Warm-up 2-21

Simplify.

1. $2(w + 1)$

2. $3x(x^2 - 4)$

Find the GCF of each pair of monomials.

3. $4h^2$ and $6h$

4. $13p$ and $26p^5m$

Find the GCF.

5. $-16p^3q^2$ and $24p^2q^3$ and $-32p^4q$

Warm-up 2-21

Simplify.

1. $2(w + 1)$

$2w + 2$

2. $3x(x^2 - 4)$

$3x^3 - 12x$

Find the GCF of each pair of monomials.

3. $4h^2$ and $6h$

$2 \cdot 2 \cdot h \cdot h$
$2 \cdot 3 \cdot h$

$2h$

4. $13p$ and $26p^5m$

$13 \cdot p$
$2 \cdot 13 \cdot p \cdot p \cdot p \cdot p \cdot p \cdot m$

$13p$

Find the GCF.

5. $-16p^3q^2$ and $24p^2q^3$ and $-32p^4q$

$-2 \cdot 2 \cdot 2 \cdot 2 \cdot p \cdot p \cdot p \cdot q \cdot q$
$2 \cdot 2 \cdot 2 \cdot 3 \cdot p \cdot p \cdot q \cdot q \cdot q$
$-2 \cdot 2 \cdot 2 \cdot 2 \cdot 2 \cdot p \cdot p \cdot p \cdot p \cdot q$

$2 \cdot 2 \cdot 2 \cdot p \cdot p \cdot q$

$8p^2q$

$2 \mid 24$
$2 \mid 12$
$2 \mid 6$
3

16
4 4
2 2 2 2

32
2 16
4 4
2 2 2 2

31. José is making fruit-filled tart shells for a party. He has 72 raspberries and 108 blueberries. The tarts will each have the same number of berries. Raspberries and blueberries will not be in the same tart. If he puts the greatest possible number of fruits in each tart, how many tarts can he make?

31. José is making fruit-filled tart shells for a party. He has 72 raspberries and 108 blueberries. The tarts will each have the same number of berries. Raspberries and blueberries will not be in the same tart. If he puts the greatest possible number of fruits in each tart, how many tarts can he make?

ras b

$2 \cdot 2 \cdot 2 \cdot 3 \cdot 3$

$2 \cdot 2 \cdot 3 \cdot 3 \cdot 3$

$= 2 \cdot 2 \cdot 3 \cdot 3 = 2^2 \cdot 3^2 = 36$

$\frac{72}{36} = 2$ $\frac{108}{36} = 3$

5 tarts

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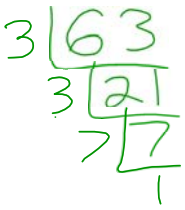
9s and $63s^3$

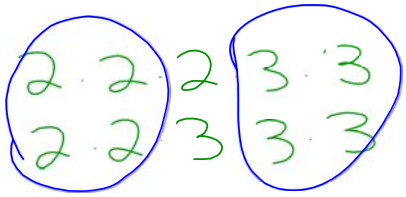
$3 \cdot 3 \cdot s = 9s$



#31

72 ras

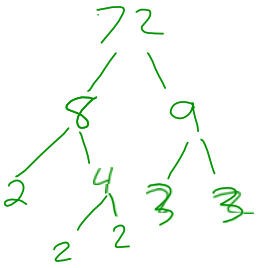
108 bl



$2 \cdot 2 \cdot 3 \cdot 3 = 36$

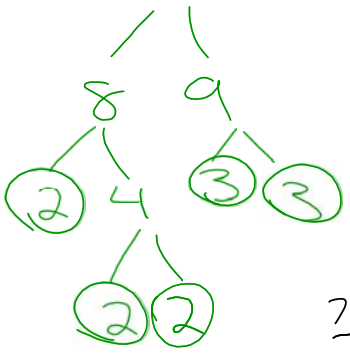
$\frac{72}{36} = 2$ ras

$\frac{108}{36} = 3$ bl

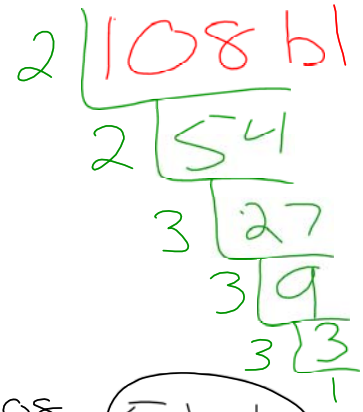


5 tarts

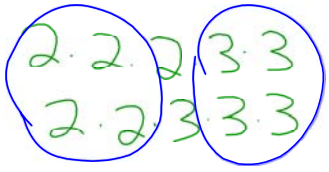
72 ras



108 bl



$\frac{72+108}{36} =$ 5 tarts



$2 \cdot 2 \cdot 3 \cdot 3 = 2^2 \cdot 3^2 = 36$

Factor

Greatest Common Factor

Prime Number

Composite Number

Prime Factorization

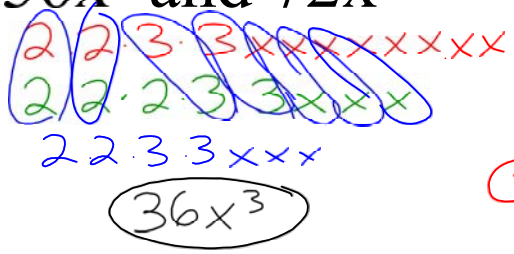
Factorization

Today's Goal

I can...

