

El Segundo
High School

Algebra 1AB

Summer Packet

2007 Algebra 1AB Packet

Name: _____

Solve each problem and place the answer on the line to the left of the problem.

1.) Adding Integers

A. If both numbers are positive, answer will be positive. Add the two numbers.

B. Steps if both numbers are negative.

Example: $(-5) + (-2)$

Step 1: Ignore the negative signs and add the two numbers.

$$5 + 2 = 7$$

Step 2: Put a negative sign on the answer.

Answer will then be -7.

C. Steps if one number is positive and one number is negative.

Example: $(-2) + 9$

Step 1: Ignore the negative sign and determine which number is greater.

9 is greater than 2

The answer will have the sign of the greater number so the answer will be positive because 9 is positive.

Step 2: Subtract the smaller number from the larger number.

2 is smaller and 9 is larger

$$9 - 2 = 7$$

Step 3: Combine the sign of answer with the numeric answer.

Answer is positive 7 or just 7.

Try these.

1. _____ $(-4) + 5$

5. _____ $(-17) + 34$

2. _____ $(-3) + (-6)$

6. _____ $12 + (-21)$

3. _____ $13 + 19$

7. _____ $23 + (-45)$

4. _____ $15 + (-34)$

8. _____ $(-23) + (-12)$

2.) Subtracting Integers

Steps for subtracting

Step 1: Two negative signs in a row = a positive sign.

Example: $-(-8) = +8$

Example: $6 - (-11) = 6 + 11$

Step 2: Turn subtraction into adding a negative number.

Example: $4 - 10 = 4 + (-10)$

Step 3: Use process for adding integers from the previous page.

Try these.

9. _____ $(-4) - 5$

13. _____ $(-17) - 34$

10. _____ $(-3) - (-6)$

14. _____ $12 + (-21)$

11. _____ $13 - 9$

15. _____ $23 - (-45)$

12. _____ $15 - (-34)$

16. _____ $(-23) - (-12)$

3.) Multiplying Integers

A. The following signs are equivalent multiplication signs:

· * x

B. If multiplying two positive numbers, answer will be positive.

C. If multiplying two negative numbers, answer will be positive.

D. If multiplying one positive number and one negative number, answer will be negative.

E. Steps:

Step 1: Determine the sign of the answer.

Example: $12 * 23$ Since both numbers are positive, answer will be positive.

Example: $(-40) * (-6)$ Since both numbers are negative, answer will be positive.

Example: $(-89) * 5$ Since one number is positive and one number is negative, answer will be negative.

Step 2: Determine the numeric answer by ignoring any negative signs.

Example: $(-5) * 8 = 40$ (Negative sign on the 5 is ignored.)

Step 3: Combine the sign of the answer with the numeric answer.

The answer will have a negative sign and the numeric answer is 40, therefore, the complete answer is -40.

Try these.

17. _____ $(-4) * 5$

21. _____ $(-17) * 34$

18. _____ $(-3) * (-6)$

22. _____ $12 * (-21)$

19. _____ $13 * 9$

23. _____ $23 * (-45)$

20. _____ $15 * (-34)$

24. _____ $(-23) * (-12)$

4.) Dividing Integers

A. The following signs are equivalent division signs:

/ ÷

B. If both numbers are positive, the answer will be positive.

C. If both numbers are negative, the answer will be positive.

D. If one number is positive and one number is negative, the answer will be negative.

E. Steps:

Step 1: Determine the sign of the answer.

Example: $15 / 5$ Since both numbers are positive, the answer will be positive

Example: $(-25) / (-5)$ Since both numbers are negative, the answer will be positive.

Example: $40 / (-8)$ Since one number is positive and one number is negative, the answer will be negative.

Example: $(-50) / 10$ Since one number is positive and one number is negative, the answer will be negative.

Step 2: Determine the numeric answer by dividing the two numbers and ignoring any negative signs.

Example: $20 / (-10) = 2$ (Negative sign on the 10 is ignored.)

Step 3: Combine the sign of the answer with the numeric answer.

The answer will have a negative sign combined with 2, therefore the answer is -2.

Try these.

25. _____ $(-12) / 3$

29. _____ $(-56) / (-7)$

26. _____ $(-24) / (-8)$

30. _____ $(-98) / 14$

27. _____ $16 / (-2)$

31. _____ $(-28) / 7$

28. _____ $64 / (-16)$

32. _____ $(-108) / 4$

5.) Adding Fractions

A. The denominators are identical and both fractions are positive.
Add the numerators. The denominator for the answer is the same as the denominator for each of the added fractions.

