

Fractions

1. Write the following fractions in lowest terms.

(a) $\frac{18}{30} = \frac{6 \cdot 3}{6 \cdot 5} = \frac{3}{5}$

(b) $\frac{-24}{60} = \frac{-2 \cdot 12}{5 \cdot 12} = \frac{-2}{5}$

(c) $\frac{98}{140} = \frac{14 \cdot 7}{14 \cdot 10} = \frac{7}{10}$

(d) $\frac{5^7 \times 7^5}{5^6 \times 7^7} = \frac{5}{7^2} = \frac{5}{49}$

(e) $\frac{2^3 \times 6^3 \times 5^8}{2^4 \times 3^5 \times 25^4} = \frac{2^3 \cdot (2 \cdot 3)^3 \cdot 5^8}{2^4 \cdot 3^5 \cdot (5^2)^4} = \frac{2^6 \cdot 3^3 \cdot 5^8}{2^4 \cdot 3^5 \cdot 5^8} = \frac{2^2}{3^2} = \frac{4}{9}$

2. Find one fraction that is between the fractions $\frac{1}{3}$ and $\frac{5}{12}$.

$\frac{1}{3} = \frac{8}{24}$
 $\frac{5}{12} = \frac{10}{24}$ } $\frac{9}{24} = \frac{3}{8}$ is between these fractions.

3. Find one fraction that is between the fractions $-\frac{5}{2}$ and $-2\frac{5}{6}$.

$-\frac{5}{2} = -\frac{15}{6}$
 $-2\frac{5}{6} = -\frac{17}{6}$ } $-\frac{16}{6} = -\frac{8}{3}$ is between these fractions.

4. True or False: $\frac{-3}{4} > \frac{-1}{4}$.

False, $\frac{-3}{4} < \frac{-1}{4}$ (think of number line)

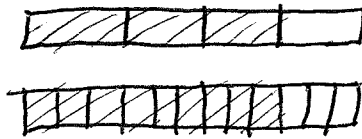
5. How many fractions are there between $\frac{3}{7}$ and $\frac{5}{7}$?

- (a) 0 (b) $\frac{2}{7}$ (c) 1 (d) 2 (e) 3 (f) an infinite amount

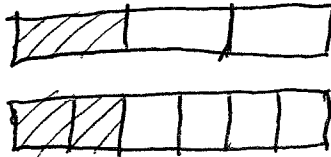
Because the rational numbers are dense.

6. Draw fraction bars which demonstrate the following equalities.

(a) $\frac{3}{4} = \frac{9}{12}$

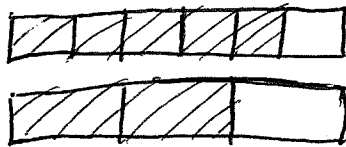


(b) $\frac{1}{3} = \frac{2}{6}$

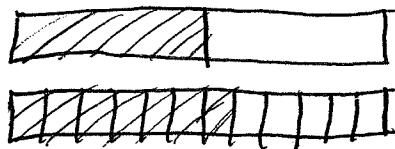


7. Draw fraction bars which demonstrate the following inequalities.

(a) $\frac{5}{6} > \frac{2}{3}$

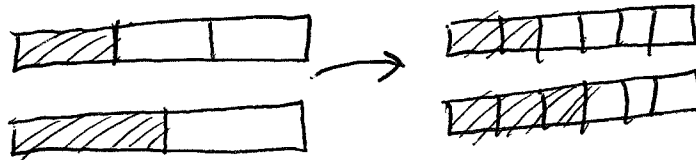


(b) $\frac{1}{2} < \frac{7}{12}$

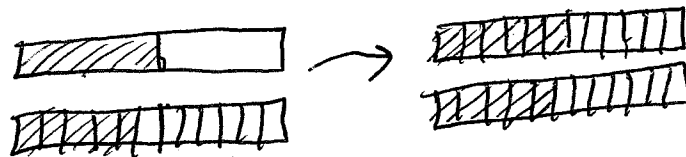


8. Draw fraction bars which demonstrate the following calculations.

(a) $\frac{1}{3} + \frac{1}{2} = \frac{5}{6}$



(b) $\frac{1}{2} + \frac{5}{12} = \frac{11}{12}$



9. In a large group of children each child is either 8 years old, 9 years old or 10 years old. If $\frac{1}{3}$ of them are 8 years old and $\frac{2}{7}$ of them are 9 years old, then what fraction of them are 10 years old?

