

Chapter 1: Practice Problem Answers

FRACTIONS

Reduce the following fractions to lowest terms.

1. $\frac{8}{24}$

$$\frac{8 \div 8}{24 \div 8} = \frac{1}{3}$$

2. $\frac{9}{54}$

$$\frac{9 \div 9}{54 \div 9} = \frac{1}{6}$$

3. $\frac{12}{32}$

$$\frac{12 \div 4}{32 \div 4} = \frac{3}{8}$$

4. $\frac{16}{224}$

$$\frac{16 \div 16}{224 \div 16} = \frac{1}{14}$$

5. $\frac{56}{192}$

$$\frac{56 \div 8}{192 \div 8} = \frac{7}{24}$$

Convert the improper fractions to mixed numbers.

6. $\frac{74}{22}$

$$74 \div 22 = 3.364$$

The whole number in the mixed number becomes 3 since 74 can only be divided by 22 three times.

$$3 \times 22 = 66$$

$$74 - 66 = 8$$

The 8 becomes the new numerator and the resulting mixed number is $3 \frac{8}{22}$.

This can be further reduced to:

$$\frac{8 \div 2}{22 \div 2} = \frac{4}{11}$$

$$22 \div 2 = 11$$

Therefore, the mixed number in lowest terms is $3 \frac{4}{11}$.

7. $\frac{8}{5}$

$$8 \div 5 = 1.6$$

The whole number in the mixed number becomes 1 since 8 can only be divided by 5 once.

$$1 \times 5 = 5$$

$$8 - 5 = 3$$

The 3 becomes the new numerator. The final mixed number is $1 \frac{3}{5}$

8. $\frac{44}{16}$

$$44 \div 16 = 2.75$$

The whole number in the mixed number becomes 2 since 44 can only be divided by 16 two times.

$$2 \times 16 = 32$$

$$44 - 32 = 12$$

The 12 becomes the new numerator and the resulting mixed fraction is $2 \frac{12}{16}$.

This can be further reduced to:

$$\frac{12 \div 4}{16 \div 4} = \frac{3}{4}$$

$$16 \div 4 = 4$$

The resulting mixed number is $2 \frac{3}{4}$

9. $216/61$

$$216 \div 61 = 3.541$$

The whole number in the mixed number becomes 3 since 216 can only be divided by 61 three times.

$$3 \times 61 = 183$$

$$216 - 183 = 33$$

The 33 becomes the numerator and the resulting mixed fraction is $3 \frac{33}{61}$.

The resulting mixed number is $3 \frac{33}{61}$

10. $81/8$

$$81 \div 8 = 10.125$$

The whole number in the mixed number becomes 10 since 81 can only be divided by 8 ten times.

$$10 \times 8 = 80$$

$$81 - 80 = 1$$

The 1 becomes the numerator and the resulting mixed fraction is $10 \frac{1}{8}$.

Convert the mixed numbers to improper fractions.

11. $4 \frac{8}{13}$

$$4 \times 13 = 52$$

$$52 + 8 = 60$$

The 60 becomes the numerator, so the resulting improper fraction is $\frac{60}{13}$.

12. $2 \frac{4}{51}$

$$2 \times 51 = 102$$

$$102 + 4 = 106$$

The 106 becomes the numerator, so the resulting improper fraction is $\frac{106}{51}$.

13. $3 \frac{1}{4}$

$$3 \times 4 = 12$$

$$12 + 1 = 13$$

The 13 becomes the numerator, so the resulting improper fraction is $\frac{13}{4}$.

14. $2 \frac{7}{9}$

$$2 \times 9 = 18$$

$$18 + 7 = 25$$

The 25 becomes the numerator, so the resulting improper fraction is $\frac{25}{9}$.

15. $1 \frac{23}{24}$

$$1 \times 24 = 24$$

$$24 + 23 = 47$$

The 47 becomes the numerator, so the resulting improper fraction is $\frac{47}{24}$.

Perform the mathematical calculations specified. Reduce to lowest terms and/or convert to a mixed number when necessary.

16. $\frac{4}{21} + \frac{9}{7} =$

$$\frac{4}{21} + \frac{9 \times 3}{7 \times 3} =$$

$$\frac{4}{21} + \frac{27}{21} = \frac{31}{21} = 1.476$$

The whole number in the mixed number becomes 1 since 31 can only be divided by 21 one time.

$$31 - 21 = 10$$

The 10 becomes the new numerator and the resulting mixed fraction is $1 \frac{10}{21}$

Therefore, the answer is $1 \frac{10}{21}$.

