

Solutions

Page 58 #s 2ace, 4bdf, 6bdf, 7ace, 9ace,
11ace, 12ace

Page 59 #s 15, 16, 18, 19, 23

2. Express each of the following multiplications as a repeated addition and evaluate. Express your final answer as a fraction in lowest terms.

a) $2 \times \frac{1}{3}$

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

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

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

c) $5\left(\frac{2}{3}\right)$

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

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

$$= \frac{10}{3}$$

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

e) $6\left(\frac{1}{4}\right)$

$$= \frac{6}{1} \times \frac{1}{4}$$

$$= \frac{6 \times 1}{1 \times 4}$$

$$= \frac{6}{4}$$

$$= 1\frac{2}{4}$$

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

4. Evaluate. Express each answer as a fraction in lowest terms.

b) 5 times $\frac{1}{8}$

$$= \frac{5}{1} \times \frac{1}{8}$$

$$= \frac{5 \times 1}{1 \times 8}$$

$$= \frac{5}{8}$$

d) $8\left(\frac{3}{11}\right)$

$$= \frac{8}{1} \times \frac{3}{11}$$

$$= \frac{8 \times 3}{1 \times 11}$$

$$= \frac{24}{11}$$

$$= 2\frac{3}{11}$$

f) $\left(\frac{3}{4}\right)(3)$

$$= \frac{3}{4} \times \frac{3}{1}$$

$$= \frac{3 \times 3}{4 \times 1}$$

$$= \frac{9}{4}$$

$$= 2\frac{1}{4}$$

6. Determine the value of each of the following.

b) $\frac{1}{2}$ of $\frac{1}{3}$

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

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

$$= \frac{1}{6}$$

d) $\frac{1}{3}$ of $\frac{1}{2}$

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

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

$$= \frac{1}{6}$$

f) $\frac{2}{3}$ of $\frac{4}{5}$

$$= \frac{2}{3} \times \frac{4}{5}$$

$$= \frac{2 \times 4}{3 \times 5}$$

$$= \frac{8}{15}$$

7. Multiply. Express each answer as a fraction in simplest (reduced) form.

a) $\frac{1}{2} \times \frac{1}{4}$

$$= \frac{1 \times 1}{2 \times 4}$$

$$= \frac{1}{8}$$

c) $\left(\frac{2}{3}\right)\left(\frac{4}{3}\right)$

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

$$= \frac{8}{9}$$

e) $\frac{5}{8} \times \frac{2}{3}$

$$= \frac{5 \times 2}{8 \times 3}$$

$$= \frac{10}{24}$$

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

9. Divide. Express each answer as a fraction in simplest (reduced) form.

a) $5 \div \frac{1}{2}$

$$= \frac{5}{1} \div \frac{1}{2}$$

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

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

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

$$= 10$$

c) $\frac{1}{3} \div \frac{1}{2}$

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

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

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

e) $\frac{9}{4} \div \frac{2}{5}$

$$= \frac{9}{4} \times \frac{5}{2}$$

$$= \frac{9 \times 5}{4 \times 2}$$

$$= \frac{45}{8}$$

$$= 5 \frac{5}{8}$$

11. Multiply. Express each answer as a fraction in lowest terms.

$$\text{a) } 7 \times \frac{5}{8}$$

$$= \frac{7}{1} \times \frac{5}{8}$$

$$= \frac{7 \times 5}{1 \times 8}$$

$$= \frac{35}{8}$$

$$= 4 \frac{3}{8}$$

$$\text{c) } \frac{1}{4} \left(\frac{7}{6} \right)$$

$$= \frac{1 \times 7}{4 \times 6}$$

$$= \frac{7}{24}$$

$$\text{e) } -\frac{9}{4} \left(\frac{5}{6} \right)$$

$$= -\frac{9 \times 5}{4 \times 6}$$

$$= -\frac{45}{24}$$

$$= -1 \frac{21}{24}$$

$$= -1 \frac{7}{8}$$

12. Divide. Express each answer as a fraction in lowest terms.

$$\text{a) } \frac{2}{3} \div \frac{1}{2}$$

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

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

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

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

$$\text{c) } 20 \div \frac{8}{3}$$

$$= \frac{20}{1} \div \frac{8}{3}$$

$$= \frac{20}{1} \times \frac{3}{8}$$

$$= \frac{20 \times 3}{1 \times 8}$$

$$= \frac{60}{8}$$

$$= 7 \frac{4}{8}$$

$$= 7 \frac{1}{2}$$

$$\text{e) } -\frac{7}{16} \div \frac{3}{2}$$

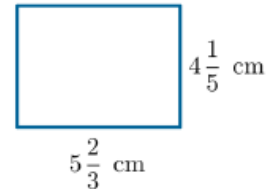
$$= -\frac{7}{16} \times \frac{2}{3}$$

$$= \frac{-7 \times 2}{16 \times 3}$$

$$= \frac{-14}{48}$$

$$= -\frac{7}{24}$$

15. Determine the area and perimeter of the rectangle on the right.



$$\text{Area} = \text{length} \times \text{width}$$

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

$$= \frac{17}{3} \times \frac{21}{5}$$

$$= \frac{357}{15}$$

$$= 23\frac{12}{15}$$

$$= 23\frac{4}{5} \text{ cm}^2$$

$$P = 2l + 2w$$

