Factoring by Grouping

Step 1: Group the first two terms together and then the last two terms together.

Step 2: Factor out a GCF from each separate binomial.

Step 3: Factor out the common binomial.

$6v^3 - 16v^2 + 21v - 56$

$(6v^3 - 16v^2) + (21v - 56)$

$2v^2(3v - 8) + 7(3v - 8)$

$(3v - 8)(2v^2 + 7)$

Check: $6v^3 + 21v - 16v^2 - 56$

$12x^3 + 2x^2 - 30x - 5$

$(12x^3 + 2x^2) - (30x + 5)$

$2x^2(6x + 1) - 5(6x + 1)$

$(6x + 1)(2x^2 - 5)$

Check: $12x^3 - 30x + 2x^2 - 5$

Long Division

Divide 5435 by 7 using long division.

$$7\overline{)5435} = 776\tfrac{3}{7}$$

-49

53

-49

45

42

3

Divide $f(x) = 3x^3 + 17x^2 + 21x - 11$ by $x + 3$

Note: if any "degrees" are missing, use 0's as place-holders.

$$3x^2 + 8x - 3 + \frac{-2}{x+3}$$

$$x+3\overline{)3x^3 + 17x^2 + 21x - 11}$$

$-3x^3 + -9x^2$

$8x^2 + 21x$

$-8x^2 + -24x$

$-3x - 11$

$+3x + 9$

-2

Divide $f(x) = x^3 + 3x^2 - 7$ by $x^2 - x - 2$

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

$$x^2 - x - 2\overline{)x^3 + 3x^2 + 0x - 7}$$

$-x^3 + x^2 + 2x$

$4x^2 + 2x - 7$

$-4x^2 + 4x + 8$

$6x + 1$

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