Warm Up:
Find all possible values of b such that the following can be factored:

\[ x^2 + bx + 12 \]

\[ b = 13, 9, 7 \]

Swoop, Factor, and Divide:
1.) Swoop the front number to the back (multiply)
2.) Factor using the X just like normal!!!
3.) Divide the number parts by the number you swooped at the beginning!

Examples 1 and 2:
(swoop, factor and divide method)
Examples 3 and 4:
(swoop, factor and divide method)

\[3d^2 + 20d + 12\]

\[= \frac{3d^2 + 20d + 12}{3d+6} \cdot \frac{d+6}{3d+6}\]

\[= (d+6)(3d+2)\]

\[2w^2 + 13w + 15\]

\[= \frac{2w^2 + 13w + 15}{w+5} \cdot \frac{w+3}{w+5}\]

\[= (w+5)(2w+3)\]

Examples 5 and 6:
(swoop, factor and divide method)

\[6x^2 + 16x + 10\]

\[= \frac{6x^2 + 16x + 10}{x+5} \cdot \frac{x+4}{x+5}\]

\[= (x+5)(x+4)\]

\[4x^2 + 11x + 6\]

\[= \frac{4x^2 + 11x + 6}{x+2} \cdot \frac{4x+3}{x+2}\]

\[= (x+2)(4x+3)\]

Examples 7 and 8:
(swoop, factor and divide method)
(with your shoulder buddy)

\[4n^2 + 62n - 32\]

\[= \frac{4n^2 + 62n - 32}{n+8} \cdot \frac{n+61}{n+8}\]

\[= (n+8)(n+61)\]

\[3p^2 - 7p - 40\]

\[= \frac{3p^2 - 7p - 40}{(p-5)} \cdot \frac{(p+8)}{3}\]

\[= (p-5)(p+8)\]

Examples 9 and 10:
_factoring out a monomial first_

\[6x^2 - 10x - 4\]

\[= \frac{6x^2 - 10x - 4}{2} \cdot \frac{3}{2}\]

\[= (2x-1)(3x+2)\]

\[20p^2 - 115p - 30\]

\[= \frac{20p^2 - 115p - 30}{5} \cdot \frac{4}{5}\]

\[= (5p-15)(4p+2)\]
Examples 11 and 12:
(factoring out a monomial first)
(9m^2 - 66m + 21)
3(m^2 - 22m + 7)
\[ \frac{m^2 - 22m + 21}{-21x - 21} \]
\[ \frac{(m-3)(m-7)}{3(m-7)(m-1)} \]

Example 13:
The area of a rectangular granite countertop is 12x^2 + 10x - 12. The width of the countertop is 2x + 3. What is the length of the countertop?

\[ \frac{12x^2 + 10x - 12}{2(x^2 + 5x - 6)} \]
\[ \frac{(x-4)(x+9)}{6x} \]
\[ \frac{(x-2)(x+3)}{3} \]
\[ \frac{2(3x-2)(2x+3)}{9} \]

Summary
What are the steps for Swoop, Factor and Divide?
1. Multiply first, then last.
2. Factor using the X method.
3. Divide by the result from step 1.

When you factor out a monomial what are you doing?
Taking out GCF!