$$= \frac{2}{1} \times 5\frac{2}{3} + \frac{2}{1} \times 4\frac{1}{5}$$

$$= \frac{2}{1} \times \frac{17}{3} + \frac{2}{1} \times \frac{21}{5}$$

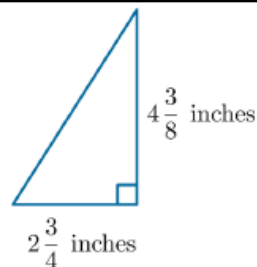
$$= \frac{34}{3} + \frac{42}{5}$$

$$= \frac{34}{3} \times \frac{5}{5} + \frac{42}{5} \times \frac{3}{3}$$

$$= \frac{170}{15} + \frac{126}{15}$$

$$= \frac{296}{15} = 19\frac{11}{15} \text{ cm}$$

16. Determine the area of the triangle on the right.



$$\text{Area} = \frac{\text{base} \times \text{height}}{2}$$

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

$$= \frac{11}{4} \times \frac{35}{8}$$

$$= \frac{11 \times 35}{4 \times 8}$$

$$= \frac{385}{32}$$

→ now \div by 2

$$\frac{385}{32} \div 2$$

$$= \frac{385}{32} \times \frac{1}{2}$$

$$= \frac{385}{64} = 6\frac{1}{64} \text{ in}^2$$

18. Holly took $1\frac{4}{5}$ hours to mow her lawn.

- It took Raymond twice as long to mow his lawn. Express this time as a mixed number.
- Jerika mowed her lawn in half the time it took Holly. Express this time as a mixed number.
- Manny mowed his lawn in 1 hour and 24 minutes. Express this time in hours as a mixed number in simplest form.
- Express the time it took Holly to mow her lawn as a combination of hours and minutes.

$$\begin{aligned} \text{a)} \quad & 1\frac{4}{5} \times 2 \\ & = \frac{9}{5} \times \frac{2}{1} \\ & = \frac{18}{5} \\ & = 3\frac{3}{5} \text{ hours} \end{aligned}$$

$$\begin{aligned} \text{b)} \quad & 1\frac{4}{5} \times \frac{1}{2} \\ & = \frac{9}{5} \times \frac{1}{2} \\ & = \frac{9}{10} \text{ hour} \end{aligned}$$

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- Express the time it took Holly to mow her lawn as a combination of hours and minutes.

$$\begin{aligned} \text{c)} \quad & 1\frac{24}{60} \\ & = 1\frac{2}{5} \text{ hours} \end{aligned}$$

$$\begin{aligned} \text{d)} \quad & \frac{4}{5} \times \frac{60}{1} \\ & = \frac{240}{5} \\ & = 48 \text{ minutes} \\ & \Rightarrow 1 \text{ hour } 48 \text{ mins} \end{aligned}$$

19. Show how $\frac{1257}{370} \times \frac{370}{2411}$ can be quickly evaluated without using large numbers.

x by 370 and ÷ by 370
Cancels each other out.

$$\Rightarrow \frac{1257}{\cancel{370}} \times \frac{\cancel{370}}{2411}$$

$$= \frac{1257}{2411}$$

23. Among other ingredients, a banana bread recipe that will serve 10 people calls for 3 bananas, $\frac{2}{3}$ cup of sugar and $1\frac{1}{2}$ cups of flour.

- a) How much of each of these ingredients would be needed to serve twice as many people?
b) If a loaf that is $\frac{3}{2}$ the size of the given recipe is to be baked, how much of each of these ingredients is needed? How many people will it serve?

a) $3 \times 2 = 6$ bananas

$\frac{2}{3} \times 2 = \frac{4}{3}$ cups of sugar

$1\frac{1}{2} \times 2 = 3$ cups of flour

b) $3 \times \frac{3}{2} = \frac{9}{2} = 4\frac{1}{2}$ bananas

$\frac{2}{3} \times \frac{3}{2} = \frac{6}{6} = 1$ cup of sugar

$1\frac{1}{2} \times \frac{3}{2} = \frac{3}{2} \times \frac{3}{2} = \frac{9}{4} = 2\frac{1}{4}$ cups of flour

$10 \times \frac{3}{2} = \frac{10}{1} \times \frac{3}{2} = \frac{30}{2} = 15$ people

23. Among other ingredients, a banana bread recipe that will serve 10 people calls for 3 bananas, $\frac{2}{3}$ cup of sugar and $1\frac{1}{2}$ cups of flour.

c) How much of each of these ingredients is needed to serve 24 people?

d) If $1\frac{1}{2}$ cups of sugar are used to make this banana bread, how many cups of flour should be used?

c) 1 person \div by 10, 24 people \times by 24
 \Rightarrow \times each ingredient by $\frac{24}{10}$

$$3 \times \frac{24}{10} = \frac{72}{10} = 7\frac{2}{10} = 7\frac{1}{5} \text{ bananas}$$

$$\frac{2}{3} \times \frac{24}{10} = \frac{48}{30} = 1\frac{18}{30} = 1\frac{3}{5} \text{ cups of sugar}$$

$$1\frac{1}{2} \times \frac{24}{10} = \frac{3}{2} \times \frac{24}{10} = \frac{72}{20} = 3\frac{12}{20} = 3\frac{3}{5} \text{ cups of flour}$$

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c) How much of each of these ingredients is needed to serve 24 people?

d) If $1\frac{1}{2}$ cups of sugar are used to make this banana bread, how many cups of flour should be used?

d) Find the "multiplier" = $\frac{\text{New Sugar}}{\text{Old Sugar}}$

$$= 1\frac{1}{2} \div \frac{2}{3}$$

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

$$= \frac{9}{4}$$

\Rightarrow New flour

= old flour \times multiplier

$$= 1\frac{1}{2} \times \frac{9}{4}$$

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

$$= \frac{27}{8} = 3\frac{3}{8} \text{ cups of flour}$$