Fractions and Algebra

(supporting shots of notes on board and students examples

Equivalent Fractions

eg $\frac{3}{4} \xrightarrow{\times 3} \frac{9}{12}$ $\xleftarrow{\times 3}$

discussion

Why did we multiply both numerator and denominator by 3?

$\frac{3}{3} = 1$

So in fact we are just multiplying by 1 and choosing to write it as $\frac{3}{3}$.

Add | Subtract. Fractions

eg

$\frac{3^{\times 3}}{4_{\times 3}} + \frac{2^{\times 4}}{3_{\times 4}}$

$\frac{3^{\times 1}}{10_{\times 1}} - \frac{2^{\times 2}}{5_{\times 2}}$

Use equivalent fractions to get a common denominator

Each time we multiplying by...? 1

We just choose to write it in way that is helpful to us to solve our problem.

algebra tool for simplifying

Note: Did algebraic problems (see student's notes) at the same time.

multiplying

eg $\frac{3}{4} \times \frac{8}{9} = \frac{3}{4} \times \frac{2\times4}{3\times3}$

$= \frac{3 \times 2\times4}{3 \times 3 \times 4}$

write fraction as a product of factors

If needed reorder

Why can we cross off the 3's and the 4's?

because $\frac{3}{3} = 1$ and $\frac{4}{4} = 1$

algebra tool for simplifying

notes

Equivalent Fractions

eg. Number

$\frac{3}{4} \overset{\times 3}{=} \frac{9}{12}$

$\frac{55}{25} \overset{\div 5}{=} \frac{11}{5}$

Algebraic

$\frac{2}{x} \overset{\times 3}{=} \frac{6}{3x}$

$\frac{15w}{40} \overset{\div 5}{=} \frac{3w}{8}$

$\frac{3a}{b} \overset{\times b}{=} \frac{3ab}{b^2}$

We usally use equivalent fractions to cancel down to the simplest form.

eg. Simplify

$\frac{4}{10} \overset{\div 2}{=} \frac{2}{5}$

$\frac{56}{72} \overset{\div 8}{=} \frac{7}{9}$

$\frac{\cancel{a}c}{b\cancel{a}} \overset{\div a}{=} \frac{c}{b}$

$\frac{6d\cancel{e}}{9\cancel{e}f} \overset{\div 3e}{=} \frac{2d}{3f}$

$\frac{g^2}{3g} \overset{\div g}{=} \frac{g}{3}$

$\frac{36x^2y^4z^3}{45x^4y^2z^3} \overset{\div 9}{=} \frac{4y^2}{5x^2}$

$\frac{z^3}{z^3} = 1$

Adding / Subtracting Fractions

Must have the same denominator.

eg. Number

$\frac{3}{4} \overset{\times 3}{+} \frac{2}{3} \overset{\times 4}{=} \frac{9+8}{12}$

$= \frac{17}{12}$

$= 1\frac{5}{12}$

Algebraic

$\frac{1 \times d}{5e \times d} + \frac{1 \times 5e}{d \times 5e} = \frac{d+5e}{5ed}$

$\frac{5n \times m}{m \times n} - \frac{7m \times n}{n \times m} = \frac{5n^2 - 7m^2}{mn}$

$\frac{w^{\times 2}}{3p^{2 \times 2}} + \frac{x^{\times p}}{6p^{\times p}} = \frac{2w + px}{6p^2}$

ALGEBRA
MEASUREMENT & GEOMETRY
PROB STAT

$$\frac{3}{10}^{\times 1} - \frac{2}{5}^{\times 2} = \frac{3-4}{10}$$

$$= \frac{-1}{10}$$

Multiplying Fractions

eg. Numeric

$$\frac{2}{5} \text{ of } 15 = \frac{2}{5} \times \frac{15}{1}$$

$$= \frac{30}{5}$$

$$= 6$$

$$\frac{3}{4} \times \frac{8}{9} = \frac{3}{4} \times \frac{2 \times 4}{3 \times 3}$$

$$= \frac{3 \times 2 \times 4}{3 \times 3 \times 4}$$

$$= \frac{2}{3}$$

$$3\frac{3}{4} \times 5\frac{1}{5} = \frac{15}{4} \times \frac{26}{5}$$

$$= \frac{5 \times 3}{2 \times 2} \times \frac{2 \times 13}{5 \times 1}$$

$$= \frac{39}{2}$$

$$= 19\frac{1}{2}$$

Algebraic

$$\frac{x}{5} \times \frac{x}{4} = \frac{x^2}{20}$$

$$\frac{xy}{w} \times \frac{w^2}{x^2y^3} = \frac{xywww}{xxyyyyw}$$

$$= \frac{w}{xy^2}$$

$$\frac{14a^2b}{3c^4d^5} \times \frac{9c^6d}{21a^4b^3} \times \frac{12a^2c}{20b^2d^4}$$

$$= \frac{14 \times 9 \times 12\, a^2a^2bc^6cd}{3 \times 21 \times 20\, a^4b^3b^2c^4d^5d^4}$$

$$= \frac{6c^3}{5b^4d^8}$$

4. $\frac{1^{\times 5}}{6^{\times 5}} + \frac{1^{\times 6}}{5^{\times 6}} = \frac{5+6}{30} = \frac{11}{30}$