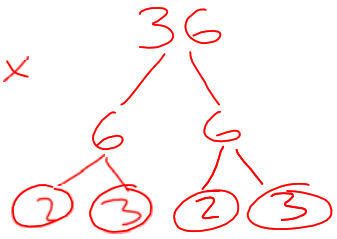
- factor Polynomials by using the GCF
- factor out common binomials
- factor by grouping

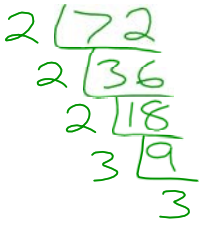
$36x^8$ and $72x^3$



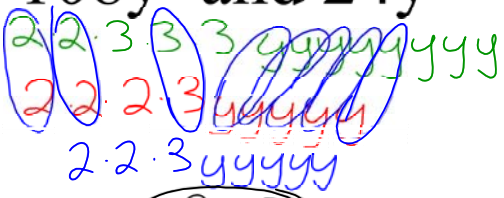
$2 \cdot 2 \cdot 3 \cdot 3 \cdot x \cdot x \cdot x$

$36x^3$



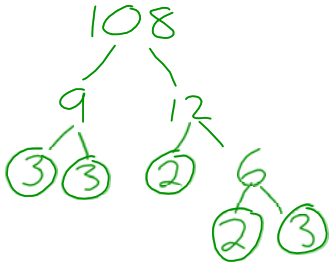


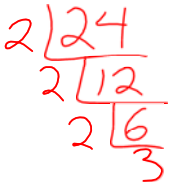
$108y^8$ and $24y^5$



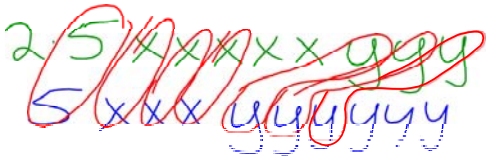
$2 \cdot 2 \cdot 3 \cdot y \cdot y \cdot y \cdot y \cdot y$

$12y^5$





$10x^5y^3$ and $5x^3y^6$



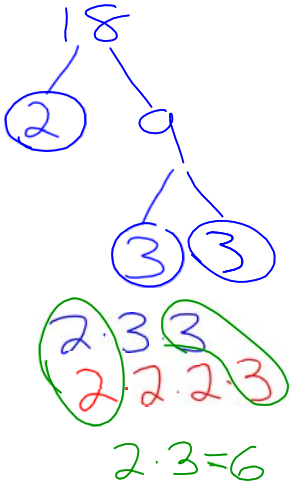
$5 \cdot x \cdot x \cdot x \cdot y \cdot y \cdot y$

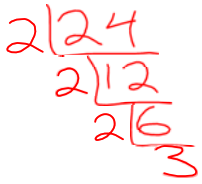
$5x^3y^3$

Application

A cafeteria has 18 chocolate-milk cartons and 24 regular-milk cartons. The cook wants to arrange the cartons with the same number of cartons in each row. Chocolate and regular milk will not be in the same row. How many rows will there be if the cook puts the greatest possible number of cartons in each row?

7 rows





GCF - 6

3+4=7

$\frac{18}{6}=3$ $\frac{24}{6}=4$

Try This!!

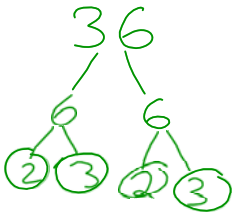
Adrianne is shopping for a CD storage unit. She has 36 CDs by pop music artists and 48 CDs by country music artists. She wants to put the same number of CDs on each shelf without putting pop music and country music CDs on the same shelf. If Adrianne puts the greatest possible number of CDs on each shelf, how many shelves does her storage unit need?

Try This!!

Adrianne is shopping for a CD storage unit. She has 36 CDs by pop music artists and 48 CDs by country music artists. She wants to put the same number of CDs on each shelf without putting pop music and country music CDs on the same shelf. If Adrianne puts the greatest possible number of CDs on each shelf, how many shelves does her ~~storage~~ unit need?

7 shelves

pop



country

$2|48$
$2|24$
$2|12$
$2|6$
3

$2 \cdot 2 \cdot 3 = 12$ CD's on each shelf

$\frac{36}{12} = 3$ pop shelves

$\frac{48}{12} = 4$ country shelves

$3+4=7$ shelves

Section 9.2: Factoring by GCF

Think.... What is the Distributive Property?

