Lesson 4-1 Divisibility and Factors

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Questions	Notes
Standards	M.R. 3.2 Derive and understand rules
	An integer is divisible by another when there is a remainder of zero.
Make brace map ★	**Divisibility Rules** (2, 5, 10) An integer is divisible by; • 2 if it ends in 0, 2, 4, 6 or 8 • 5 if it ends in 0 or 5 • 10 if it ends in 0
	Try a.) 567 by 2 (no, ends in 7) b.) 1015 by 5 (yes, ends in 5) c.) 123720 by 10 (yes ends in 0)
★	An integer is divisible by 3 if • the sum of its digits is divisible by 3
★	An integer is divisible by 9 if • the sum of its digits is divisible by 9
	Factors: A factor is a number that can divide into another number with a remainder of zero

Lesson 4-1 continued

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Questions	Notes

Finding Factors

24

2 | 2 x 12 = 24
12

4 | 4 x 6 = 24
6

3 | 3 x 8 = 24
8

Factors of 24

1, 2, 3, 4, 6, 8, 12, 24

24
24
24
24

Positive factors

Can have negative factors.
(i.e. -3, -8)

24

PB 4-1
HW
14, 20, 28, 37, 46
53a

4-2 Exponents

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Questions	Notes

Exponents are repeated multiplication.

2^3 ← Exponent

base

$2^3 = 2 \cdot 2 \cdot 2 = 6$

The base and exponent together is called a Power.

2^3 → "Two to the third power"

$-7^3 = -(7)(7)(7) = -343$

↳ "Opposite of 7 to the third power"

$(-8)^3 = (-8)(-8)(-8) = -512$

$- \cdot - = +$ → $(64) \cdot (-8)$

-512

Try:

$6^2 =$

$2^4 =$

Convert problems using exponents

$(3)(3)(3)(3) =$

$-(5)(5)(5)(5)(5)$

$(-16)(-16)(-16) =$

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Questions	Notes

Simplify $4(3+2)^2$

$4(5)^2$

$4(25)$

100

Steps

1. work in grouping symbols
2. Simplify terms with exponents
3. $\times, \div$ from left to right
4. $+, -$ left to right

Try: $2 + 5^2 + (1+3)^2$

Evaluating

$-2x^3 + 4y$; $x = -2, y = 3$

$-2(-2)^3 + 4(3)$ 1, sub in variables

$-2(-8) + 4(3)$ 2. simplify

$16 + 12$

28

Try: $3(a)^2 + 6$ for $a = -5$

PB - 4-2
HW page 178
14, 18, 20, 24, 30, 36, 42
45, 48a, 51

4-3 Prime Factorization and GCF

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Questions | Notes

Use book!!
(Page 180)

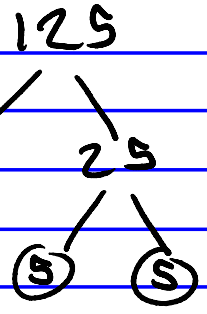
Prime number:
- a positive integer greater than one divisible only by 1 and itself.

Composite number:
- a positive integer greater than one with more than two integers

A.) 23 (Prime or Composite)
B.) 129 (Prime or Composite)

Prime Factorization
- a composite number written as a product of its prime factors.

Example



1. start with prime factor
2. continue to expand tree
3. Stop when can't be factored any more
4. write Prime Factorization $(5 \cdot 5 \cdot 5) = 5^3$

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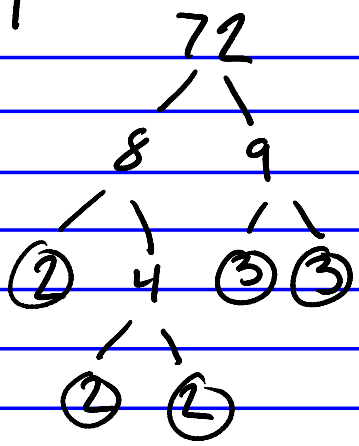
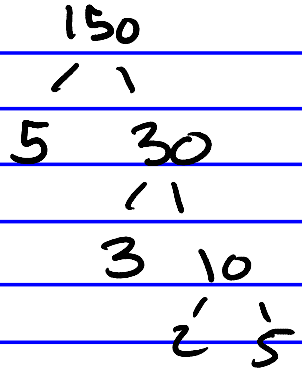
Questions	Notes