Example: $\frac{1}{9} + \frac{4}{9}$ Since the denominators are the same (9), the denominator of the answer will also be 9. The numerator of the answer will be the addition of the two numerators in the problem: $1 + 4 = 5$. Therefore the answer will be $\frac{5}{9}$.

Try these.

33. _____ $\frac{3}{5} + \frac{4}{5}$

35. _____ $\frac{2}{9} + \frac{6}{9}$

34. _____ $\frac{1}{6} + \frac{4}{6}$

36. _____ $\frac{3}{7} + \frac{3}{7}$

B. The denominators are identical and both fractions are negative.
Just like adding two negative integers, ignore the negative signs and add the numerators. The denominator is the same as the denominator for each of the two added fractions. Combine the fraction and the negative sign for the answer.

Example: $\frac{-1}{4} + \frac{-2}{4}$ Since the denominators are the same (4), the denominator of the answer will also be 4. Ignore the negative signs and add the numerators: $1 + 2 = 3$. Combine the calculated numerator, the common denominator and the negative sign for the answer. Therefore, the answer will be $\frac{-3}{4}$.

Try these.

37. _____ $\frac{-2}{5} + \frac{-2}{5}$

39. _____ $\frac{-1}{6} + \frac{-3}{6}$

38. _____ $\frac{-4}{8} + \frac{-3}{8}$

40. _____ $\frac{-6}{10} + \frac{-1}{10}$

Adding fractions continued

C. The denominators are identical and one fraction is positive and one fraction is negative.

Step 1: Just like adding two integers where one is positive and one is negative, ignore the negative signs and determine which numerator is the greatest. The sign of the answer will be the sign of the greater numerator.

Example: $\frac{4}{9} + \frac{-5}{9}$ Ignoring the negative sign, the greater of the two numerators (4 and 5) is 5. The sign of the fraction containing the numerator 5 is negative, therefore, the answer will be negative.

Step 2: The numeric answer in the numerator will then be the greater numerator minus the lesser numerator.

The greater numerator is 5 and the lesser numerator is 4. $5 - 4 = 1$
Therefore, the answer will have a 1 in the numerator.

Step 3: Since both denominators are identical, the denominator in the answer will be the same as the denominators in the two added fractions.

Since both denominators in the added fractions are 9, the denominator of the answer will be 9.

Step 4: Combine all the parts for the final answer: $\frac{-1}{9}$

Try these.

41. _____ $\frac{-3}{11} + \frac{9}{11}$

43. _____ $\frac{1}{2} + \frac{-3}{2}$

42. _____ $\frac{7}{9} + \frac{-6}{9}$

44. _____ $\frac{-5}{8} + \frac{2}{8}$

Adding fractions continued

D. Denominators are different.

You may not add fractions unless they have identical denominators. Therefore, you must modify the fractions so that they have identical denominators by finding the Least Common Denominator.

Step 1: Find the Least Common Denominator (LCD).

a) Find the prime factors of the denominators.

Example: $\frac{3}{4} + \frac{-5}{6}$

The prime factors of the first denominator (4) are $2 * 2$

The prime factors of the second denominator (6) are $2 * 3$

b) Write the prime factors in exponential format.

$$4 = 2^2$$

$$6 = 2 * 3$$

c) Find the greatest power of each unique prime factor.

The unique prime factors are 2 and 3. The greatest power of 2 is 2^2 . The greatest power of 3 is 3.

c) Multiply these together = LCD.

$$2^2 * 3 = 4 * 3 = 12 = \text{LCD}$$

Step 2: Rewrite the fractions so that each has the LCD as its denominator.

a) $\frac{3}{4} + \frac{-5}{6} = \frac{?}{12} + \frac{?}{12}$

b) To compute the new numerators, look at each fraction individually.

In the first fraction, you need to multiply the old denominator (4) by 3 in order for it to be equal to the new denominator. You must also multiply the old numerator by 3 to compute the new numerator: $3 * 3 = 9$

In the second fraction, you need to multiply the old denominator (6) by 2 in order for it to be equal to the new denominator. You must also multiply the old numerator by 2 to compute the new numerator: $(-5) * 2 = -10$

d) The fractions are now: $\frac{9}{12} + \frac{-10}{12}$

Step 3: Since the denominators are now identical, follow the previous instructions for adding fractions.

a) There is one positive fraction and one negative fraction. The sign of the answer will be negative since 10 is greater than 9.

b) To determine the numerator in the answer, $10 - 9 = 1$.

c) The denominator will be 12.

d) Combining all parts, the answer is $\frac{-1}{12}$.

