

WELCOME TO 8TH GRADE MATH

Dear Students and Parents,

As an 8th grader, it is important to be able to solve operations with positive and negative numbers. This is prerequisite material needed to be successful next year. Please complete the attached packet.

- This summer packet must be completed BEFORE the first day of school.
- You are to show all work. (no calculator)
- Packets will be graded as a homework assignment.
- Packets will be collected the first day of school.
- You will be given a test on this material within the first week of school that will count toward your first marking period grade.

Do not expect to complete this packet in one sitting. It is recommended that you work on one worksheet at a time. Plan to take your time when working on these problems. You may use another sheet of paper if there is not enough room to show your work. Showing work demonstrates to your teacher that you fully understand the concepts.

If you need help, you can go to <http://www.khanacademy.org> and sign up (free) to begin using this on-line learning tool.

Students and Parents: To show that you have read and understood the instructions above, please sign below and return it to your teacher on the first day of school.

Thank you, and have a great summer!

Student Name: _____ (print)

Student Signature: _____

Parent Signature: _____

1-4**Study Guide and Intervention****Adding Integers**

To add integers with the same sign, add their absolute values. Give the result the same sign as the integers.

EXAMPLE 1 Find $-3 + (-4)$.

$-3 + (-4) = -7$ Add $|-3| + |-4|$. Both numbers are negative, so the sum is negative.

To add integers with different signs, subtract their absolute values. Give the result the same sign as the integer with the greater absolute value.

EXAMPLE 2 Find $-16 + 12$.

$-16 + 12 = -4$ Subtract $|12|$ from $|-16|$. The sum is negative because $|-16| > |12|$.

EXERCISES

Add.

1. $9 + 16$

2. $-10 + (-10)$

3. $18 + (-26)$

4. $-23 + (-15)$

5. $-45 + 35$

6. $39 + (-38)$

7. $-55 + 81$

8. $-61 + (-39)$

9. $-74 + 36$

10. $5 + (-4) + 8$

11. $-3 + 10 + (-6)$

12. $-13 + (-8) + (-12)$

13. $3 + (-10) + (-16) + 11$

14. $-17 + 31 + (-14) + 26$

Evaluate each expression if $x = 4$ and $y = -3$.

15. $11 + y$

16. $x + (-6)$

17. $y + 2$

18. $|x + y|$

19. $|x| + y$

20. $x + |y|$

1-4**Practice: Skills***Adding Integers*

Add.

1. $-2 + (-3)$

2. $4 + 7$

3. $-8 + 9$

4. $12 + (-3)$

5. $-27 + 18$

6. $-11 + (-13)$

7. $-44 + 26$

8. $44 + (-26)$

9. $-15 + (-51)$

10. $(-17) + (-13)$

11. $53 + (-28)$

12. $-86 + 77$

13. $10 + (-4) + 6$

14. $-16 + (-5) + 12$

15. $-2 + 17 + (-12)$

16. $-35 + (-31) + (-39)$

17. $8 + (-12) + 15 + (-13)$

18. $-23 + (-18) + 41 + (-17)$

Evaluate each expression if $a = -9$, $b = -12$, and $c = 8$.

19. $3 + a$

20. $b + 8$

21. $-6 + c$

22. $|a| + b$

23. $|a| + |c|$

24. $|b + c|$

Study Guide and Intervention

Subtracting Integers

To subtract an integer, add its opposite or additive inverse.

EXAMPLE 1 Find $8 - 15$.

$$\begin{aligned} 8 - 15 &= 8 + (-15) && \text{To subtract 15, add -15.} \\ &= -7 && \text{Add.} \end{aligned}$$

EXAMPLE 2 Find $13 - (-22)$.

$$\begin{aligned} 13 - (-22) &= 13 + 22 && \text{To subtract -22, add 22.} \\ &= 35 && \text{Add.} \end{aligned}$$

EXERCISES

Subtract.

1. $-3 - 4$

2. $5 - (-2)$

3. $-10 - 8$

4. $-15 - (-12)$

5. $-23 - (-28)$

6. $16 - 9$

7. $9 - 16$

8. $-21 - 16$

9. $28 - 37$

10. $-34 - (-46)$

11. $65 - (-6)$

12. $19 - |29|$

Evaluate each expression if $a = -7$, $b = -3$, and $c = 5$.