Try:



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



$2 \cdot 3 \cdot 5 \cdot 5$
$2 \cdot 3 \cdot 5^2$

Greatest Common Factor
- The greatest factor of any two or more numbers which are shared

Steps:
① List the prime factorization of all numbers
② Find common factors. Use factors with the smaller powers.

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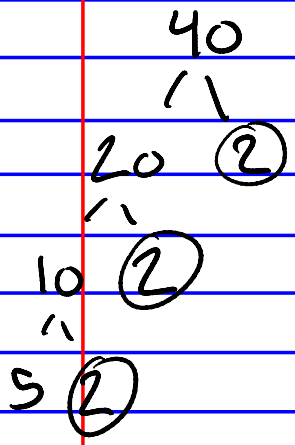
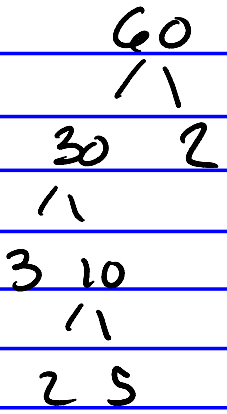
Questions	Notes





$40 = 2 \cdot 2 \cdot 2 \cdot 5 = 2^3 \cdot 5$

$60 = 2 \cdot 2 \cdot 5 \cdot 3 = 2^3 \cdot 5 \cdot 3$

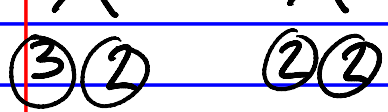
$2 \cdot 2 \cdot 5 = 4 \cdot 5 = 20$ is GCF of 40 & 60

GCF with variable expressions

$6a^3b$
$4a^2b$

1.) Find PF of coefficient
2.) keep variables intact
3.) Find common factors

Remember use the variable with the smallest power !!



$6a^3b = 3 \cdot 2 \cdot a^3 \cdot b$
$4a^2b = 2^2 \cdot a^2 \cdot b$

$\rightarrow$ GCF = $\boxed{2a^2b}$

$2 \cdot a^2 \cdot b$

PB 4-3, HW page 183
18, 24, 30, 34, 38, 42, 54

4-4 Simplifying Fractions

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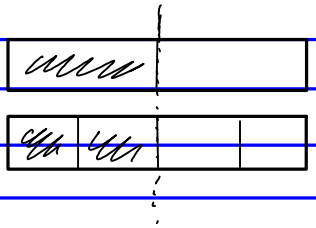
Questions	Notes

Equivalent Fractions Using Models



$\frac{1}{2}$

$\frac{2}{4}$

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

How to find:

- multiply or divide both the numerator and denominator by the same nonzero factor.

Find two equivalent fractions

1. $\frac{2}{3}$

2) $\frac{8}{12}$

Simplifying fractions

- when the denominator and numerator have no factors in common other than one.

Steps

- Find GCF
- Divide both the denominator and numerator by GCF

Try:

3) $\frac{16 \div 4}{20 \div 4} = \frac{4}{5}$

4) $\frac{28}{35}$

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Questions	Notes
	Simplifying Fractions with variables
	$\frac{3ab^2}{12ac} =$ 1.) write as a product of prime factors in expanded form
	$\frac{3ab^2}{12ac} = \frac{3 \cdot a \cdot b \cdot b}{2 \cdot 2 \cdot 3 \cdot a \cdot c}$ 2.) cancel out any common factors
	$\frac{b \cdot b}{2 \cdot 2 \cdot c}$ 3. simplify
	$\frac{b^2}{2^2 c}$ 4. write in exponential form
	Try 1.) $\frac{b}{abc} =$
	2.) $\frac{24x^2y}{8xy} =$
	PB 4-4 No hard book