## 1. Evaluate $9x^3 - 48x^2 + 3 \div x - 5$

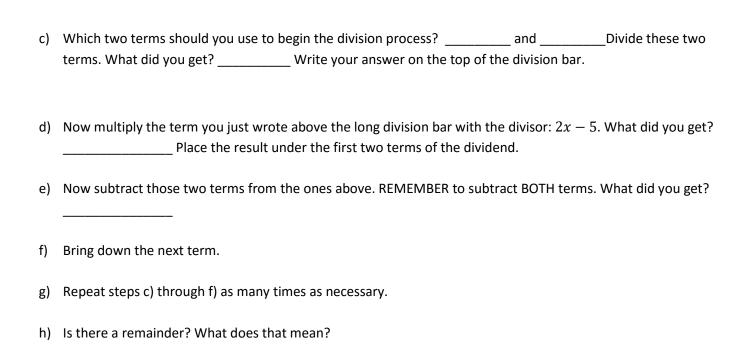
Fírst I have to set up the division problem, but since I am missing the x- term, I will need a placeholder (Ox).	$(x-5)9x^3-48x^2+0x+3$
1) Divide: To begin any long division problem, I must divide the first term in the dividend $(9x^3)$ by the first term in the divisor $(x)$ . $9x^3/x = 9x^2$ $9x^2 \text{ goes on the top as the first term of the quotient.}$	$\frac{9x^2}{x-5)9x^3-48x^2+0x+3}$
2) Multiply: I must multiply $9x^2$ by $x-5$ , making sure I distribute. $9x^2(x-5) = 9x^3 - 45x^2$ . This goes under the first two terms of the dividend.	$ \begin{array}{r} 9x^2 \\ x - 5)9x^3 - 48x^2 + 0x + 3 \\ 9x^3 - 45x^2 \end{array} $
3) Subtract: I must subtract the binomial 9x³ – 45x² from the first two terms of the dividend to get -3x² and I bring down the next term (ox).	$ \begin{array}{r} 9x^2 \\ x - 5) \overline{9x^3 - 48x^2 + 0x + 3} \\ \underline{-(9x^3 - 45x^2)} \\ -3x^2 + 0x \end{array} $
Now I just repeat steps 1, 2, and 3 until I get to the last term: $ \frac{-3x^2}{x} = -3x \qquad \begin{array}{c} -3x(x-5) \\ -3x^2+15x \end{array} $ $ \frac{-15x}{x} = -15 \qquad \begin{array}{c} -15(x-5) \\ -15x+75 \end{array} $ The remainder (-72) becomes the numerator of the fraction with the divisor (x-5) as the denominator.	$ \begin{array}{r} 9x^2 - 3x - 15 - \frac{72}{x - 5} \\ x - 5) 9x^3 - 48x^2 + 0x + 3 \\ \underline{-(9x^3 - 45x^2)} \\ -3x^2 + 0x \\ \underline{-(-3x^2 + 15x)} \\ -15x + 3 \\ \underline{-(-15x - 75)} \\ -72 \end{array} $

## 2. Is x - 5 a factor of $9x^3 - 48x^2 + 3$ ? How do you know?

No, because whenever the remainder is something other than 0, it means that the dividend is not divisible by the divisor. When the division leaves me with a remainder of 0, 1 know that 1 have found one of the factors of the polynomial.

## **Additional Practice**

- 1. Evaluate  $4x^3 11x 35 \div 2x 5$  following the steps below.
- a) Before you set up the problem, check to see if you are missing any terms in the dividend. Write the dividend with a placeholder for the missing term(s).
- b) On the top of the back of this sheet, set up the long division problem with the 2x 5 on the outside and the altered dividend with the placeholder on the inside.



2) Divide  $9x^3 - 48x^2 + 3$  by x - 5 using long division.