13. $a - 8$

14. $20 - b$

15. $a - c$

16. $c - b$

17. $b - a - c$

18. $c - b - a$

Practice: Skills

Subtracting Integers

Subtract.

1. $6 - 7$

2. $12 - 8$

3. $-9 - 9$

4. $-17 - 18$

5. $-13 - (-25)$

6. $14 - (-19)$

7. $-25 - 15$

8. $21 - (-23)$

9. $-34 - (-11)$

10. $56 - 94$

11. $38 - (-39)$

12. $72 - 27$

13. $-36 - 47$

14. $-33 - (-68)$

15. $76 - 18$

16. $4 - |-6|$

17. $|-10| - |7|$

18. $|-52| - 49$

Evaluate each expression if $k = 8$, $m = -7$, and $p = -10$.

19. $k - 19$

20. $19 - m$

21. $p - 11$

22. $k - m$

23. $p - m$

24. $m - 3$

25. $m - k$

26. $k - m + 16$

27. $k - m - p$

Study Guide and Intervention

Multiplying and Dividing Integers

Use the following rules to determine whether the product or quotient of two integers is positive or negative.

- The product of two integers with different signs is negative.
- The product of two integers with the same sign is positive.
- The quotient of two integers with different signs is negative.
- The quotient of two integers with the same sign is positive.

EXAMPLE 1 Find $7(-4)$.

$7(-4) = -28$ The factors have different signs. The product is negative.

EXAMPLE 2 Find $-5(-6)$.

$-5(-6) = 30$ The factors have the same sign. The product is positive.

EXAMPLE 3 Find $15 \div (-3)$.

$15 \div (-3) = -5$ The dividend and divisor have different signs. The quotient is negative.

EXAMPLE 4 Find $-54 \div (-6)$.

$-54 \div (-6) = 9$ The dividend and divisor have the same sign. The quotient is positive.

EXERCISES

Multiply or divide.

1. $8(-8)$

2. $-3(-7)$

3. $-9(4)$

4. $12(8)$

5. $33 \div (-3)$

6. $-25 \div 5$

7. $48 \div 4$

8. $-63 \div (-7)$

9. $(-4)^2$

10. $\frac{-75}{15}$

11. $-6(3)(-5)$

12. $\frac{-143}{-13}$

Evaluate each expression if $a = -1$, $b = 4$, and $c = -7$.

13. $3c + b$

14. $a(b + c)$

15. $c^2 - 5b$

16. $\frac{a - 6}{c}$

Practice: Skills*Multiplying and Dividing Integers*

Multiply.

1. $-2 \cdot 3$

2. $3(-3)$

3. $-4(-2)$

4. $5 \cdot 7$

5. $-9(-8)$

6. $-11 \cdot 12$

7. $15(-3)$

8. $-7(-13)$

9. $-5(2)(-7)$

10. $(-10)^2$

11. $6(8)(-3)$

12. $(-4)^3$

13. $(-9)^2$

14. $-1(-3)(-4)$

15. $(-10)^3$

16. $-3(-4)(-7)$

Divide.

17. $-15 \div 3$

18. $40 \div (-5)$

19. $-63 \div (-7)$

20. $76 \div 4$

21. $\frac{-56}{-4}$

22. $\frac{-48}{16}$

23. $\frac{-57}{-19}$

24. $\frac{75}{-5}$

Evaluate each expression if $a = -2$, $b = 5$, and $c = -6$.

25. abc

26. $2b + c$

27. $\frac{2b - c}{a}$

28. $ab - c$

29. $\frac{c}{a + b}$

30. $\frac{2a + c}{b}$

31. $b^2 - 5a$

32. $(-c)^2$

2-5

Study Guide and Intervention

Adding and Subtracting Like Fractions

Lesson 2-5

Fractions that have the same denominator are called like fractions. To add like fractions, add the numerators of the fractions and write the sum over the denominator.

