G. Adding and subtracting fractions:

If denominators are the same, combine the numerators:

example: $\frac{7}{10} - \frac{1}{10} = \frac{7-1}{10} = \frac{6}{10} = \frac{3}{5}$

Problems 33-37: Find the sum or difference (reduce if possible):

33. $\frac{4}{7} + \frac{2}{7} =$

34. $\frac{5}{6} + \frac{1}{6} =$

35. $\frac{7}{8} - \frac{5}{8} =$

36. $3 + \frac{1}{2} =$

37. $1 - \frac{2}{3} =$

If the denominators are different, first find equivalent fractions with common denominators (preferably the LCD):

example: $\frac{4}{5} + \frac{2}{3} = \frac{12}{15} + \frac{10}{15} = \frac{22}{15} = 1\frac{7}{15}$

example: $\frac{1}{2} - \frac{2}{3} = \frac{3}{6} - \frac{4}{6} = \frac{3-4}{6} = \frac{-1}{6}$

Problems 38-43: Calculate:

38. $\frac{3}{5} - \frac{2}{3} =$

39. $\frac{5}{8} + \frac{1}{4} =$

40. $\frac{5}{2} + \frac{5}{4} =$

41. $2\frac{3}{4} + 5\frac{7}{8} =$

42. $\left(3\frac{1}{4} - \frac{3}{4}\right) + \frac{1}{2} =$

43. $4\frac{1}{3} - \left(3\frac{1}{2} - 3\right) =$

Answers

33. $\frac{6}{7}$
34. 1
35. $\frac{1}{4}$
36. $3\frac{1}{2}$
37. $\frac{1}{3}$
38. $-\frac{1}{15}$
39. $\frac{7}{8}$
40. $\frac{15}{4}$
41. $8\frac{5}{8}$
42. 3
43. $3\frac{5}{6}$

H. Multiplying and dividing fractions:

To multiply fractions, multiply the tops, multiply the bottoms, and reduce if possible:
example: $\frac{3}{4} \bullet \frac{2}{5} = \frac{3 \bullet 2}{4 \bullet 5} = \frac{6}{20} = \frac{3}{10}$

Problems 44-52: Calculate:

44. $\frac{2}{3} \bullet \frac{3}{8} =$
45. $\frac{1}{2} \bullet \frac{2}{3} =$
46. $\frac{4}{5} \times 5 =$
47. $\left(\frac{3}{4}\right)^2 =$
48. $\left(\frac{3}{2}\right)^2 =$
49. $\left(2\frac{1}{2}\right)^2 =$
50. $\frac{4}{5} \bullet 30 =$
51. $8 \bullet \frac{3}{4} =$
52. $\frac{15}{21} \times \frac{14}{25} =$

Divide fractions by making a compound fraction and then multiply the top and bottom (of the larger fraction) by the lowest common denominator (LCD) of both.

example: $\frac{3}{4} \div \frac{2}{3} = \frac{\frac{3}{4}}{\frac{2}{3}}$

The LCD is 12, so multiply by 12: $\frac{\frac{3}{4} \bullet 12}{\frac{2}{3} \bullet 12} = \frac{9}{8}$

Answers

44. $\frac{1}{4}$
45. $\frac{1}{3}$
46. 4
47. $\frac{9}{16}$
48. $\frac{9}{4}$
49. $6\frac{1}{4}$ or $\frac{25}{4}$
50. 24
51. 6
52. $\frac{2}{5}$

example: $\dfrac{7}{\frac{2}{3}-\frac{1}{2}} = \dfrac{7\bullet 6}{\left(\frac{2}{3}-\frac{1}{2}\right)\bullet 6}$

$= \dfrac{42}{\frac{2}{3}\bullet 6-\frac{1}{2}\bullet 6} = \dfrac{42}{4-3} = \dfrac{42}{1} = 42$

Problems 53-62: Calculate:

53. $\frac{3}{2} \div \frac{1}{4} =$

54. $11\frac{3}{8} \div \frac{3}{4} =$

55. $\frac{3}{4} \div 2 =$

56. $\dfrac{\frac{3}{4}}{\frac{2}{3}} =$

57. $\dfrac{1+\frac{1}{2}}{1-\frac{3}{4}} =$

58. $\dfrac{2}{\frac{3}{4}} =$

59. $\dfrac{\frac{2}{3}}{4} =$

60. $\frac{4}{5} \div 5 =$

61. $\frac{3}{8} \div 3 =$

62. $\dfrac{2\frac{1}{3}-\frac{1}{3}}{3\frac{2}{3}+1\frac{1}{2}} =$

Answers

53. 6
54. $15\frac{1}{6}$
55. $\frac{3}{8}$
56. $\frac{9}{8}$
57. 6
58. $\frac{8}{3}$
59. $\frac{1}{6}$
60. $\frac{4}{25}$
61. $\frac{1}{8}$
62. $\frac{12}{31}$