Try these.

Adding fractions continued

45. _____ $\frac{-2}{3} + \frac{4}{7}$

48. _____ $\frac{-5}{8} + \frac{-2}{5}$

46. _____ $\frac{7}{9} + \frac{-3}{4}$

49. _____ $\frac{-8}{11} + \frac{-4}{7}$

47. _____ $\frac{-6}{7} + \frac{-4}{5}$

50. _____ $\frac{5}{6} + \frac{9}{14}$

6.) Subtracting Fractions

Just like subtracting integers, change subtraction of a fraction to adding a negative fraction, remembering that two negative signs in a row equal a positive sign. You may not subtract two fractions unless they have identical denominators.

Example: $\frac{3}{5} - \frac{7}{9}$ Change this to the following: $\frac{3}{5} + \frac{-7}{9}$

Then follow the steps for adding fractions.

- The LCD is 45. Therefore the fractions will be $\frac{27}{45} + \frac{-35}{45}$. The answer will have a denominator of 45.
- The answer will be negative.
- The numerator will be 8.
- The combination of the parts for the answer results in $\frac{-8}{40}$.

Try these.

51. _____ $\frac{-5}{8} - \frac{-2}{5}$

55. _____ $\frac{-8}{11} - \frac{-4}{7}$

52. _____ $\frac{7}{9} - \frac{-3}{4}$

56. _____ $\frac{1}{6} - \frac{1}{2}$

53. _____ $\frac{-6}{7} - \frac{-4}{5}$

57. _____ $\frac{-5}{13} - \frac{-4}{7}$

54. _____ $\frac{3}{5} - \frac{4}{5}$

58. _____ $\frac{-2}{3} - \frac{4}{7} =$

7.) Multiplying Fractions

A. Just like multiplication of integers,

- positive fraction * positive fraction = positive answer
- negative fraction * negative fraction = positive answer
- positive fraction * negative fraction = negative answer

B. Fractions should be simplified/reduced/canceled before multiplying. Any numerator may be canceled only with any denominator. Look for a common factor.

Example: $\frac{3}{10} * \frac{4}{9}$

Numerator 3 and denominator 9 have a common factor of 3. Divide each by 3.

Result is: $\frac{1}{10} * \frac{4}{3}$

Numerator 4 and denominator 10 have a common factor of 2. Divide each by 2.

Result is: $\frac{1}{5} * \frac{2}{3}$

C. After simplifying the fractions, multiply numerator by numerator and then multiply denominator by denominator.

Numerator: $1 * 2 = 2$

Denominator: $5 * 3 = 15$

Result is: $\frac{2}{15}$

Try these.

59. _____ $\frac{-5}{8} * \frac{-2}{5}$

63. _____ $\frac{-8}{11} * \frac{-4}{7}$

60. _____ $\frac{7}{9} * \frac{-3}{4}$

64. _____ $\frac{2}{5} * \frac{6}{5}$

61. _____ $\frac{-6}{7} * \frac{-4}{5}$

65. _____ $\frac{-5}{13} * \frac{-4}{7}$

62. _____ $\frac{3}{5} * \frac{4}{5}$

66. _____ $\frac{-2}{3} * \frac{4}{7}$

8.) Dividing Fractions

A. Just like multiplication of fractions,

- a. if both fractions are positive, the answer will be positive
- b. if both fractions are negative, the answer will be positive
- c. if one fraction is positive and one fraction is negative, the answer will be negative

B. Steps:

Step 1: Dividing by a fraction is the same as multiplying by its reciprocal. Change the division operation to multiplication and flip the second fraction.

Example: $\frac{4}{7} \div \frac{2}{3}$

Change this to $\frac{4}{7} * \frac{3}{2}$

Step 2: Determine if the expression can be simplified.

Numerator 4 and denominator 2 have a common factor of 2. Divide each by

2.

Result is: $\frac{2}{7} * \frac{3}{1}$

Step 3: Multiply the two fractions using the steps in the previous section.

Results is: $\frac{6}{7}$

Try these.

