Powers and Exponents

Write the power as a product.

$8^5 = 8 \cdot 8 \cdot 8 \cdot 8 \cdot 8$

Evaluate the expression

$4^3 = 4 \cdot 4 \cdot 4 = 64$

Write the Product in exponential Form

$7 \cdot 7 \cdot 7 \cdot 7 \cdot 7 = 7^5$

Prime Factorization

Prime numbers: contains only 2 factors, one and itself

Examples → 5, 13, 2, 7, 23

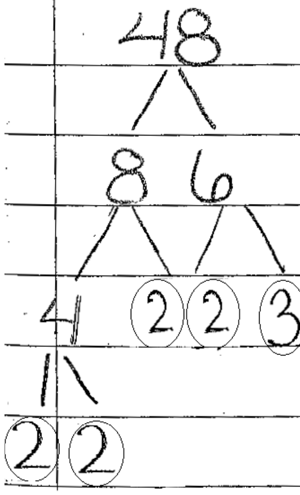
Composite number: contains more than 2 factors

Examples → 4, 9, 28, 45, 33.

Factors of 12:

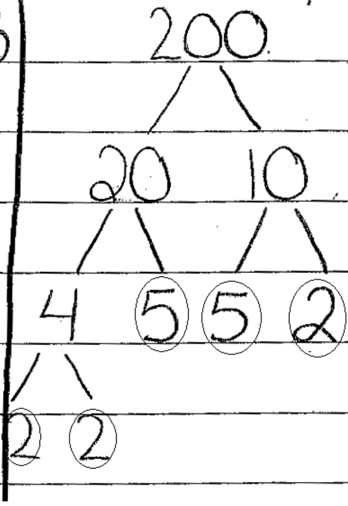
12 → 1, 2, 3, 4, 6, 12

Find the prime factorization of each number



$48 = 2^4 \cdot 3$

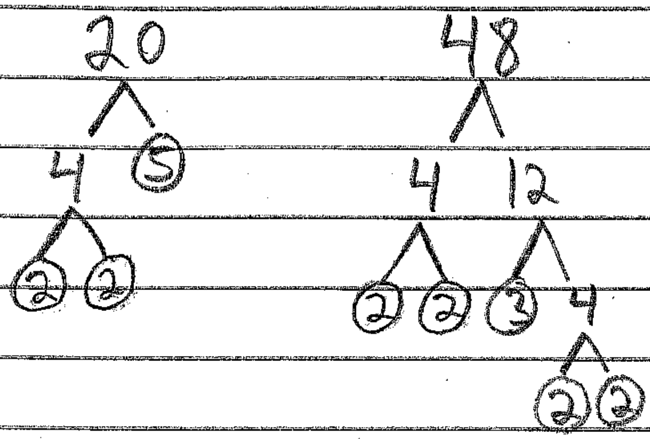
$200x^3y^2$



$\boxed{200x^3y^2 = 2^3 \cdot 5^3 \cdot x^3 \cdot y^2}$

Greatest Common Factor

1) Find the GCF of 20 and 48.

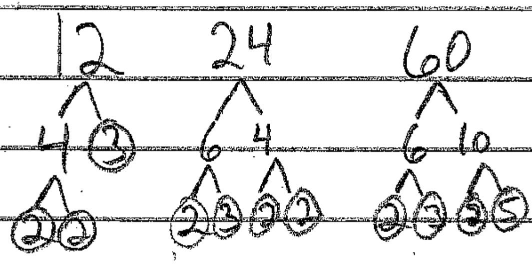


$20 = 2 \cdot 2 \cdot 5$

$48 = 2 \cdot 2 \cdot 2 \cdot 2 \cdot 3$

$GCF = 2 \cdot 2 = \boxed{4}$

2) Find the GCF of 12, 24, and 60.



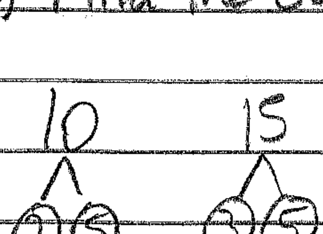
$12 = 2 \cdot 2 \cdot 3$

$24 = 2 \cdot 2 \cdot 2 \cdot 3$

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

$GCF = 2 \cdot 2 \cdot 3 = \boxed{12}$

3) Find the GCF of $10x^2y$ and $15xy^3$



$10x^2y = 2 \cdot 5 \cdot x \cdot x \cdot y$

$15xy^3 = 3 \cdot 5 \cdot x \cdot y \cdot y \cdot y$

$GCF = \boxed{5xy}$

Simplifying Fractions

1) $$\frac{8 \div 4}{28 \div 4} = \boxed{\frac{2}{7}}$$

GCF

2) $$\frac{180 \div 10}{200 \div 10} = \frac{18 \div 2}{20 \div 2} = \boxed{\frac{9}{10}}$$

3) $$\frac{75 \div 5}{105 \div 5} = \frac{15 \div 3}{21 \div 3} = \boxed{\frac{5}{7}}$$

4) $$\frac{81 \div 9}{144 \div 9} = \boxed{\frac{9}{16}}$$

Least Common Multiple

Find the LCM of each set of numbers.