EXAMPLE 1 Find $\frac{1}{5} + \left(-\frac{4}{5}\right)$. Write in simplest form.

$$\begin{aligned} \frac{1}{5} + \left(-\frac{4}{5}\right) &= \frac{1 + (-4)}{5} && \text{Add the numerators. The denominators are the same.} \\ &= \frac{-3}{5} \text{ or } -\frac{3}{5} && \text{Simplify.} \end{aligned}$$

To subtract like fractions, subtract the numerators of the fractions and write the sum over the denominator.

EXAMPLE 2 Find $-\frac{4}{9} - \frac{7}{9}$. Write in simplest form.

$$\begin{aligned} -\frac{4}{9} - \frac{7}{9} &= \frac{-4 - 7}{9} && \text{Subtract the numerators. The denominators are the same.} \\ &= \frac{-11}{9} \text{ or } -1\frac{2}{9} && \text{Rename } \frac{-11}{9} \text{ as } -1\frac{2}{9}. \end{aligned}$$

To add or subtract mixed numbers, first write the mixed numbers as improper fractions. Then add or subtract the improper fractions and simplify the result.

EXAMPLE 3 Find $2\frac{3}{7} + 6\frac{5}{7}$. Write in simplest form.

$$\begin{aligned} 2\frac{3}{7} + 6\frac{5}{7} &= \frac{17}{7} + \frac{47}{7} && \text{Write the mixed numbers as improper fractions.} \\ &= \frac{17 + 47}{7} && \text{Add the numerators. The denominators are the same.} \\ &= \frac{64}{7} \text{ or } 9\frac{1}{7} && \text{Rewrite } \frac{64}{7} \text{ as } 9\frac{1}{7}. \end{aligned}$$

EXERCISES

Add or subtract. Write in simplest form.

- | | | |
|-----------------------------------|---|--|
| 1. $\frac{4}{7} + \frac{2}{7}$ | 2. $\frac{1}{10} + \frac{5}{10}$ | 3. $\frac{5}{9} + -\frac{1}{9}$ |
| 4. $\frac{1}{6} + -\frac{5}{6}$ | 5. $-\frac{3}{8} + \frac{7}{8}$ | 6. $\frac{5}{11} - \left(-\frac{4}{11}\right)$ |
| 7. $-\frac{4}{5} - \frac{3}{5}$ | 8. $-\frac{9}{13} + \left(-\frac{6}{13}\right)$ | 9. $2\frac{1}{4} + 1\frac{1}{4}$ |
| 10. $3\frac{5}{7} + 2\frac{3}{7}$ | 11. $3\frac{5}{8} - 1\frac{3}{8}$ | 12. $4\frac{3}{5} - 2\frac{4}{5}$ |

2-5**Practice: Skills****Adding and Subtracting Like Fractions**

Add or subtract. Write in simplest form.

1. $\frac{1}{5} + \frac{3}{5}$

2. $\frac{2}{9} + \frac{5}{9}$

3. $\frac{7}{11} + \frac{3}{11}$

4. $-\frac{1}{4} + \frac{3}{4}$

5. $-\frac{4}{9} + \frac{8}{9}$

6. $-\frac{5}{7} + \frac{2}{7}$

7. $\frac{7}{12} + \frac{5}{12}$

8. $\frac{1}{9} + \left(-\frac{4}{9}\right)$

9. $-\frac{5}{7} + \left(-\frac{3}{7}\right)$

10. $-\frac{9}{16} + \left(-\frac{3}{16}\right)$

11. $\frac{5}{8} - \frac{3}{8}$

12. $\frac{13}{19} - \frac{6}{19}$

13. $\frac{2}{7} - \frac{6}{7}$

14. $\frac{4}{15} - \frac{7}{15}$

15. $\frac{1}{9} - \left(-\frac{4}{9}\right)$

16. $\frac{3}{13} - \left(-\frac{11}{13}\right)$

17. $2\frac{3}{7} + 1\frac{2}{7}$

18. $1\frac{4}{15} + 4\frac{8}{15}$

19. $5\frac{6}{7} - 3\frac{2}{7}$

20. $6\frac{7}{12} - 3\frac{1}{12}$

21. $-2\frac{5}{11} - 7\frac{1}{11}$

22. $-4\frac{3}{8} - 2\frac{7}{8}$

23. $5\frac{2}{9} - 2\frac{4}{9}$

24. $8\frac{1}{5} - 4\frac{2}{5}$

2-3

Study Guide and Intervention

Multiplying Rational Numbers

To multiply fractions, multiply the numerators and multiply the denominators.

