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

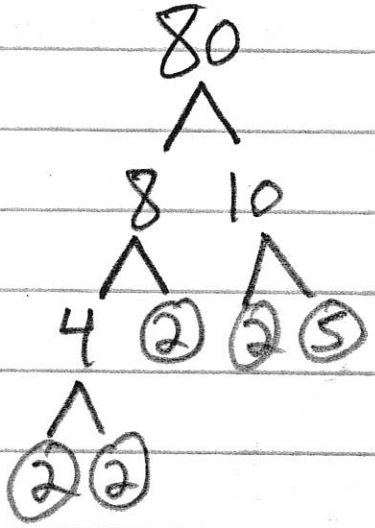
Prime → number that has exactly 2 factors, 1 and itself

Ex. 2, 7, 13, 29

Composite → number that has more than 2 factors

Ex. 4, 9, 16, 24, 81

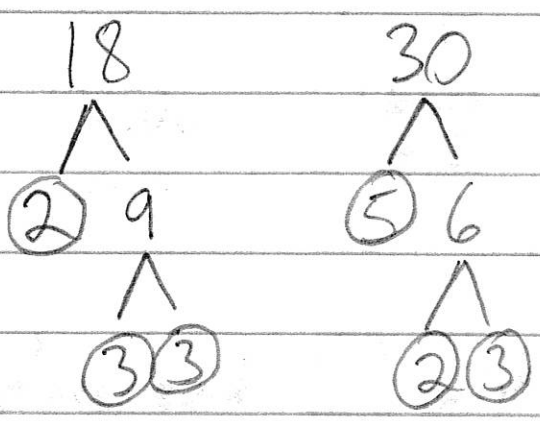
Find the prime factorization of 80.



$80 = \boxed{2 \times 2 \times 2 \times 2 \times 5} = \boxed{2^4 \times 5}$

4-1 Greatest Common Factor

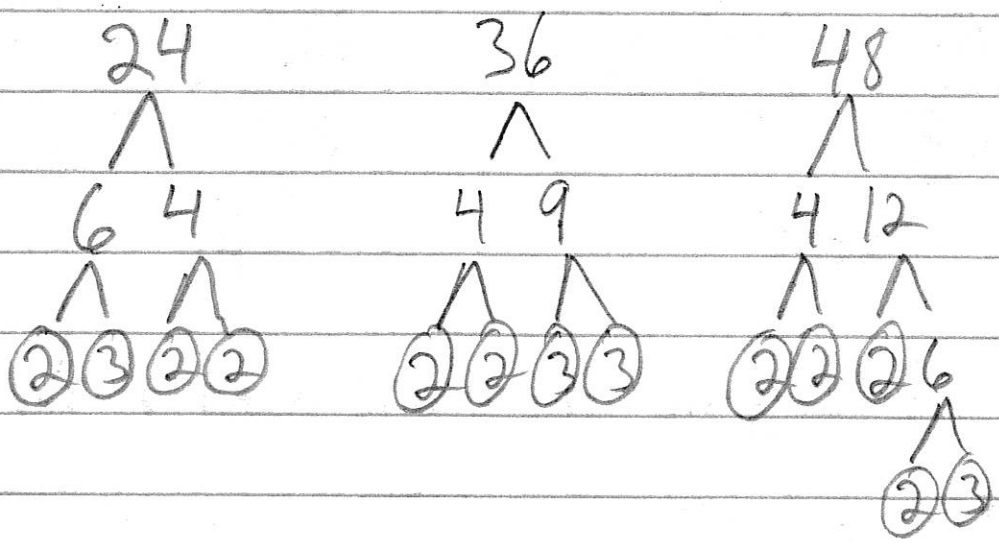
1) Find the GCF of 18 and 30.



$18 = 2 \cdot 3 \cdot 3$
$30 = 2 \cdot 3 \cdot 5$

$GCF = 2 \cdot 3 = \boxed{6}$

2) Find the GCF of 24, 36, and 48



$24 = 2 \cdot 2 \cdot 2 \cdot 3$
$36 = 2 \cdot 2 \cdot 3 \cdot 3$
$48 = 2 \cdot 2 \cdot 2 \cdot 2 \cdot 3$

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

Simplifying Fractions

$\frac{4}{22} \div 2 = \frac{2}{11}$ (Even ↑ Divide by 2 ↑)

$\frac{15}{25} \div 5 = \frac{3}{5}$ (Ends in 5 ↑ Divide by 5 ↑)

$\frac{20}{30} \div 10 = \frac{2}{3}$ (Ends in 0 ↑)

Replace each $\square$ with a number so the fractions are equivalent.

1) $\frac{3}{7} = \frac{12}{28}$ (×4 above, ×4 below)

2) $\frac{4}{7} = \frac{20}{35}$ (×5 above, ×5 below)

Write each fraction in simplest form.

3) $\frac{16 \div 8}{40 \div 8} = \frac{2}{5}$

4) $\frac{30 \div 15}{45 \div 15} = \frac{2}{3}$

4-6

Least Common Multiple

Find the LCM of each set of numbers.