I. Comparing fractions:

example: Arrange small to large: $\frac{7}{9}$, $\frac{5}{7}$, and $\frac{3}{4}$

LCD is $2^2 \cdot 3^2 \cdot 7 = 252$

$$\frac{7}{9} = \frac{7 \cdot 28}{9 \cdot 28} = \frac{196}{252}$$

$$\frac{5}{7} = \frac{5 \cdot 36}{7 \cdot 36} = \frac{180}{252}$$

$$\frac{3}{4} = \frac{3 \cdot 63}{4 \cdot 63} = \frac{189}{252}$$

So the order is $\frac{5}{7}$, $\frac{3}{4}$, $\frac{7}{9}$

Fractions can also be compared by writing in decimal from and comparing the decimals.

Problems 63-65: Arrange small to large:

63. $\frac{15}{8}$, $\frac{11}{6}$

64. $\frac{7}{8}$, $\frac{5}{6}$, $\frac{11}{12}$

65. $\frac{2}{3}$, $\frac{7}{12}$, $\frac{5}{6}$, $\frac{25}{36}$

Answers

63. $\frac{11}{6}, \frac{15}{8}$

64. $\frac{5}{6}, \frac{7}{8}, \frac{11}{12}$

65. $\frac{7}{12}, \frac{2}{3}, \frac{25}{36}, \frac{5}{6}$

Word Problems:

66. How many 2's are in 8?

67. How many $\frac{1}{2}$'s are in 8?

68. Three fourths is equal to how many twelfths?

69. What is $\frac{3}{4}$ of a dozen?

70. Joe and Mae are decorating the gym for a dance. Joe has done $\frac{1}{3}$ of the work and Mae has done $\frac{2}{5}$. What fraction of the work still must be done?

71. The ratio of winning tickets to tickets sold is 2 to 5. If 3,500,000 are sold, how many tickets are winners?

Answers

66. 4
67. 16
68. 9
69. 9
70. $\frac{4}{15}$
71. 1,400,000

Word Problems:

72. An $11\frac{3}{8}$-inch wide board can be cut into how many strips of width $\frac{5}{8}$ inch, if each cut takes $\frac{1}{8}$ inch of the width? (Must the answer be a whole number?)

Problems 73-76: Inga and Lee each work for $4.60 per hour:

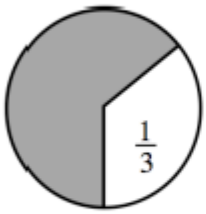
73. If Inga works $3\frac{1}{2}$ hours, what will her pay be?
74. If Lee works $2\frac{3}{4}$ hours, what will he be paid?
75. Together, what is the total time they work?
76. What is their total pay?

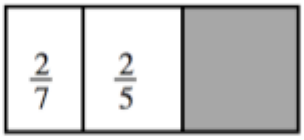
Answers

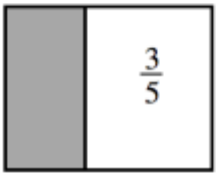
72. 18; yes
73. $16.10
74. $12.65
75. $6\frac{1}{4}$
76. $28.75

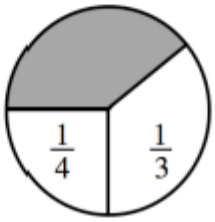
Visual Problems:

Problems 77-80: What fraction of the figure is shaded?

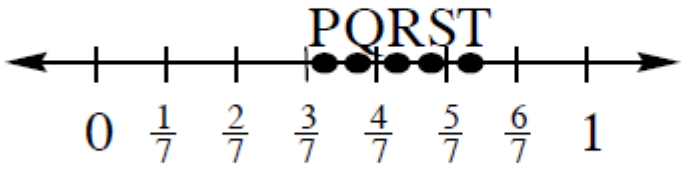
77. 

79. 

78. 

80. 

Problems 81-83: What letter best locates the given number?



81. $\frac{5}{9}$

82. $\frac{3}{4}$

83. $\frac{2}{3}$

Answers

77. $\frac{2}{3}$
78. $\frac{2}{5}$
79. $\frac{11}{35}$
80. $\frac{5}{12}$
81. Q
82. T
83. S