EXAMPLE 1 Find $\frac{3}{8} \cdot \frac{4}{11}$. Write in simplest form.

$$\begin{aligned} \frac{3}{8} \cdot \frac{4}{11} &= \frac{3}{\cancel{8}^2} \cdot \frac{\cancel{4}^1}{11} && \text{Divide 8 and 4 by their GCF, 4.} \\ &= \frac{3 \cdot 1}{2 \cdot 11} && \text{Multiply the numerators and denominators.} \\ &= \frac{3}{22} && \text{Simplify.} \end{aligned}$$

To multiply mixed numbers, first rewrite them as improper fractions.

EXAMPLE 2 Find $-2\frac{1}{3} \cdot 3\frac{3}{5}$. Write in simplest form.

$$\begin{aligned} -2\frac{1}{3} \cdot 3\frac{3}{5} &= -\frac{7}{3} \cdot \frac{18}{5} && -2\frac{1}{3} = -\frac{7}{3}, 3\frac{3}{5} = \frac{18}{5} \\ &= -\frac{7}{\cancel{3}^1} \cdot \frac{\cancel{18}^6}{5} && \text{Divide 18 and 3 by their GCF, 3.} \\ &= -\frac{7 \cdot 6}{1 \cdot 5} && \text{Multiply the numerators and denominators.} \\ &= -\frac{42}{5} && \text{Simplify.} \\ &= -8\frac{2}{5} && \text{Write the result as a mixed number.} \end{aligned}$$

EXERCISES

Multiply. Write in simplest form.

- | | | |
|--|--|---|
| 1. $\frac{2}{3} \cdot \frac{3}{5}$ | 2. $\frac{4}{7} \cdot \frac{3}{4}$ | 3. $\frac{1}{2} \cdot \frac{7}{9}$ |
| 4. $\frac{9}{10} \cdot \frac{2}{3}$ | 5. $\frac{5}{8} \cdot \left(-\frac{4}{9}\right)$ | 6. $-\frac{4}{7} \cdot \left(-\frac{2}{3}\right)$ |
| 7. $2\frac{2}{5} \cdot \frac{1}{6}$ | 8. $-3\frac{1}{3} \cdot 1\frac{1}{2}$ | 9. $3\frac{3}{7} \cdot 2\frac{5}{8}$ |
| 10. $-1\frac{7}{8} \cdot \left(-2\frac{2}{5}\right)$ | 11. $-1\frac{3}{4} \cdot 2\frac{1}{5}$ | 12. $2\frac{2}{3} \cdot 2\frac{3}{7}$ |

Lesson 2-3

2-3**Practice: Skills****Multiplying Rational Numbers**

Multiply. Write in simplest form.

1. $\frac{1}{8} \cdot \frac{2}{3}$

2. $\frac{2}{9} \cdot \frac{7}{8}$

3. $\frac{5}{6} \cdot \frac{3}{11}$

4. $-\frac{4}{7} \cdot \frac{3}{10}$

5. $\frac{2}{9} \cdot \left(-\frac{3}{8}\right)$

6. $-\frac{3}{5} \cdot \left(-\frac{5}{9}\right)$

7. $1\frac{3}{4} \cdot \frac{2}{3}$

8. $\frac{4}{5} \cdot 4\frac{3}{8}$

9. $-\frac{2}{15} \cdot 5\frac{5}{6}$

10. $-1\frac{3}{7} \cdot 1\frac{1}{5}$

11. $-2\frac{1}{4} \cdot 1\frac{2}{3}$

12. $1\frac{9}{16} \cdot 2\frac{4}{5}$

13. $-3\frac{1}{7} \cdot \left(-1\frac{2}{11}\right)$

14. $2\frac{2}{3} \cdot \left(-2\frac{1}{4}\right)$

15. $\left(-\frac{4}{5}\right)\left(-\frac{4}{5}\right)$

ALGEBRA Evaluate each expression if $r = \frac{5}{6}$, $s = -\frac{1}{3}$, $t = \frac{4}{5}$, and $v = -\frac{3}{4}$.