$a(b+c) = ab+ac$

Factoring Polynomials by GCF

GCF ~ Greatest Common Factor

Example: $4x^2 - 3x$

$2 \cdot 2 \cdot x \cdot x$

$-3 \cdot x$

$x(4x-3)$

check

$x(4x-3)$

$4x^2-3x$ ✓

More Examples

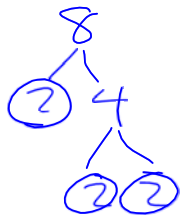
$8y^3 - 4x^2 - 16x$

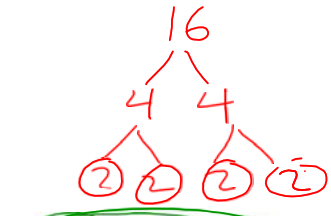
$2 \cdot 2 \cdot 2 \cdot y \cdot y \cdot y$

$-2 \cdot 2 \cdot x \cdot x$

$-2 \cdot 2 \cdot x$

$4(2y^3 - x^2 - 4x)$





$4(2y^3 - x^2 - 4x)$

$8y^3 - 4x^2 - 16x$ ✓

$-14x - 12x^2$

$-2 \cdot 7 \cdot x$

$-2 \cdot 2 \cdot 3 \cdot x \cdot x$

$-2x$

$-2x(7 + 6x)$

$2 \mid 14$
7

$2 \mid 12$
$2 \mid 6$
3

$-2x(7 + 6x)$

$-14x - 12x^2$ ✓

$3x^3 + 2x - 10$

$3 \cdot x \cdot x \cdot x$

$2 \cdot x$

$-2 \cdot 5$

cannot be factored

Try These!! (check your answers)

1. $5b + 9b^3$

2. $9d^2 - 8^2$

3. $-18y^3 - 7y^2$

4. $8x^4 + 4x^3 - 2x^2$

Try These!! (check your answers)

1. $5b + 9b^3$

$5 \cdot b$
$3 \cdot 3 \cdot b \cdot b \cdot b$

$b(5 + 9b^2)$

9 → 3 · 3

check
$b(5 + 9b^2)$
$5b + 9b^3$ ✓

2. $9d^2 - 8^2$

$3 \cdot 3 \cdot d \cdot d$
$2 \cdot 2 \cdot 2 \cdot 2 \cdot 2 \cdot 2$

nothing in common
cannot be factored

9 → 3 · 3

$8^2 = 64$

2 | 64
2 | 32
2 | 16
2 | 8
2 | 4
2

3. $-18y^3 - 7y^2$

$-2 \cdot 3 \cdot 3 \cdot y \cdot y \cdot y$
$-7 \cdot y \cdot y$

$-y^2(18y + 7)$

18 → 2 · 9 → 2 · 3 · 3

check
$-y^2(18y + 7)$
$-18y^3 - 7y^2$ ✓

4. $8x^4 + 4x^3 - 2x^2$

$2 \cdot 2 \cdot 2 \cdot x \cdot x \cdot x \cdot x$
$2 \cdot 2 \cdot x \cdot x \cdot x$
$2 \cdot x \cdot x$

$2x^2(4x^2 + 2x - 1)$

8 → 2 · 4 → 2 · 2 · 2

2 | 4
2

$2x^2(4x^2 + 2x - 1)$
$8x^4 + 4x^3 - 2x^2$ ✓

Application

The area of a court for the game squash is $(9x^2 + 6x)$ m^2. Factor this polynomial to find possible expressions for the dimensions of the squash court.

one side: $3x$ m
another side: $3x+2$ m

$3x+2$

$9x^2+6x$ m^2 | $3x$

9 → 3 3
6 → 2 3

$3 \cdot 3 \cdot x \cdot x$
$2 \cdot 3 \cdot x$

$3x(3x+2)$

$3x(3x+2)$
$9x^2+6x$ ✓

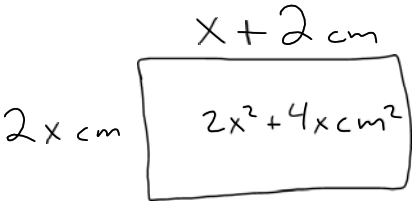
Try This!!

The area of a solar panel on a calculator is $(2x^2 + 4x)$ cm^2. Factor this polynomial to find the possible expressions for the dimensions of the solar panel.

Try This!!

The area of a solar panel on a calculator is $(2x^2 + 4x)$ cm^2. Factor this polynomial to find the possible expressions for the dimensions of the solar panel.

one side: $2x$ cm
other side: $x+2$ cm



$2 \cdot x \cdot x$
$2 \cdot 2 \cdot x$

$2x(x+2)$

Homework

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