17. $\frac{5}{6} + \frac{1}{8} =$

$$\frac{5 \times 4}{6 \times 4} + \frac{1 \times 3}{8 \times 3} =$$

$$\frac{20}{24} + \frac{3}{24} = \frac{23}{24}$$

Therefore, the answer is $\frac{23}{24}$.

18. $\frac{36}{45} - \frac{2}{5} =$

The denominators must be the same before subtraction can occur.

$$\frac{36}{45} - \left(\frac{2 \times 9}{5 \times 9} \right) =$$

$$\frac{36}{45} - \frac{18}{45} = \frac{18}{45}$$

The fraction can be further reduced

$$\frac{18 \div 9}{45 \div 9} = \frac{2}{5}$$

The final answer in lowest terms is 2/5

19. $7/4 - 3/12$

The denominators must be the same before subtraction can occur.

$$\frac{(7 \times 3) - 3}{(4 \times 3) \quad 12} =$$

$$\frac{21 - 3}{12 \quad 12 \quad 12} = \frac{18}{12}$$

Convert the improper fraction to a mixed number.

$$18 \div 12 = 1.5$$

The whole number in the mixed number becomes 1 since 18 can only be divided by 12 once.

$$1 \times 12 = 12$$

$$18 - 12 = 6$$

The 6 becomes the numerator and the resulting mixed fraction is 1 6/12.

This can be further reduced to:

$$\frac{6 \div 6}{12 \div 6} = \frac{1}{2}$$

The resulting mixed number is 1 1/2.

*****For problems 20-24, multiplying fractions simply requires multiplying numerators and/or denominators. When involved, mixed numbers should be converted to improper fractions before being multiplied.**

20. $3/7 \times 2 \frac{2}{3}$

The mixed number must first be converted to an improper fraction.

$$2 \times 3 = 6$$

$$6 + 2 = 8$$

The 8 becomes the numerator, and the 3 remains the denominator, so the resulting improper fraction is $\frac{8}{3}$.

$$\frac{3}{7} \times \frac{8}{3} =$$

$$\frac{\cancel{3}^1 \times 8}{7 \times \cancel{3}^1} = \frac{8}{7}$$

Note: 3 was able to be cancelled out of the problem.

$$8 \div 7 = 1.43$$

The whole number in the mixed number becomes 1 since 8 can only be divided by 7 one time.

$$8 - 7 = 1$$

The one becomes the new numerator and the resulting mixed number is $1 \frac{1}{7}$.

Therefore, the answer is $1 \frac{1}{7}$.

21. $\frac{5}{8} \times \frac{9}{10}$

$$\frac{5 \times 9}{8 \times 10} = \frac{45}{80}$$

This can be further reduced to:

$$\frac{45 \div 5}{80 \div 5} = \frac{9}{16}$$

22. $\frac{13}{15} \times 4 \frac{1}{5}$

The mixed number must first be converted to an improper fraction.

$$4 \times 5 = 20$$

$$20 + 1 = 21$$

The 21 becomes the numerator, and the 5 remains the denominator, so the resulting improper fraction is $\frac{21}{5}$.

$$13/15 \times 21/5 =$$

$$\frac{13 \times 21}{15 \times 5} = \frac{273}{25}$$

The fraction 273/75 must then be reduced to lowest terms.

$$\frac{273 \div 3}{75 \div 3} = \frac{91}{25}$$

The improper fraction 91/25 must be converted to a mixed number.

$$91 \div 25 = 3.64$$

The whole number in the mixed number becomes 3 since 91 can only be divided by 25 three times.

$$25 \times 3 = 75$$

$$91 - 75 = 16$$

The 16 becomes the new numerator, and the 25 remains the denominator, so the resulting mixed number is 3 16/25.

23. $2/5 \times 11/12$

$$\frac{\cancel{2}^1 \times 11}{5 \times \cancel{12}^6} = \frac{11}{30}$$

Note: 2 was able to be cancelled out of the problem above to give the answer in lowest terms.