1) 30 and 45

Method #1 (List Multiples)	Method #2 (Prime Factorization)
30 → 30, 60, 90	$30 = \boxed{2} \cdot 3 \cdot \boxed{5}$
45 → 45, 90	$45 = \boxed{3^2} \cdot 5$
LCM = $\boxed{90}$	$LCM = 2 \cdot 3^2 \cdot 5 = \boxed{90}$

2) 12, 16, and 36

Method #1

12 → 12, 24, 36, 48, 60, 72, 84, 96, 108, 120, 132, 144
16 → 16, 32, 48, 64, 80, 96, 112, 128, 144 LCM = $\boxed{144}$
36 → 36, 72, 108, 144

Method #2

$12 = 2^2 \cdot 3$
$16 = \boxed{2^4}$ $LCM = 2^4 \cdot 3^2 = \boxed{144}$
$36 = 2^2 \cdot \boxed{3^2}$

The Distributive Property and GCF

Fill in the boxes to make a true statement. The boxes inside the parentheses should not have any common factors.

1) $32 + 10 = \square(\square + \square)$

32 → 4, 8; 4 → 2, 2; 8 → 2, 4; 4 → 2, 2

10 → 2, 5

$32 \div 2 = 16$

$10 \div 2 = 5$

$\boxed{2(16+5)}$

2) $\square + \square = 4(5+12)$

$4(5+12)$

$4 \cdot 5 + 4 \cdot 12$

$\boxed{20+48}$

Adding and Subtracting Fractions

1) $\frac{4}{9} + \frac{3}{9} = \frac{7}{9}$

2) $\frac{4}{15} + \frac{13}{15} = \frac{17}{15} = \boxed{1\frac{2}{15}}$

$$\begin{array}{r} 1 \\ 15\overline{)17} \\ \underline{-15} \\ 2 \end{array}$$

3) $\frac{7_{\times 3}}{8_{\times 3}} - \frac{1_{\times 4}}{6_{\times 4}}$ LCD=24

$\frac{21}{24} - \frac{4}{24} = \boxed{\frac{17}{24}}$

4) $\frac{7_{\times 5}}{12_{\times 5}} + \frac{9_{\times 6}}{10_{\times 6}}$ LCD=60

$\frac{35}{60} + \frac{54}{60} = \frac{89}{60} = \boxed{1\frac{29}{60}}$

Adding and Subtracting Mixed Numbers

1) $6\frac{7}{8} + 9\frac{3}{10}$

$6\frac{35}{40} + 9\frac{12}{40} = 15\frac{47}{40} = \boxed{16\frac{7}{40}}$

2) $10\frac{5}{8} - 3 = \boxed{7\frac{5}{8}}$

3) $10 - 3\frac{5}{8}$

$9\frac{8}{8} - 3\frac{5}{8} = \boxed{6\frac{3}{8}}$

4) $7\frac{1}{6} - 3\frac{3}{4}$

Rename $\boxed{7\frac{2}{12}} - 3\frac{9}{12}$

$6\frac{14}{12} - 3\frac{9}{12} = \boxed{3\frac{5}{12}}$

Multiplying Fractions and Mixed Numbers

1) $\frac{3}{\cancel{10}_{5}} \cdot \frac{\cancel{2}^{1}}{7} = \boxed{\frac{3}{35}}$

2) $\frac{\cancel{3}^{1}}{\cancel{8}_{4}} \cdot \frac{\cancel{2}^{1}}{\cancel{7}_{1}} \cdot \frac{\cancel{14}^{\cancel{2}^{1}}}{\cancel{15}_{3}} \cdot \frac{\cancel{8}^{1}}{\cancel{6}_{\cancel{2}_{1}}} = \boxed{\frac{1}{12}}$

3) $4\frac{1}{5} \cdot \frac{5}{14}$

$\frac{{}^{3}\cancel{21}}{\cancel{5}_{1}} \cdot \frac{\cancel{5}^{1}}{\cancel{14}_{2}} = \frac{3}{2} = \boxed{1\frac{1}{2}}$

4) $9 \cdot \frac{5}{6}$

$\frac{{}^{3}\cancel{9}}{1} \cdot \frac{5}{\cancel{6}_{2}} = \frac{15}{2} = \boxed{7\frac{1}{2}}$

5) $3\frac{1}{3} \cdot 2\frac{3}{4}$

$\frac{{}^{5}\cancel{10}}{3} \cdot \frac{11}{\cancel{4}_{2}} = \frac{55}{6} = \boxed{9\frac{1}{6}}$

Dividing Fractions and Mixed Numbers

1) $\frac{3}{11} \div \frac{21}{22} = \frac{\cancel{3}^{1}}{\cancel{11}_{1}} \cdot \frac{\cancel{22}^{2}}{\cancel{21}_{7}} = \boxed{\frac{2}{7}}$

2) $8 \div \frac{3}{4} = \frac{8}{1} \cdot \frac{4}{3} = \frac{32}{3} = \boxed{10\frac{2}{3}}$

3) $\frac{2}{15} \div 4 = \frac{2}{15} \div \frac{4}{1} = \frac{\cancel{2}^{1}}{15} \cdot \frac{1}{\cancel{4}_{2}} = \boxed{\frac{1}{30}}$

4) $7\frac{1}{3} \div 1\frac{1}{6}$

$\frac{22}{3} \div \frac{7}{6} = \frac{22}{\cancel{3}_{1}} \cdot \frac{\cancel{6}^{2}}{7} = \frac{44}{7} = \boxed{6\frac{2}{7}}$