16. rv

17. st

18. rs

19. stv

20. rst

21. rtv

ALGEBRA Evaluate each expression if $a = -\frac{5}{9}$, $b = -\frac{1}{5}$, $c = \frac{2}{3}$, and $d = \frac{3}{4}$.

22. ad

23. bc

24. abc

2-4

Study Guide and Intervention

Dividing Rational Numbers

Two numbers whose product is 1 are multiplicative inverses, or reciprocals, of each other.

EXAMPLE 1 Write the multiplicative inverse of $-2\frac{3}{4}$.

$-2\frac{3}{4} = -\frac{11}{4}$ Write $-2\frac{3}{4}$ as an improper fraction.

Since $-\frac{11}{4} \left(-\frac{4}{11}\right) = 1$, the multiplicative inverse of $-2\frac{3}{4}$ is $-\frac{4}{11}$.

To divide by a fraction or mixed number, multiply by its multiplicative inverse.

EXAMPLE 2 Find $\frac{3}{8} \div \frac{6}{7}$. Write in simplest form.

$\frac{3}{8} \div \frac{6}{7} = \frac{3}{8} \cdot \frac{7}{6}$ Multiply by the multiplicative inverse of $\frac{6}{7}$, which is $\frac{7}{6}$.

$= \frac{1}{8} \cdot \frac{7}{2}$ Divide 6 and 3 by their GCF, 3.

$= \frac{7}{16}$ Simplify.

EXERCISES

Write the multiplicative inverse of each number.

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

2. $-\frac{8}{9}$

3. $\frac{1}{10}$

4. $-\frac{1}{6}$

5. $2\frac{3}{5}$

6. $-1\frac{2}{3}$

7. $-5\frac{2}{5}$

8. $7\frac{1}{4}$

Divide. Write in simplest form.

9. $\frac{1}{3} \div \frac{1}{6}$

10. $\frac{2}{5} \div \frac{4}{7}$

11. $-\frac{5}{6} \div \frac{3}{4}$

12. $1\frac{1}{5} \div 2\frac{1}{4}$

13. $3\frac{1}{7} \div \left(-3\frac{2}{3}\right)$

14. $-\frac{4}{9} \div 2$

15. $\frac{6}{11} \div (-4)$

16. $5 \div 2\frac{1}{3}$

2-4**Practice: Skills***Dividing Rational Numbers*

Write the multiplicative inverse of each number.

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

2. $-\frac{4}{7}$

3. $-\frac{1}{12}$

4. 22

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

6. $-\frac{14}{17}$

7. $1\frac{5}{7}$

8. $-1\frac{3}{13}$

9. $2\frac{3}{7}$

10. $-3\frac{6}{11}$

11. $4\frac{8}{15}$

12. $5\frac{3}{5}$

Divide. Write in simplest form.

13. $\frac{3}{7} \div \frac{3}{5}$

14. $\frac{2}{7} \div \frac{6}{7}$

15. $-\frac{5}{8} \div \frac{3}{4}$

16. $\frac{7}{9} \div \left(-\frac{14}{15}\right)$

17. $-\frac{4}{5} \div \frac{8}{9}$

18. $\frac{2}{11} \div \frac{4}{9}$

19. $1\frac{3}{4} \div 2\frac{1}{2}$

20. $-2\frac{3}{5} \div 1\frac{3}{10}$

21. $-3\frac{4}{7} \div \left(-1\frac{1}{14}\right)$

22. $\frac{10}{11} \div 5$

23. $-4 \div \frac{3}{5}$

24. $3\frac{4}{15} \div 4\frac{2}{3}$

25. $9\frac{1}{3} \div 5\frac{3}{5}$

26. $-12\frac{3}{4} \div \left(-2\frac{5}{6}\right)$

27. $2\frac{4}{9} \div \left(-6\frac{2}{7}\right)$

28. $-11\frac{1}{5} \div 3\frac{1}{9}$