Dividing Polynomial 6-3 A

Name: Key

Divide using long division.

1. $(x^2 - 3x - 40) \div (x + 5)$

$x - 8$

$x+5 \,\overline{)\, x^2 - 3x - 40}$

$-(x^2 + 5x)$

$-8x - 40$

$-(-8x - 40)$

0

$\boxed{(x-8)}$

2. $(3x^2 + 7x - 20) \div (x + 4)$

$3x - 5$

$x+4 \,\overline{)\, 3x^2 + 7x - 20}$

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

$-5x - 20$

$(-5x - 20)$

0

$\boxed{3x-5}$

3. $(x^3 + 3x^2 - x + 2) \div (x - 1)$

$x^2 + 4x + 3$

$x-1 \,\overline{)\, x^3 + 3x^2 - x + 2}$

$-(x^3 - x^2)$

$4x^2 - x$

$-(4x^2 - 4x)$

$3x + 2$

$-(3x - 3)$

5

$\boxed{x^2 + 4x + 3 + \frac{5}{x-1}}$

4. $(2x^3 - 3x^2 - 18x - 8) \div (x - 4)$

$2x^2 + 5x + 2$

$x-4 \,\overline{)\, 2x^3 - 3x^2 - 18x - 8}$

$-(2x^3 - 8x^2)$

$5x^2 - 18x$

$-(5x^2 - 20x)$

$2x - 8$

$-(2x - 8)$

0

$\boxed{2x^2 + 5x + 2}$

5. $(9x^3 - 18x^2 - x + 2) \div (3x + 1)$

$3x^2 - 7x + 2$

$3x+1 \,\overline{)\, 9x^3 - 18x^2 - x + 2}$

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

$-21x^2 - x$

$-(-21x^2 - 7x)$

$6x + 2$

$-(6x + 2)$

0

$\boxed{3x^2 - 7x + 2}$

6. $(9x^2 - 21x - 20) \div (x - 1)$

$9x - 12$

$x-1 \,\overline{)\, 9x^2 - 21x - 20}$

$-(9x^2 - 9x)$

$-12x - 20$

$-(-12x + 12)$

-32

$\boxed{9x - 12 - \frac{32}{x-1}}$

Determine whether each binomial is a factor of $x^3 + 4x^2 + x - 6$.

9. $x + 1$

$$
\begin{array}{r}
x^2 + 3x - 2 \\
x+1 \overline{\big)\, x^3 + 4x^2 + x - 6} \\
-(x^3 + x^2) \\
\hline
3x^2 + x \\
-(3x^2 + 3x) \\
\hline
-2x - 6 \\
-(-2x - 2) \\
\hline
-4
\end{array}
$$

No, there is a remainder!

10. $x + 2$

$$
\begin{array}{r}
x^2 + 2x - 3 \\
x+2 \overline{\big)\, x^3 + 4x^2 + x - 6} \\
-(x^3 + 2x^2) \downarrow \\
\hline
2x^2 + x \\
-(2x^2 + 4x) \\
\hline
-3x - 6 \\
-3x - 6 \\
\hline
0
\end{array}
$$

Yes, a factor

11. $x + 3$

$$
\begin{array}{r}
x^2 + x - 2 \\
x+3 \overline{\big)\, x^3 + 4x^2 + x - 6} \\
-(x^3 + 3x^2) \\
\hline
x^2 + x \\
-(x^2 + 3x) \\
\hline
-2x - 6 \\
-(-2x - 6) \\
\hline
0
\end{array}
$$

Yes, a factor!

12. $x - 3$

$$
\begin{array}{r}
x^2 + 7x + 22 \\
x-3 \overline{\big)\, x^3 + 4x^2 + x - 6} \\
-(x^3 - 3x^2) \\
\hline
7x^2 + x \\
-(7x - 21x) \\
\hline
22x - 6 \\
-(22x - 66) \\
\hline
60
\end{array}
$$

No, there is a remainder