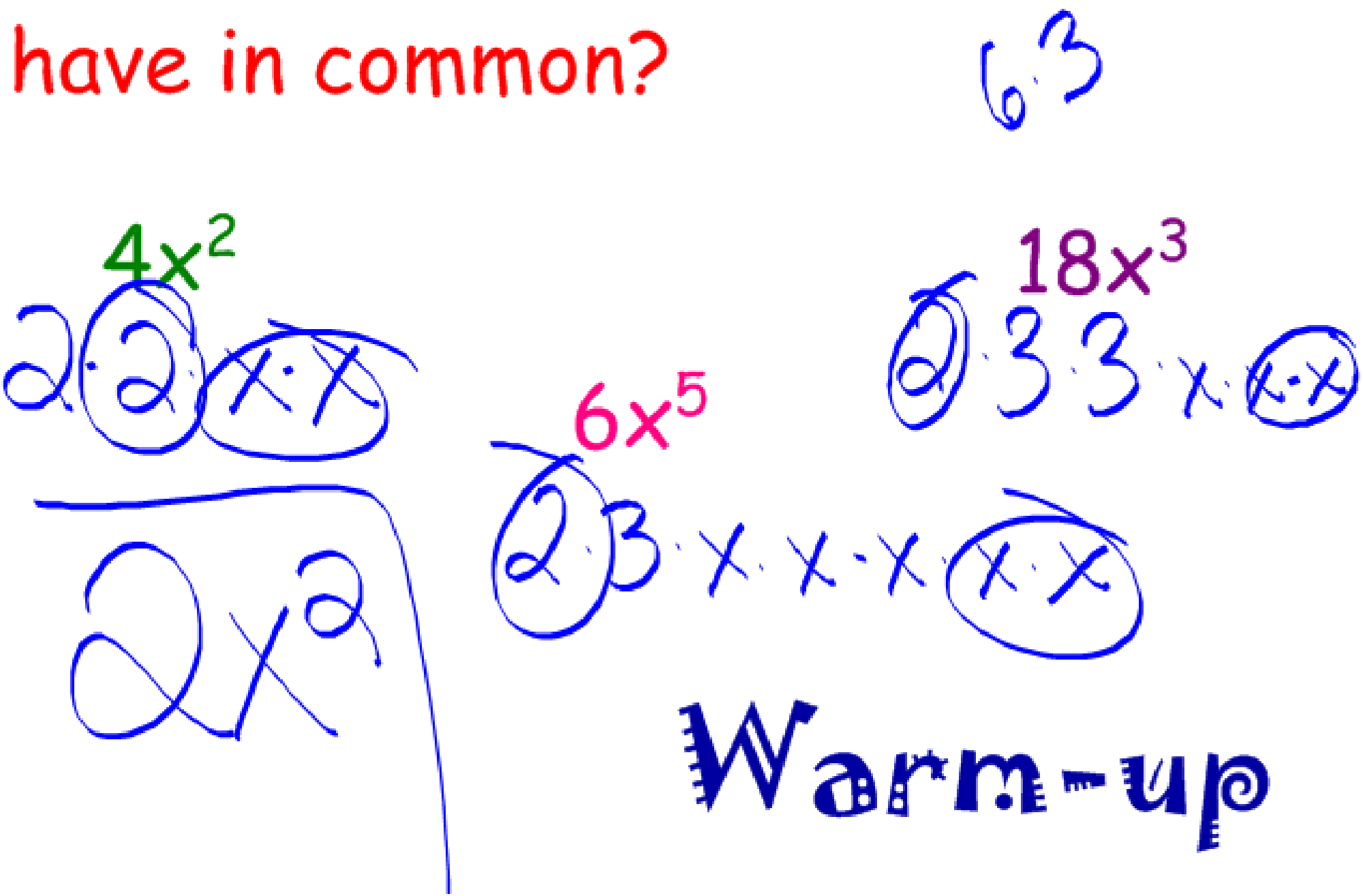
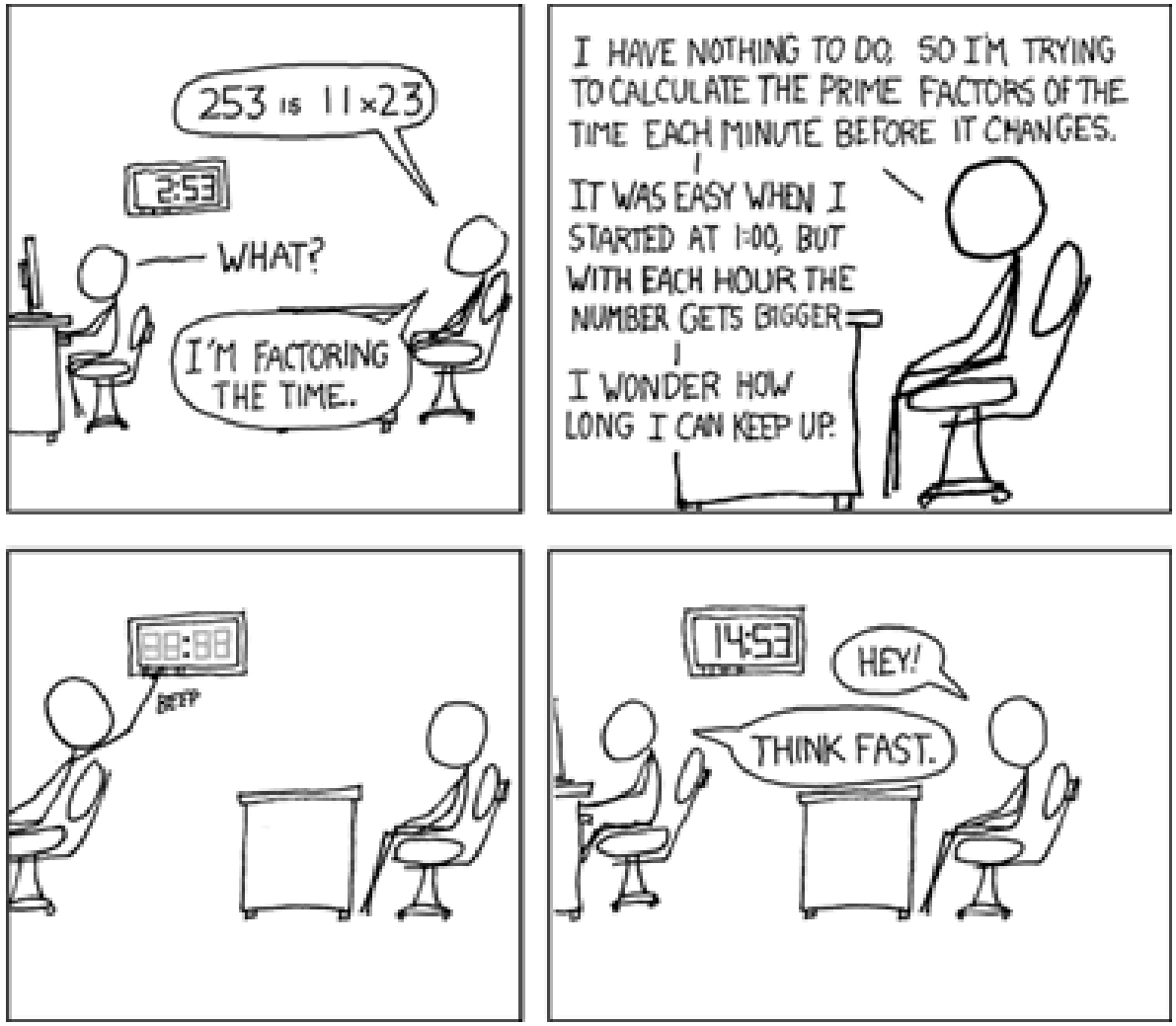
What does the following terms have in common?



