## Properties of Polynomials

- It sometimes helps to write a polynomial with the terms in descending order.
- The term with the highest degree indicates the degree of the polynomial as well.
- The **leading coefficient** is the coefficient on the term of highest degree.

Circle the leading term then identify the degree and leading coefficient of the following polynomial:

$$4x^3y^2 - 2x^2y + 3z$$

Degree: _____ Leading coefficient: _____

## Adding, Subtracting, and Multiplying Polynomials

Use different colors to underline the **like terms** and then add the polynomials together.

$$(3x^2 - x + 2) + (x^2 + 4x - 9) = \_\_\_\_\_$$

When subtracting polynomials, it is sometimes easier to distribute the negative sign first THEN combine the polynomials.

$$(9r^2 + 6r + 16) - (8r^2 + 7r + 10)$$

(Distribute the negative then color code the like terms!)

$$(9r^2 + 6r + 16) - (\_\_\_\_ + \_\_\_\_ + \_\_\_\_) = \_\_\_\_\_$$

When you multiply polynomials, you must distribute like terms:

$$(n^2 + 6n - 2)(n + 4)$$

$$n^2(n + 4) + 6n(n + 4) - 2(n + 4) = \_\_\_\_\_$$

(Once again, combine like terms to get the final answer!)

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| $\frac{3x^3 - 5x^2 + 10x - 3}{3x + 1}$<br>Becomes:<br>Setup the Problem | $\frac{3x^3 - 5x^2 + 10x - 3}{3x + 1}$<br>Becomes:<br>Setup the Problem | $\frac{3x^3 - 5x^2 + 10x - 3}{3x + 1}$<br>Becomes:<br>Setup the Problem |
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$$3x+1 \overline{)\ 3x^3-5x^2+10x-3}$$
$$3x^3$$

1st Term

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| | | |
|---|---|---|
| $$\begin{array}{r} x^2-2x \\ 3x+1 \overline{\big\vert\ 3x^3-5x^2+10x-3} \\ -\ (3x^3+x^2) \\ \hline -6x^2+10x-3 \\ -6x^2 \end{array}$$ 2nd Term | $$\begin{array}{r} x^2-2x \\ 3x+1 \overline{\big\vert\ 3x^3-5x^2+10x-3} \\ -\ (3x^3+x^2) \\ \hline -6x^2+10x-3 \\ -6x^2 \end{array}$$ 2nd Term | $$\begin{array}{r} x^2-2x \\ 3x+1 \overline{\big\vert\ 3x^3-5x^2+10x-3} \\ -\ (3x^3+x^2) \\ \hline -6x^2+10x-3 \\ -6x^2 \end{array}$$ 2nd Term |
| | | |
| | | |

$$
\begin{array}{r}
x^2 - 2x + 4 \\
3x + 1 \overline{\big|\ 3x^3 - 5x^2 + 10x - 3} \\
-\ (3x^3 + x^2) \\
\hline
-6x^2 + 10x - 3 \\
-\ (-6x^2 - 2x) \\
\hline
12x - 3 \\
12x
\end{array}
$$

3rd Term


$$
\begin{array}{r}
x^2 - 2x + 4 \\
3x + 1 \overline{\big|\ 3x^3 - 5x^2 + 10x - 3} \\
-\ (3x^3 + x^2) \\
\hline
-6x^2 + 10x - 3 \\
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\hline
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Use the form:

$$q(x)+\frac{r(x)}{b(x)}$$

to write the solution below.

Construct the Answer!


$$\begin{array}{r} x^2-2x+4 \\ 3x+1 \overline{\big|\ 3x^3-5x^2+10x-3} \\ -\ (3x^3+x^2) \\ \hline -6x^2+10x-3 \\ -\ (-6x^2-2x) \\ \hline 12x-3 \\ -\ (12x+4) \\ \hline -7 \end{array}$$

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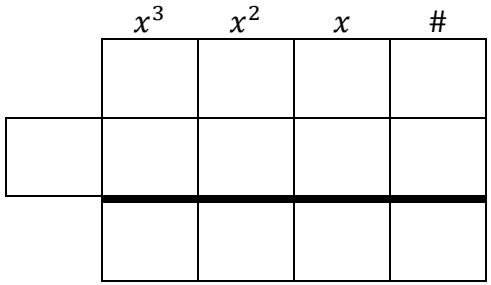
$$\frac{3x^3 - 2x^2 - 7x + 6}{x + 1}$$




Use the form $q(x) + \frac{r(x)}{b(x)}$ to construct your answer!

Answer: _____

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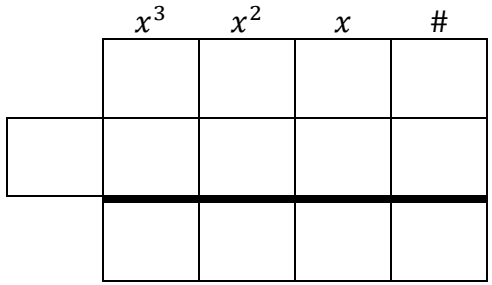


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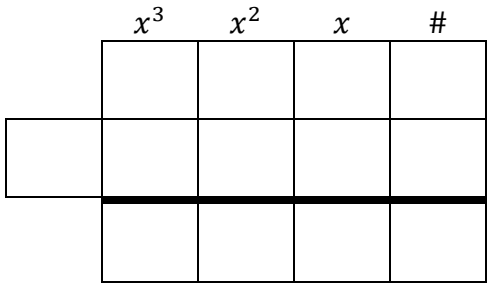
Answer: _____

$$\frac{5x^3 - 3x^2 - 6}{x - 1}$$

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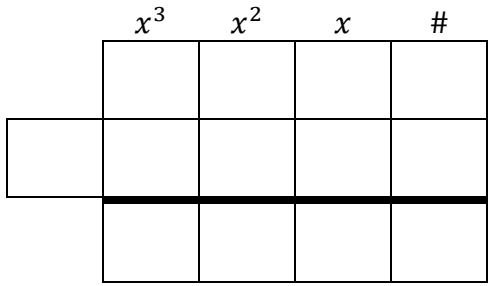


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