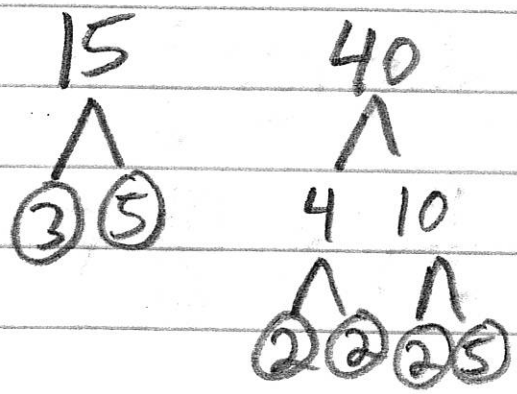
① 6, 10

6 → 6, 12, 18, 24, 30
10 → 10, 20, 30

LCM = 30

② 15, 40

15 = 3 · 5
40 = 2 · 2 · 2 · 5



LCM = 2 · 2 · 2 · 3 · 5
= 12 · 10
= 120

③ 4, 8, 12

4 → 4, 8, 12, 16, 20, 24
8 → 8, 16, 24
12 → 12, 24

LCM = 24

4-3 Mixed Numbers and Improper Fractions

Write each mixed numbers as an improper fraction.

1) $7\frac{2}{3} = \frac{7\times3+2}{3} = \boxed{\frac{23}{3}}$

2) $9\frac{1}{2} = \frac{9\times2+1}{2} = \boxed{\frac{19}{2}}$

Write each improper fraction as a mixed number or whole number.

3) $\frac{27}{7} = \boxed{3\frac{6}{7}}$

$$\begin{array}{r} 3 \\ 7\overline{)27} \\ -21 \\ \hline 6 \end{array}$$

4) $\frac{24}{6} = \boxed{4}$

5) $\frac{35}{8} = \boxed{4\frac{3}{8}}$

$$\begin{array}{r} 4 \\ 8\overline{)35} \\ -32 \\ \hline 3 \end{array}$$

Adding and Subtracting Fractions

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

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

$15\overline{)17}$ R 2

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

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

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

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

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

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

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

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

Dividing Fractions and Mixed Numbers

1) $\frac{3}{11} \div \frac{21}{22} = \frac{\cancel{3}^{1}}{\cancel{4}_{1}} \cdot \frac{\cancel{22}^{2}}{\cancel{21}_{7}} = \boxed{\frac{2}{7}}$

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

$\frac{22}{3} \div \frac{7}{6} = \frac{\cancel{22}^{11}}{\cancel{3}_{1}} \cdot \frac{\cancel{6}^{2}}{7} = \frac{44}{7} = \boxed{6\frac{2}{7}}$

3-5

Adding and Subtracting Decimals

Line up the decimal point!

1) $17.8 + 12.93$

$$\begin{array}{r} {\scriptstyle 1\ 1} \\ 17.80 \\ +\ 12.93 \\ \hline 30.73 \end{array}$$

2) $65.31 - 18.42$

$$\begin{array}{r} {\scriptstyle 5\ 14\ 12\ 11} \\ 6\not{5}.3\not{1} \\ -\ 18.42 \\ \hline 46.89 \end{array}$$

3) $25 - 12.78$

$$\begin{array}{r} {\scriptstyle 4\ 9\ 10} \\ 2\not{5}.\not{0}\not{0} \\ -\ 12.78 \\ \hline 12.22 \end{array}$$

3-3

Multiplying Decimals by Whole Numbers

Line up the digits!

1) 13.6×4

$$\begin{array}{r} {\scriptstyle 1\ 2} \\ 13.6 \\ \times\ \ 4 \\ \hline 54.4 \end{array}$$

2) 0.0163×7

$$\begin{array}{r} {\scriptstyle 1\ 4\ 2} \\ .0163 \\ \times\ \ \ 7 \\ \hline .1141 \end{array}$$

3) 3.91×21

$$\begin{array}{r} {\scriptstyle 1} \\ 3.91 \\ \times\ 21 \\ \hline 391 \\ +7820 \\ \hline 82.11 \end{array}$$

4) $6.98 \times 100 = 698$

5) $2.345 \times 10{,}000 = 23{,}450$

6) $2.31 \times 10 = 23.1$

Multiplying Decimals

Line up the digits!

1) 2.73×0.9

$$\begin{array}{r} {}^{6}\,{}^{2} \\ 2.73 \\ \times\ \ .9 \\ \hline \boxed{2.457} \end{array}$$

2) 10.3×0.42

$$\begin{array}{r} 10.3 \\ \times\ .42 \\ \hline 206 \\ +4120 \\ \hline \boxed{4.326} \end{array}$$

3-8 Dividing Decimals by Whole Numbers

1) $7.5 \div 3$

$$\begin{array}{r} 2.5 \\ 3\overline{)7.5} \\ -6 \\ \hline 15 \\ -15 \\ \hline 0 \end{array}$$

2) $9.84 \div 2$

$$\begin{array}{r} 4.92 \\ 2\overline{)9.84} \\ -8 \\ \hline 18 \\ -18 \\ \hline 04 \\ -4 \\ \hline 0 \end{array}$$

3) $9.48 \div 15$

$$\begin{array}{r} .632 \\ 15\overline{)9.480} \\ -90 \\ \hline 48 \\ -45 \\ \hline 30 \\ -30 \\ \hline 0 \end{array}$$

4) $55.08 \div 17$

$$\begin{array}{r} 3.24 \\ 17\overline{)55.08} \\ -51 \\ \hline 40 \\ -34 \\ \hline 68 \\ -68 \\ \hline 0 \end{array}$$

2-9 Dividing by Decimals

1) $62.4 \div 0.002$

$.002 \overline{)62.400}$

$2 \overline{)62400}$ = 31,200

-6

02

-2

04

-4

00

-0

00

-0

0

2) $14.19 \div 2.2$

$2.2 \overline{)14.19}$

$22 \overline{)141.90}$ = 6.45

-132

99

-88

110

-110

0