)$$

$$= 2x^3 + 14x^2 - 6x$$
$$\quad - 5x^2 - 35x + 15$$

$$= 2x^3 + 9x^2 - 41x + 15$$

Ex2

$$(x^2 + 3x - 2)(2x^2 - 5x + 1)$$

$$= 2x^4 + 6x^3 - 4x^2$$
$$\quad - 5x^3 - 15x^2 + 10x$$
$$\quad + x^2 + 3x - 2$$

$$= 2x^4 + x^3 - 18x^2 + 13x - 2$$

Reminder of number long division: $3822 \div 14$

$1 \times 14 = 14$

$2 \times 14 = 28$

$3 \times 14 = 42$

$4 \times 14 = 56$

$5 \times 14 = 70$

$6 \times 14 = 84$

$7 \times 14 = 98$

$8 \times 14 = 112$

$9 \times 14 = 126$

$10 \times 14 = 140$

$$\begin{array}{r} 0\,2\,7\,3 \\ 14\,\overline{\smash{)}\,3\,8\,2\,2} \\ \underline{2\,8} \\ 1\,0\,2 \\ \underline{9\,8} \\ 4\,2 \\ \underline{4\,2} \end{array}$$

Answer 273

ALGEBRAIC MULTIPLICATION AND DIVISION

Algebraic long division examples

Ex3 $x^3 + 8x^2 + 17x + 6 \div (x+3)$

$$
\begin{array}{r}
x^2 + 5x + 2 \\[2pt]
x+3 \,\big)\, \overline{x^3 + 8x^2 + 17x + 6} \\
\underline{x^3 + 3x^2} \\
+5x^2 + 17x \\
\underline{+5x^2 + 15x} \\
+2x + 6 \\
\underline{+2x + 6}
\end{array}
$$

Answer $x^2 + 5x + 2$

Ex4 $2x^3 - 7x^2 + 11x - 4 \div (2x-1)$

$$
\begin{array}{r}
x^2 - 3x + 4 \\[2pt]
2x-1 \,\big)\, \overline{2x^3 - 7x^2 + 11x - 4} \\
\underline{2x^3 - x^2} \\
-6x^2 + 11x \\
\underline{-6x^2 + 3x} \\
+8x - 4 \\
\underline{+8x - 4}
\end{array}
$$

Answer $x^2 - 3x + 4$

ALGEBRAIC MULTIPLICATION AND DIVISION

An example not on the A-level syllabus, dividing by a quadratic factor

Ex 5 $x^4 - 3x^3 + 7x^2 - 7x + 6 \div (x^2 - 2x + 3)$

$$
\begin{array}{r}
x^2 - x + 2 \\
x^2 - 2x + 3 \overline{\smash{\big)}\ x^4 - 3x^3 + 7x^2 - 7x + 6} \\
\underline{x^4 - 2x^3 + 3x^2} \\
-x^3 + 4x^2 - 7x \\
\underline{-x^3 + 2x^2 - 3x} \\
+2x^2 - 4x + 6 \\
\underline{+2x^2 - 4x + 6}
\end{array}
$$

Answer $x^2 - x + 2$

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