Simplifying Fractions

BEAM

January 13, 2016

Problems:

1. Simplify:

    (a) $\dfrac{8}{16}$

    (b) $\dfrac{20}{12}$

    (c) $\dfrac{20}{10}$

    (d) $\dfrac{\frac{5}{8}}{3}$

    (e) $\dfrac{\frac{12}{15}}{\frac{4}{5}}$

2. Below are several fractions. Break them up into groups, so that in each group, all the fractions represent the same number. It might be easiest to put shapes (like triangles, circles, or squares) around all the numbers that are equal.

$$\frac{16}{10} \qquad \frac{24}{15} \qquad \frac{10}{5} \qquad \frac{24}{12} \qquad \frac{1}{3}$$

$$\frac{18}{9} \qquad \frac{2}{3} \qquad \frac{\frac{2}{5}}{\frac{3}{5}} \qquad \frac{20}{30} \qquad \frac{10}{15}$$

$$\frac{\frac{1}{5}}{\frac{2}{20}} \qquad \frac{8}{24}$$

3. Problem 4.5.1 (page 177): Simplify each of the following.

    (a) $\frac{36}{27}$

    (b) $\frac{256}{304}$

    (c) $\frac{4800}{12000}$

    (d) $\frac{1260}{1008}$

4. Simplify:

   (a) $\dfrac{3^2}{3}$

   (b) $\dfrac{3^3}{3}$

   (c) $\dfrac{3^3}{3^2}$

   (d) $\dfrac{124^{30}}{124^{19}}$

   (e) $\dfrac{50^9 \cdot 7}{50^8}$

   (f) $\dfrac{3^2 \cdot 5^8 \cdot 11^{14}}{3^4 \cdot 5^6 \cdot 11^{13} \cdot 13}$

5. Problem 4.5.3 (page 177): Simplify the following fractions, assuming $a, b, m,$ and p are nonzero.

   (a) $\dfrac{4a^3b}{2ab}$

   (b) $\dfrac{8m^7p^{12}}{12m^5p^{15}}$

6. Problem 4.5.5 (page 177): Evaluate $\dfrac{42x^3y^6}{35x^2y^6}$ when $x = \dfrac{5}{4}$ and $y = \dfrac{2012}{2013}$.

7. Use the distributive property to simplify:

   (a) $\dfrac{12 + 6}{15}$

   (b) $\dfrac{16 \cdot 15 - 16 \cdot 12}{16}$

   (c) $\dfrac{983 \cdot 51 - 155 \cdot 18 + 155 \cdot 10 - 983 + 8 \cdot 155 + 19 \cdot 983}{983}$

   (d) $\dfrac{3 + 6 + 9 + \cdots + 183}{3}$ (Hint: the last step on this problem is just a problem from the warm-up module!)

   (e) $\dfrac{127 + 127 + 127 + 127 + 127}{5}$

   (f) $\dfrac{2 + 4 + 6 + \cdots + 500}{1 + 2 + 3 + \cdots + 250}$

8. If you did the "Creative Tricks With Division" module, explain how part (d) of the previous question relates to Question 1 from that module.

9. Explain how part (e) of the previous question relates to 1.61 on page 51 in your book. (This was a question on "The Distributive Property" module.)

10. Here are three attempts to simplify fractions. Mark each one as correct or incorrect. If it's incorrect, explain where it went wrong.

(a) Ariel simplifies
$$\frac{143 + 13}{13} = \frac{143}{13} + \frac{13}{13} = 11 + 1 = 12.$$

(b) Aishat simplifies
$$\frac{18 + 7}{24} = \frac{3 \cdot \cancel{6} + 7}{4 \cdot \cancel{6}} = \frac{3 + 7}{4} = \frac{10}{4} = \frac{5}{2}.$$

(c) Ashlee simplifies
$$\frac{21 + 65}{70} = \frac{\cancel{7} \cdot 3 + 13 \cdot \cancel{5}}{2 \cdot \cancel{5} \cdot \cancel{7}} = \frac{3 + 13}{2} = \frac{16}{2} = 8.$$

11. Simplify:

(a) $\dfrac{1}{\dfrac{1}{4}}$

(b) $\dfrac{1}{\dfrac{1}{\dfrac{1}{4}}}$

(c) $\dfrac{1}{\dfrac{1}{\dfrac{1}{\dfrac{1}{4}}}}$

(d) $\dfrac{1}{\dfrac{1}{\dfrac{1}{\dfrac{1}{\dfrac{1}{4}}}}}$

(e) $\dfrac{1}{\dfrac{2}{3}}$

(f) $\dfrac{1}{\dfrac{1}{\dfrac{2}{3}}}$

(g) $\dfrac{1}{\dfrac{a}{b}}$ for any a and b

12. Problem 4.1.8 (page 155): For how many positive integer values of n is the expression $\frac{36}{n+1}$ an integer?