24. $8 \frac{3}{8} \times 3/4$

The mixed number must first be converted to an improper fraction.

$$8 \times 8 = 64$$

$$64 + 3 = 67$$

The 67 becomes the numerator, and the 8 remains the denominator, so the resulting improper fraction is 67/8.

$$67/8 \times 3/4 = \frac{67 \times 3}{8 \times 4} = \frac{201}{32}$$

The improper fraction 201/32 must be converted to a mixed number.

$$201 \div 32 = 6.28125$$

The whole number in the mixed number becomes 6 since 201 can only be divided by 32 six times.

$$32 \times 6 = 192$$

$$201 - 192 = 9$$

The 9 becomes the new numerator, and the 32 remains the denominator, so the resulting mixed number is 6 9/32.

*****For problems 25-29, dividing fractions is the same as multiplying one fraction by the reciprocal of another.**

25. $1/3 \div 8/9$

Multiply 1/3 by the reciprocal of 8/9 by inverting it.

$$1/3 \div 8/9 = 1/3 \times 9/8$$

$$\frac{(1 \times 9)}{(3 \times 8)} = \frac{9}{24}$$

The fraction 9/24 must then be reduced to lowest terms.

$$\frac{9 \div 3}{24 \div 3} = \frac{3}{8}$$

26. $6 \frac{8}{9} \div 4 \frac{3}{7}$

The mixed numbers must first be converted to improper fractions.

$$6 \times 9 = 54$$

$$54 + 8 = 62$$

For the first mixed number, the 62 becomes the numerator, and the 9 remains the denominator, so the resulting improper fraction is 62/9.

$$4 \times 7 = 28$$

$$28 + 3 = 31$$

For the second mixed number, the 31 becomes the numerator, and the 7 remains the denominator, so the resulting improper fraction is $31/7$.

Therefore, the problem becomes $62/9 \div 31/7$.

Multiply $62/9$ by the reciprocal of $31/7$ by inverting it.

$$62/9 \div 31/7 = 62/9 \times 7/31$$

$$\frac{(62 \times 7)}{(9 \times 31)} = \frac{434}{279}$$

The improper fraction $434/279$ must be converted to a mixed number.

$$434 \div 279 = 1.5555$$

The whole number in the mixed number becomes 1 since 434 can only be divided by 279 one time.

$$434 - 279 = 155$$

The 155 becomes the new numerator, and the 279 remains the denominator, so the resulting mixed number is $1 \frac{155}{279}$.

The fraction can be further reduced to:

$$\frac{155 \div 31}{279 \div 31} = \frac{5}{9}$$

Therefore, the mixed number in lowest terms is $1 \frac{5}{9}$

27. $6 \div 1 \frac{3}{5}$

The mixed number must first be converted to an improper fraction.

$$1 \times 5 = 5$$

$$5 + 3 = 8$$

The 8 becomes the numerator, and the 5 remains the denominator, so the resulting improper fraction is $8/5$.

Therefore, the problem becomes $6 \div 8/5$.

Multiply $6/1$ (equals 6) by the reciprocal of $8/5$ by inverting it.

$$6/1 \div 8/5 = 6/1 \times 5/8$$

$$\frac{(6 \times 5)}{(1 \times 8)} = \frac{30}{8}$$

The improper fraction $30/8$ must be converted to a mixed number.

$$30 \div 8 = 3.75$$

The whole number in the mixed number becomes 3 since 30 can only be divided by 3 times.

$$8 \times 3 = 24$$

$$30 - 24 = 6$$

The 6 becomes the new numerator, and the 8 remains the denominator, so the resulting mixed number is $3 \frac{6}{8}$.

This can be further reduced to:

$$\frac{6 \div 2}{8 \div 2} = \frac{3}{4}$$

Therefore, the mixed number in lowest terms is $3 \frac{3}{4}$.

28. $1/2 \div 2/5$

Multiply $1/2$ by the reciprocal of $2/5$ by inverting it.

$$1/2 \div 2/5 = 1/2 \times 5/2$$

$$\frac{(1 \times 5)}{(2 \times 2)} = \frac{5}{4}$$

The improper fraction $5/4$ must be converted to a mixed number.

$$5 \div 4 = 1.25$$

The whole number in the mixed number becomes 1 since 5 can only be divided by 4 once.

$$1 \times 4 = 4$$

$$5 - 4 = 1$$

The 1 becomes the new numerator and the 4 remains the denominator, so the resulting mixed number is $1 \frac{1}{4}$.

29. $19/22 \div 4$

Multiply $19/22$ by the reciprocal of $4/1$ (equals 4) by inverting it.

$$19/22 \div 4/1 = 19/22 \times 1/4$$

$$\frac{(19 \times 1)}{(22 \times 4)} = \frac{19}{88}$$

DECIMALS

For problems 30 – 34, convert the written expression for decimals into numbers.