67. _____ $\frac{-5}{8} \div \frac{-2}{5}$

71. _____ $\frac{-8}{11} \div \frac{-4}{7}$

68. _____ $\frac{7}{9} \div \frac{-3}{4}$

72. _____ $\frac{2}{5} \div \frac{4}{5}$

69. _____ $\frac{-6}{7} \div \frac{-4}{5}$

73. _____ $\frac{-5}{13} \div \frac{-4}{7}$

70. _____ $\frac{3}{5} \div \frac{1}{5}$

74. _____ $\frac{-2}{3} \div \frac{4}{7}$

9.) Properties

In Algebra 1, you will be asked to identify certain properties. These are properties that are the “rules” of Algebra that allow us to work the problems in certain ways. Here is a list of properties that you should be able to recognize:

Associative Property: Addition: $1 + (2 + 3) = (1 + 2) + 3$
Multiplication: $1 * (2 * 3) = (1 * 2) * 3$

Commutative Property: Addition: $1 + 2 = 2 + 1$
Multiplication: $1 * 2 = 2 * 1$

Distributive: $2(x + 3) = 2x + 6$

Additive Inverses: $4 + (-4) = 0$

Multiplicative Inverses: $4 * \frac{1}{4} = 1$

Additive Identity: $1 + 0 = 1$

Multiplicative Identity: $5 * 1 = 5$

Determine if the expressions are True or False. If True, state what property is shown.

75. _____ $4 + 3 = 3 + 4$

76. _____ $(2 + 3) + 5 = 2 + (3 + 5)$

77. _____ $4(2 + 3) = 4(2) + 4(3)$

78. _____ $5 + (-5) = 1$

79. _____ $9(4 - 2) = (9 - 4) * (9 - 2)$

80. _____ $5 * 4 = 4 * 5$

81. _____ $7 - 8 = 8 - 7$

82. _____ $2 + 0 = 2$

10.) Adding Decimals

- A. Just like adding integers and fractions,
- a) if both decimals are positive, the answer will be positive
 - b) if both decimals are negative, the answer will be negative
 - c) if one decimal is positive and one decimal is negative, follow the steps for adding integers to determine the sign of the answer

B. Steps for determine the numeric answer:

Step 1: To add decimals, line up the numbers vertically with the decimal points under each other.

Example: $2.91 + 56.8$

Rewrite as:

$$\begin{array}{r} 2.91 \\ + 56.8 \\ \hline \end{array}$$

Step 2: Add down the columns, keeping the decimal point in the same place.
Result is: 59.71

Try these.

83. _____ $3.45 + 4.32$

87. _____ $(-4.567) + 2.56$

84. _____ $4.2345 + (-4.343)$

88. _____ $2.32 + 4.673$

85. _____ $1.23 + 2.345$

89. _____ $(-33.4) + 22.45$

86. _____ $(-32.455) + (-23.4534)$

90. _____ $(-3.75) + 4.321$

11.) Subtracting Decimals

A. Just like subtracting integers or fractions, change the subtraction to addition of a negative number.

Example: $5.18 - 6.09$ Change to $5.18 + (-6.09)$

B. Follow the steps for adding decimals.

a) The answer will be negative.

b) The numeric answer is 0.91

c) Combine the parts and the answer is -0.91.

Try these.

91. _____ $3.45 - 4.32$

95. _____ $(-4.567) - 2.56$

92. _____ $4.2345 - (-4.343)$

96. _____ $2.32 - 4.673$

93. _____ $1.23 - 2.345$

97. _____ $(-33.4) - 22.45$

94. _____ $(-32.455) - (-23.4534)$

98. _____ $(-3.75) - 4.321$

12.) Multiplying Decimals

A. Just like multiplying integers or fractions:

- a) if both numbers are positive, the answer will be positive
- b) if both numbers are negative, the answer will be positive
- c) if one number is positive and one number is negative, the answer will be negative

Example: $5.1 * (-6.01)$

The answer will be negative.

B. Count the total number of decimal places to the right of the decimal point in each number. Add the two numbers and the answer will have this many decimal places.

In the example, there is 1 decimal place in the first number and 2 decimal places in the second number. $1 + 2 = 3$ Therefore the answer will have a total of 3 decimal places.

C. Ignore the decimal points and any negative signs then multiply the two numbers.

$$51 * 601 = 30651$$

D. Temporarily place the decimal point after the rightmost number.
30651.

E. Move decimal point to the left the number of decimal places previously identified for the answer (B above). Therefore, move the decimal point 3 places to the left.

$$30.651$$

F. Combine all parts for the answer.

$$\text{Result: } -30.651$$

Try these.

