

### Questions

1. Simplify the fraction  $\frac{18}{24}$ .
2. Simplify the fraction  $\frac{12}{36}$ .
3. Change  $\frac{17}{6}$  to a *mixed number*.
4. Change  $\frac{111}{9}$  to a *mixed number*.
5. Change  $3\frac{1}{5}$  to an *improper fraction*.
6. Change  $6\frac{3}{5}$  to an *improper fraction*.
7. Find the missing numerator when  $\frac{3}{11} = \frac{?}{44}$ .
8. Find the missing numerator when  $\frac{3}{5} = \frac{?}{35}$ .
9. Charles Barkley of the Phoenix Suns once scored 1560 points during 68 games played during the season. Express as a mixed number in simplified form how many points he averaged per game.
10. The University of California system accepted 14,664 out of 18,330 California Community College students who applied as transfer in fall 2003. What simplified fraction shows what portion of applications were accepted?

### Solutions

1. Technique: **prime factor** the numerator and denominator.

$$\frac{18}{24} = \frac{3 \times \cancel{3} \times \cancel{2}}{4 \times \cancel{3} \times \cancel{2}} = \frac{3}{4}$$

- 2.

$$\frac{12}{36} = \frac{1 \times \cancel{12}}{3 \times \cancel{12}} = \frac{1}{3}$$

3. Six goes into seventeen 2 times with a remainder of  $\frac{5}{6}$ .

$$\frac{17}{6} = 2\frac{5}{6}$$

4. Nine goes into one hundred and eleven 12 times with a remainder of  $\frac{3}{9} = \frac{1 \times \cancel{3}}{3 \times \cancel{3}} = \frac{1}{3}$ .

$$\frac{111}{9} = 12\frac{1}{3}$$

5.

$$\begin{aligned}3\frac{1}{5} &= 3 + \frac{1}{5} \text{ write the addition in the mixed number explicitly} \\ &= \frac{3 \times 5}{5} + \frac{1}{5} \text{ get a } \mathbf{\text{common denominator}} \text{ by multiplying the 3 by } \frac{5}{5} \\ &= \frac{15}{5} + \frac{1}{5} \text{ simplify} \\ &= \frac{15+1}{5} \text{ simplify} \\ &= \frac{16}{5} \text{ done!}\end{aligned}$$

6.

$$6\frac{3}{5} = 6 + \frac{3}{5} = \frac{6 \times 5}{5} + \frac{3}{5} = \frac{30}{5} + \frac{3}{5} = \frac{30+3}{5} = \frac{33}{5}$$

7. The numerator must be 12.

$$\begin{aligned}\frac{3}{11} &= \frac{3 \times 4}{11 \times 4} \text{ multiply (both numerator and denominator!) by 4 to get a denominator of 44} \\ &= \frac{12}{44} \text{ simplify}\end{aligned}$$

8. The numerator must be 21.

$$\begin{aligned}\frac{3}{5} &= \frac{3 \times 7}{5 \times 7} \text{ multiply (both numerator and denominator!) by 7 to get a denominator of 35} \\ &= \frac{21}{35} \text{ simplify}\end{aligned}$$

9. Start prime factoring and cancel until nothing else factors and cancels. Your solution might look different from mine.

$$\frac{1560}{68} = \frac{\cancel{4} \times 390}{\cancel{4} \times 17} = \frac{390}{17}$$

Now that we have the the simplified improper fraction, we can convert to a mixed number.

Seventeen goes into three hundred and ninety 22 times with a remainder of  $\frac{16}{17}$ .

$$\frac{390}{17} = 22\frac{16}{17}$$

10.

$$\begin{aligned}\frac{14664}{18330} &= \frac{\cancel{2} \times 7332}{\cancel{2} \times 9165} \\ &= \frac{7332}{9165} \\ &= \frac{\cancel{3} \times 2444}{\cancel{3} \times 3055} \\ &= \frac{2 \times 1222}{5 \times 611} \\ &= \frac{2 \times 2 \times \cancel{611}}{5 \times \cancel{611}} \\ &= \frac{4}{5}\end{aligned}$$