Factorisation et division polynomiale

Exercice 1.

a) $\boxed{(x+4)(x-10)}$

b) $7(x^2-2x-3)) =$
$\boxed{7\,(x+1)(x-3)}$

c) $\boxed{(6\,x+5)(6\,x-5)}$

d) $\boxed{(2\,x+1)(x-4)}$

e) $x(x^2-50x+49) =$
$\boxed{x(x-1)(x-49)}$

f) $x^2(2x-y)-9(2x-y) = (2x-y)(x^2-9)$
$= \boxed{(2\,x-y)(x+3)(x-3)}$

$\boxed{(x+5)(x-8)}$

$x(x^2-5x+4) =$
$\boxed{x(x-1)(x-4)}$

$\boxed{(3\,x+1)(x-3)}$

$\boxed{(7\,x+8)(7\,x-8)}$

$5(x^2+2x-8) =$
$\boxed{5\,(x+4)(x-2)}$

$x^2(3x-z)-4(3x-z) = (3x-z)(x^2-4)$
$= \boxed{(3\,x-z)(x+2)(x-2)}$

Exercice 2.

a)
$$\begin{array}{rrrl}
2x^4 & -6x^2 & +x & -7 = \left(x^2+x+2\right)\left(2x^2-2x-8\right)+13x+9 \\
-2x^4-2x^3 & -4x^2 & & \\
\hline
 & -2x^3-10x^2 & +x & \\
 & 2x^3 & +2x^2+4x & \\
\hline
 & & -8x^2+5x & -7 \\
 & & 8x^2+8x+16 & \\
\hline
 & & 13x & +9
\end{array}$$

. . . . . .

$$\begin{array}{rrrl}
3x^4 & -7x^2+3x & & -9 = \left(x^2+2x+1\right)\left(3x^2-6x+2\right)+5x-11 \\
-3x^4-6x^3 & -3x^2 & & \\
\hline
 & -6x^3-10x^2+3x & & \\
 & 6x^3+12x^2+6x & & \\
\hline
 & & 2x^2+9x & -9 \\
 & & -2x^2-4x & -2 \\
\hline
 & & 5x-11 &
\end{array}$$

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b) $-x^6 + 5x^4 + 3x^3 + 12 = \big(x-2\big)\big(-x^5-2x^4+x^3+5x^2+10x+20\big)+52$

$$
\begin{array}{rl}
x^6-2x^5 & \\
\hline
-2x^5+5x^4 & \\
2x^5-4x^4 & \\
\hline
x^4+3x^3 & \\
-x^4+2x^3 & \\
\hline
5x^3 & \\
-5x^3+10x^2 & \\
\hline
10x^2 & \\
-10x^2+20x & \\
\hline
20x+12 & \\
-20x+40 & \\
\hline
52 &
\end{array}
$$

. . . . . .

$-x^6 + 26x^3 + 2x^2 + 15 = \big(x-3\big)\big(-x^5-3x^4-9x^3-x^2-x-3\big)+6$

$$
\begin{array}{rl}
x^6-3x^5 & \\
\hline
-3x^5 & \\
3x^5-9x^4 & \\
\hline
-9x^4+26x^3 & \\
9x^4-27x^3 & \\
\hline
-x^3+2x^2 & \\
x^3-3x^2 & \\
\hline
-x^2 & \\
x^2-3x & \\
\hline
-3x+15 & \\
3x-9 & \\
\hline
6 &
\end{array}
$$