$$1 - \frac{1}{3} - \frac{2}{7} = \frac{21}{21} - \frac{7}{21} - \frac{6}{21} = \frac{8}{21}$$

10. Martha has read $\frac{4}{5}$ of a 205-page book. How many pages does she have left to read?

$$\frac{1}{5}(205) = 41$$

11. One bit is one-eighth of a Spanish dollar. A teacher asks students to start with 21 bits and to exchange the bits for whole Spanish dollars and bits. The point of such an exercise is to teach the students

- (a) that every little bit counts when doing mathematics.
- (b) how to multiply fractions.
- (c) about the least common multiple.
- (d) how to express fractions as mixed fractions.
- (e) the commutative property of addition.
- (f) the commutative property of multiplication.

12. C. D. Mueller University has male and female students. If 4500 of the students are male and two-thirds of the students are female, then what is the total number of students who attend this university?

$$\frac{1}{3}(\text{total \# students}) = 4500$$

$$\text{total \# students} = 13500$$

13. A foot is $\frac{1}{3}$ the length of a yard. The volume of a box is 33 cubic feet. What is the volume of the box in cubic yards? Let L, W, H be the number of feet in the length, width, and height of this box. Then $L \cdot W \cdot H = 33 \text{ ft}^3$.

The volume in yd^3 is

$$V = \left(\frac{1}{3}L\right) \cdot \left(\frac{1}{3}W\right) \cdot \left(\frac{1}{3}H\right) = \frac{1}{27}(L \cdot W \cdot H) = \frac{33}{27} \text{ yd}^3$$

14. An inch is $\frac{1}{12}$ the length of a foot. The area of a rectangle is $\frac{1}{3}$ square feet. What is the area of the rectangle in square inches?

$$L \cdot W = \frac{1}{3} \text{ ft}^2$$

The area in in^2 is

$$A = (12L)(12W) = 144(L \cdot W) = 144 \cdot \frac{1}{3}$$

$$= 48 \text{ in}^2$$

LET L, W BE THE NUMBER OF FEET IN LENGTH, WIDTH

for $11/9$

15. Write the fractions $\frac{19}{31}$, $\frac{7}{11}$, and $\frac{19}{30}$ in decreasing order. How would you list the order if the fractions were all negative?

$$\frac{7}{11} > \frac{19}{30} > \frac{19}{31}$$

so $-\frac{19}{31} > -\frac{19}{30} > -\frac{7}{11}$

16. If a , b , c and d are positive integers, then which of the following is not always true?

(a) $\frac{a}{b} \times \frac{c}{d} = \frac{a}{b} \div \frac{d}{c}$ true

(b) $\frac{a}{b} + \frac{c}{d} = \frac{a+c}{b+d}$

not always true (for example, $\frac{1}{2} + \frac{1}{2} \neq \frac{2}{4}$)

(c) $\frac{a}{b} \div \frac{c}{d} = \frac{a \div c}{b \div d}$ true

(d) $\frac{a}{b} \cdot \frac{c}{d} = \frac{a \cdot c}{b \cdot d}$ true

17. Each lap around a small track at an elementary school is a distance of $\frac{1}{8}$ of mile. How many times would a student need to run around the track to run a total distance of $2\frac{1}{4}$ miles?

$$2\frac{1}{4} \div \frac{1}{8} = \frac{9}{4} \div \frac{1}{8} = \frac{9}{4} \cdot \frac{8}{1} = \frac{72}{4} = 18$$

(or just think about it)

18. A clerk sold three pieces of one type of ribbon to different customers. One piece was $\frac{1}{3}$ feet long, another was $2\frac{1}{4}$ feet long, and the third was $3\frac{1}{2}$ feet long. What was the total length of that type of ribbon sold?

(a) $6\frac{1}{12}$ feet

(b) $6\frac{1}{6}$ feet

(c) $6\frac{1}{4}$ feet

(d) $6\frac{1}{3}$ feet

$$\frac{1}{3} + 2\frac{1}{4} + 3\frac{1}{2} = \frac{1}{3} + \frac{9}{4} + \frac{7}{2} = \frac{4}{12} + \frac{27}{12} + \frac{42}{12} = \frac{73}{12} = 6\frac{1}{12}$$