

Dividing Polynomials

(Sec 5.5 and Sec 5.6)

Remember:

+	and	+	=	+	—	and	+	=	—
—	and	—	=	+	+	and	—	=	—

When multiplying or **dividing**

We will only be dividing a polynomial (one or more terms) by a monomial, symbolically, using algebra tiles and area models. The monomial could be a constant term or contain a variable

Ex: $4x^2 \div 2 = \frac{4x^2}{2}$ or $4x^2 \div 2x = \frac{4x^2}{2x}$ $\frac{4x^2 - 8x}{2}$ or $\frac{4x^2 - 8x}{2x}$, etc.

Dividing Symbolically:

$\frac{4x^2}{2}$	When dividing a monomial by a monomial You just divide the numbers like normal.	$\frac{4x^2}{2} = 2x^2$
$\frac{4x^2}{2x}$	When dividing a monomial by a monomial and there is also a variable in the denominator, you must remember the exponent rule. When dividing powers with the same base, you subtract exponents. Still divide the numerical coefficients like normal.	$\frac{4x^2}{2x} = 2x$
$\frac{4x^2 - 8x}{2}$	you can rewrite the quotient as a sum of two fractions and divide like it is two monomials.	$\frac{4x^2}{2} - \frac{8x}{2} = 2x^2 - 4x$
$\frac{4x^2 - 8x}{2x}$	Rewrite the quotient as a sum of two fractions and divide like it is two monomials. Don't forget the exponent rules when there is a variable in the denominator.	$\frac{4x^2}{2x} - \frac{8x}{2x} = 2x - 4$

NOTE:

However many terms are in the numerator, that's how many terms are in your answer.
When dividing a trinomial by a monomial, you will have a trinomial answer.

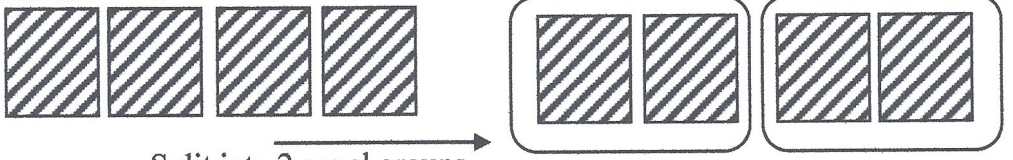
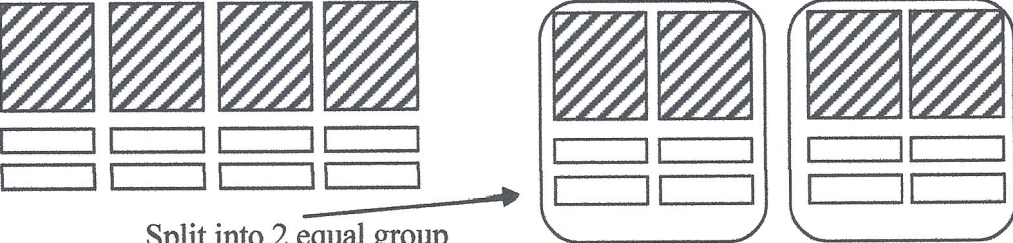
Ex5: $\frac{12m^2 + 6m - 9}{3} = \frac{12m^2}{3} + \frac{6m}{3} - \frac{9}{3} = 4m^2 + 2m - 3$

Be careful when dividing by negatives!

Ex6: $\frac{-3y^2 + 15xy - 21x^2}{-3} = \frac{-3y^2}{-3} + \frac{15xy}{-3} - \frac{21x^2}{-3} = y^2 - 5xy + 7x^2$

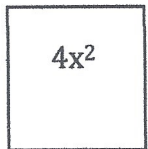
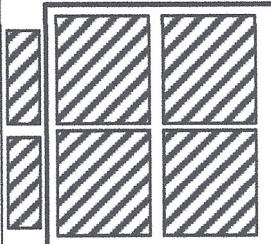
Dividing Using Algebra Tiles

Dividing by 2 means, split the tiles into 2 equal groups.

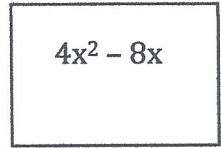
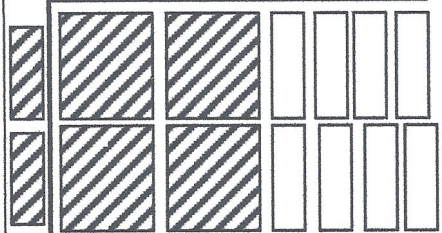
$\frac{4x^2}{2}$	 <p>Split into 2 equal groups</p> <p>$2x^2$ in each group: that's our answer</p>
$\frac{4x^2 - 8x}{2}$	 <p>Split into 2 equal group</p> <p>$2x^2 - 4x$ in each group: that's our answer</p>

Dividing Using an Area Model and Algebra Tiles

- a). Find the missing dimension if the area of the rectangle is $4x^2$ and the length is $2x$.

Area Model	Algebra Tiles
<p>?</p>  <p>$2x$ $4x^2$</p> <p>$\frac{4x^2}{2x} = 2x$</p>	<p>?</p>  <p>The missing dimension is $2x$ because $\frac{4x^2}{2x}$</p>

- b). Find the missing dimension if the area of the rectangle is $4x^2 - 8x$ and the length is $2x$.

Area Model	Algebra Tiles
<p>?</p>  <p>$2x$ $4x^2 - 8x$</p> <p>$\frac{4x^2 - 8x}{2x} = 2x - 4$</p>	<p>?</p>  <p>The missing dimension is $2x - 4$ because $\frac{4x^2 - 8x}{2x} = 2x - 4$</p>