99. _____ $3.45 * 4.32$

103. _____ $(-4.56) * 2.56$

100. _____ $4.2346 * (-4.3)$

104. _____ $2.32 * 4.673$

101. _____ $1.23 * 2.345$

105. _____ $(-33.4) * 22.45$

102. _____ $(-32.4) * (-23.45)$

106. _____ $(-3.75) * 4.321$

13.) Dividing Decimals

A. Just as in dividing integers or fractions,

a) if both numbers are positive, the answer is positive

b) if both numbers are negative, the answer is positive

c) if one number is positive and one number is negative, the answer is negative

B. Steps to determine the numeric answer.

Step 1: Write as a traditional division problem.

Example: $7.164 \div 1.8$

Rewrite as $1.8 \overline{)7.164}$

Step 2: No decimal places are allowed in the divisor. Since 1.8 has one decimal place to the right of the decimal point, move the decimal point to the right one place. Because the decimal is moved in the divisor, it must also be moved the same amount of places in the dividend.

Result is: $18 \overline{)71.64}$

Step 3: Put the decimal place in the quotient right above the decimal place in the dividend.

Result is: $18 \overline{)71.64}$

Step 4: Ignoring the decimal points, perform division.

Result is: $18 \overline{)71.64}$

Try these.

107. _____ $3.4 \div 4.2$

111. _____ $(-4) \div 2.56$

108. _____ $4.345 \div (-4.3)$

112. _____ $2.32 \div 4.6$

109. _____ $1.23 \div 2$

113. _____ $(-33.4) \div 2.45$

110. _____ $(-32.5) \div (-23.4)$

114. _____ $(-3.75) \div 4.3$

Answer Key

Adding Integers

- 1.
2. -9
3. 32
4. -19
5. 17
6. -9
7. -22
8. -35

Subtracting Integers

9. -9
10. 3
11. 4
12. 49
13. -51
14. -9
15. 68
16. -11

Multiplying Integers

17. -20
18. 18
19. 117
20. -510
21. -578
22. -252
23. -1045
24. 276

Dividing Integers

25. -4
26. 3
27. -8
28. -4
29. 8
30. -7
31. -4
32. -27

Adding Fractions

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

34. $\frac{5}{6}$

35. $\frac{8}{9}$

36. $\frac{6}{7}$

37. $\frac{-4}{5}$

38. $\frac{-7}{8}$

39. $\frac{-4}{6}$

40. $\frac{-7}{10}$

41. $\frac{6}{11}$

42. $\frac{1}{9}$

43. $\frac{-2}{2}$

44. $\frac{-3}{8}$

45. $\frac{-2}{21}$

46. $\frac{1}{36}$

47. $\frac{-58}{35}$

48. $\frac{-41}{40}$

49. $\frac{-100}{77}$

50. $\frac{31}{21}$

Subtracting Fractions

51. $\frac{2591}{40}$

52. $\frac{55}{36}$

53. $\frac{-2}{35}$

54. $\frac{-1}{5}$

55. $\frac{-12}{77}$

56. $\frac{-1}{3}$

57. $\frac{9}{77}$

58. $\frac{-26}{21}$

Multiplying Fractions

59. $\frac{1}{4}$

60. $\frac{-7}{12}$

61. $\frac{24}{35}$

62. $\frac{12}{25}$

63. $\frac{32}{77}$

64. $\frac{12}{25}$

65. $\frac{20}{91}$

66. $\frac{-8}{21}$

Dividing Fractions

67. $\frac{25}{16}$

68. $\frac{-28}{27}$

69. $\frac{15}{14}$

70. 3

71. $\frac{14}{11}$

72. $\frac{1}{2}$

73. $\frac{35}{52}$

74. $\frac{-7}{6}$

Properties

75. True, Commutative Property

76. True, Associative Property

77. True, Distributive Property

78. False

79. False

80. True, Commutative Property

81. False

82. True, Additive Identity

Adding Decimals

83. 7.77

84. -.1085

85. 3.575

86. -55.9084

87. -2.007

88. 6.993

89. -10.95

90. .571

Subtracting Decimals

- 91. $-.87$
- 92. 8.5775
- 93. -1.115
- 94. -9.0016
- 95. -7.127
- 96. -2.353
- 97. -55.85
- 98. -8.071

Multiplying Decimals

- 99. 14.904
- 100. -18.20878
- 101. 2.88435
- 102. 759.78
- 103. -11.6736
- 104. 10.84136
- 105. -749.83
- 106. -16.20375

Dividing Decimals

- 107. $.809524$
- 108. -1.010465
- 109. $.615$
- 110. 1.388889
- 111. -1.5625
- 112. $.504348$
- 113. -13.632653
- 114. $-.872093$