30. Four hundred three and sixty-nine thousandths

The “and” represents the decimal point. Four hundred three is written to the left of the decimal point. Sixty-nine follows the decimal point. A zero is placed between the decimal point and sixty-nine since the thousandths position is the third spot following the decimal point.

$$403.069$$

31. Twenty-one and seven-tenths

The “and” represents the decimal point. Twenty-one is written to the left of the decimal point. Seven follows the decimal point in the first (tenths) position.

$$21.7$$

32. Seven thousand seven hundred sixty-one and thirteen hundredths

The “and” represents the decimal point. Seven thousand seven hundred sixty-one is written to the left of the decimal point. Thirteen follows the decimal point, with

three in the hundredths position.

7,761.13

33. One hundred seventy-five thousandths

One hundred seventy-five follows the decimal point because the “th” on thousandths indicates the number is less than one. Because the number is less than one, zero precedes the decimal point.

0.175

34. Four-hundredths

Four follows the decimal point in the second (hundredths) position. The “th” on hundredths indicates that the number is less than one. Because the number is less than one, zero precedes the decimal point and another zero is placed between the decimal point and the nine since the hundredths position is the second spot following the decimal point.

0.04

Convert the fractions to decimal numbers.

*****For problems 35-42, to convert from fractions to decimals, you simply divide the numerator by the denominator.**

35. $\frac{3}{5}$

$$3 \div 5 = 0.6$$

36. $\frac{5}{16}$

$$5 \div 16 = 0.3125$$

37. $\frac{32}{80}$

$$32 \div 80 = 0.4$$

38. $\frac{14}{8}$

$$14 \div 8 = 1.75$$

39. $\frac{55}{250}$

$$55 \div 250 = 0.22$$

40. $124/320$

$$124 \div 320 = 0.3875$$

41. $1,587/12,696$

$$1,587 \div 12,696 = 0.125$$

42. $30/8$

$$30 \div 8 = 3.75$$

Convert the decimal numbers to fractions or mixed numbers in lowest terms.

*****For problems 43-46, to convert from decimals to fractions, the decimal number represented as a whole number becomes the numerator of the fraction, while the denominator becomes the decimal place value.**

43. 0.65

$$\frac{65}{100}$$

The fraction 65/100 must then be reduced to lowest terms.

$$\frac{65 \div 5 = 13}{100 \div 5 = 20}$$

Therefore, the final answer in lowest terms is 13/20.

44. 145.2

$$145 \frac{2}{10}$$

The fraction 2/10 must then be reduced to lowest terms.

$$\frac{2 \div 2 = 1}{10 \div 2 = 5}$$

Therefore, the final answer in lowest terms is 145 1/5.

45. 0.375

$$\frac{375}{1,000}$$

The fraction 375/1,000 must then be reduced to lowest terms.

$$\frac{375 \div 125}{1,000 \div 125} = \frac{3}{8}$$

Therefore, the final answer in lowest terms is 3/8.

46. 32.002

$$32 \frac{2}{1,000}$$

The fraction 2/1,000 must then be reduced to lowest terms.

$$\frac{2 \div 2}{1,000 \div 2} = \frac{1}{500}$$

Therefore, the final answer in lowest terms is 32 1/500.

Round the decimal numbers as directed.

47. 24.182 to the nearest tenth

The tenth digit is held by the number 1.

$$24.\underline{1}82$$

The number to the right of the 1 is 8, which is greater than the number five, so 1 should be added to the number 1 to equal 2. All the numbers to the right are dropped as seen below.

$$24.2$$

48. 15,832.54918 to the nearest thousandth

The thousandths digit is held by the number 9.

$$15,832.549\underline{1}8$$

The number to the right of the 9 is 1, which is less than the number five, so the 9 should be left the same. All the numbers to the right are dropped as seen below.

15,832.549

Determine the number of significant figures.

49. 0.00865

Since digits other than zero are always significant and leading zeros to the left of the first nonzero digits are never significant, only the 8, 6 and 5 are considered significant figures.

Therefore, 0.00865 has three significant figures.

50. 654.1072

Since digits other than zero are always significant and zeros between two other significant digits are always significant, the 6, 5, 4, 1, 0, 7 and 2 are all considered significant figures.

Therefore, 654.1072 has seven significant figures.