Warm-up

Factoring by GCF and Grouping



Goals Aligned to Common Core Standards

You will recognize ways to rewrite an expression.

You will solve quadratic equations using gcf or grouping by inspection.

You will use the process of factoring in a quadratic function to reveal the zeros by solving quadratic equations.

You will interpret parts of an expression (factors).

What is a prime number??

*Divisible by 1 and itself.

*What is the smallest prime number?

What is a composite number??

*More than two factors.

*What is the smallest composite number?

*Which category does 1 fall into?

What is a factor??

*Numbers you can multiply together to get another number.

Factoring using the Greatest Common Factor (GCF):

*The GCF of two or more:

*integers is the largest number that is a factor of both the original numbers.

*of the same variables, is the variable with the smallest exponent.

*Steps:

* Find the GCF of the integers.

* Find the GCF of the variables.

* Write the GCFs down.

*In parenthesis, next to the GCFs, put the remaining factors. (Divide the original integers and variables by the GCF).

$6a^2 + 15a$

$3a(2a+5)$

$15x + 25x^2$

$5x(3+5x)$

$5a^2b^3 + 10a^3b^2 - 15ab^4$

$5ab^2(ab + 2a^2 - 3b^2)$

How could you check your work?

How does factoring relate to the distributive property?

If you don't factor the GCF but you still pull out a factor, have you completely factored the two terms?

example: $12a^2 + 16a$

$2 \cdot 2a(6a + 8)$

$4a(3a + 4)$

Examples:

$9a^3 + 21a^2$

$3 \cdot 3 \cdot a \cdot a \cdot a \quad 3 \cdot 7 \cdot a \cdot a$

$3a^2(3a + 7)$

$12xy + 24xy^2 - 30x^2y^4$

$2 \cdot 2 \cdot 3 \cdot x \cdot y \quad 2 \cdot 2 \cdot 2 \cdot 3 \cdot x \cdot y \cdot y \quad 2 \cdot 3 \cdot 5 \cdot x \cdot x \cdot y \cdot y \cdot y \cdot x$

$6xy(2 + 4y - 5xy^3)$

Factoring by Grouping

Pairs of terms are grouped together and factored

Steps:

* Notice there is not a GCF in all 4 terms.
* Put parenthesis around the 1st 2 and last 2 terms.
* Make sure there is an addition sign between the 2 groupings.
* Find the GCF in the 1st 2 terms and factor.
* Find the GCF in the last 2 terms and factor.
* The remaining factors in parenthesis need to be the same. If they are, factor the remaining factors.

$$2xy + 7x - 2y - 7$$

$$x(2y+7) - 1(2y+7)$$

$$(2y+7)(x-1)$$

How will you know when to factor using the GCF and when to factor by grouping?

Example...

$$15a - 3ab + 4b - 20$$

$$3a(5-b)+4(-b+5)$$

$$3a(5-b)-4(5-b)$$

$$(5-b)(3a-4)$$

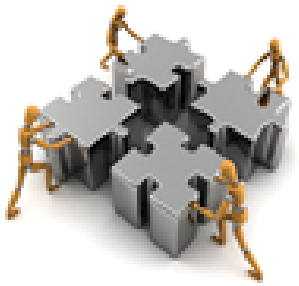
Example...

$12a - 8 + 9ab^2 - 6b^2$

$4(3a-2) + 3b^2(3a-2)$

$(3a-2)(4+3b^2)$

Solving Equations by Factoring



-Zero Product Property: If the product of two factors are 0, then at least one of the factors must be 0.

$6(0) = 0$ $0(-3) = 0$ $(5 - 5)(0) = 0$

$-2(-3 + 3) = 0$

* When you solve the quadratic equation in factored form, this is called:

- Solution
- Root
- Zero

Find the zeros.

$3n(n+2)=0$

$3n=0 \quad n+2=0$

$n=0 \quad n=-2$

$\{0, -2\}$

$(x - 2)(4x - 1) = 0$

$\{2, \frac{1}{4}\}$

Find the roots.

$12y^2 - 4y$ [redacted]

$4y(3y - 1) = 0$

$4y = 0 \quad 3y - 1 = 0$

$y = 0 \quad y = 1/3$

$a^2 = 4a$

$-4a \quad -4a$

$a^2 - 4a = 0$

$a(a - 4) = 0$

$\{0, 4\}$

Find the solutions.

$$(d - 5)(3d + 4) = 0$$

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