5. $\frac{1^{\times 9}}{4^{\times 9}} - \frac{1^{\times 4}}{9^{\times 4}} = \frac{9-4}{36} = \frac{5}{36}$

6. $\frac{1^{\times b}}{a^{\times b}} + \frac{1^{\times a}}{b^{\times a}} = \frac{b+a}{ab}$

7. $\frac{1^{\times y}}{x^{\times y}} + \frac{1^{\times x}}{y^{\times x}} = \frac{x+y}{xy}$

8. $\frac{1^{\times q}}{p^{\times q}} + \frac{1^{\times p}}{q^{\times p}} = \frac{q+p}{pq}$

9. $\frac{1^{\times d}}{c^{\times d}} + \frac{1^{\times c}}{d^{\times c}} = \frac{d+c}{cd}$

10. $\frac{1^{\times m}}{n^{\times m}} + \frac{1^{\times n}}{m^{\times n}} = \frac{m+n}{nm}$

11. $\frac{1^{\times r}}{2q^{\times r}} + \frac{1^{\times 2q}}{r^{\times 2q}} = \frac{r+2q}{2qr}$

12. $\frac{1^{\times 4b}}{a^{\times 4b}} - \frac{1^{\times a}}{4b^{\times a}} = \frac{4b+a}{a4b}$

13. $\frac{1^{\times g}}{3f} + \frac{1^{\times 3f}}{g} = \frac{g+3f}{3fg}$

14. $\frac{1^{\times v}}{6t} - \frac{1^{\times 6t}}{v} = \frac{v-6t}{6tv}$

15. $\frac{1^{\times d}}{5e^{\times d}} - \frac{1^{\times 5e}}{d^{\times 5e}} = \frac{d-5e}{5ed}$

Monday 28 March

Mathletics.

$\frac{5}{16} + \frac{1}{4} = \frac{5}{16} + \frac{4}{16}$

$= \frac{9}{16}$

$\frac{11}{28} + \frac{1^{\times 7}}{4^{\times 7}} = \frac{11+7}{28}$ ex bk

$= \frac{18}{28}$

$\frac{1}{20} + \frac{1^{\times 4}}{5^{\times 4}} = \frac{1+4}{20}$

$= \frac{5}{20}$

$\frac{4}{30} + \frac{1^{\times 5}}{6^{\times 5}} = \frac{4+5}{30}$

$= \frac{9}{30}$

$\frac{2}{16} + \frac{1^{\times 4}}{4^{\times 4}} = \frac{2+4}{16} = \frac{6}{16}$

$\frac{9}{30} + \frac{1^{\times 6}}{5^{\times 6}} = \frac{9+6}{30} = \frac{15}{30}$

$\frac{3}{24} + \frac{1^{\times 6}}{4^{\times 6}} = \frac{3+6}{24} = \frac{9}{24}$

$\frac{10}{18} - \frac{1^{\times 3}}{6^{\times 3}} = \frac{10+3}{18} = \frac{13}{18}$

$\frac{16}{18} - \frac{1^{\times 3}}{6^{\times 3}} = \frac{16-3}{18} = \frac{13}{18}$

$\frac{9}{14} - \frac{3^{\times 2}}{7^{\times 2}} = \frac{9-6}{14} = \frac{3}{14}$

$\frac{11}{18} - \frac{2^{\times 2}}{9^{\times 2}} =$

$\frac{7}{10} - \frac{2^{\times 2}}{5^{\times 2}} = \frac{7+4}{10} = \frac{11}{10}$

$\frac{22}{27} - \frac{5^{\times 3}}{9^{\times 3}} = \frac{22-15}{27} = \frac{7}{27}$

$\frac{11}{16} - \frac{1^{\times 4}}{4^{\times 4}} = \frac{11-4}{16} = \frac{7}{16}$

ex 6d

1. $\frac{2}{3} \times \frac{9}{10} = \frac{2}{3} \times \frac{3 \times 3}{5 \times 2}$

$= \frac{2 \times 3 \times 3}{3 \times 5 \times 2} = \frac{3}{5}$

4. $\frac{20}{21} \times \frac{14}{35} = \frac{5 \times 4}{7 \times 3} \times \frac{7 \times 2}{5 \times 7}$

$\frac{5 \times 4 \times 7 \times 2}{7 \times 3 \times 5 \times 7} = \frac{8}{21}$

8. $3\frac{2}{5} \times \frac{25}{51} = \frac{17}{5} \times \frac{5 \times 5}{17 \times 3}$

$\frac{17 \times 5 \times 5}{5 \times 17 \times 3} = \frac{5}{3}$

10. $5\frac{1}{4} \times \frac{32}{49} \quad \frac{21}{4} \times \frac{8 \times 4}{7 \times 7}$

$\frac{21 \times 8 \times 4}{4 \times 7 \times 7} = \frac{168}{49} = \frac{24}{7}$

26. $3\frac{3}{4} \times \frac{6}{15} \quad \frac{15}{4} \times \frac{3 \times 2}{5 \times 3}$

$= \frac{15 \times 3 \times 2}{4 \times 5 \times 3} = \frac{36}{20} \quad \div 10 = \frac{3}{2}$

$3\frac{1}{3} \times 2\frac{1}{4} \quad \frac{10}{3} \times \frac{9}{4}$

$\frac{10 \times 9}{3 \times 4} = \frac{90}{12}$