Summer Math Packet

Bridgewater-Raynham Regional School District

Grade 7 into 8

• This packet is designed to help you retain the information you learned this year in 7th grade.

• The packet is due at the start of school 2021.

• You can download the packet from your school’s website at www.bridge-rayn.org.

• If you are stuck on a problem try the following list of websites as resources. You can also use your Glencoe Math online resources that you used throughout the year.

  www.glencoe.com  
  www.mathisfun.com  
  www.coolmath.com

  www.aplusmath.com  
  www.aaamath.com  
  www.sheppardsoftware.com

  www.mathgoodies.com  
  www.IXL.com

• This packet will be used as a review for your first quiz grade.

Have a great Summer
NO Calculator!
Show all work on this worksheet or on separate sheet!

Add Integers

To add integers with the same sign, add their absolute values. The sum is:
• positive if both integers are positive.
• negative if both integers are negative.

To add integers with different signs, subtract their absolute values. The sum is:
• positive if the positive integer's absolute value is greater.
• negative if the negative integer's absolute value is greater.

To add integers, it is helpful to use a number line.

Example 1
Find \(4 + (-6)\).

Use a number line.
• Start at 0.
• Move 4 units right.
• Then move 6 units left.

\[
\begin{align*}
4 + (-6) &= -2
\end{align*}
\]

Example 2
Find \(-2 + (-3)\).

Use a number line.
• Start at 0.
• Move 2 units left.
• Move another 3 units left.

\[
\begin{align*}
-2 + (-3) &= -5
\end{align*}
\]

Exercises
Add.
1. \(-5 + (-2)\)  
2. \(8 + 1\)  
3. \(-7 + 10\)
4. \(16 + (-11)\)  
5. \(-22 + (-7)\)  
6. \(-50 + 50\)
7. \(-10 + (-10)\)  
8. \(100 + (-25)\)  
9. \(-35 + (-20)\)
10. \(-7 + (-3) + 10\)  
11. \(-42 + 36 + (-36)\)  
12. \(-17 + 17 + 9\)

Write an addition expression to describe each situation. Then find each sum.

13. HAWK A hawk is in a tree 100 feet above the ground. It flies down to the ground.

14. RUNNING Leah ran 6 blocks north then back 4 blocks south.
Subtract Integers

To subtract an integer, add its opposite.

Example 1
Find 6 – 9.

\[ 6 - 9 = 6 + (-9) \]
\[ = -3 \]
To subtract 9, add -9.
Simplify.

Example 2

\[ -10 - (-12) = -10 + 12 \]
\[ = 2 \]
To subtract -12, add 12.
Simplify.

Example 3
Evaluate \( a - b \) if \( a = -3 \) and \( b = 7 \).

\[ a - b = -3 - 7 \]
\[ = -3 + (-7) \]
Replace \( a \) with -3 and \( b \) with 7.
\[ = -10 \]
To subtract 7, add -7.
Simplify.

Exercises
Subtract.

1. 7 – 9
2. 20 – (–6)
3. –10 – 4
4. 0 – 12
5. –7 – 8
6. 13 – 18
7. –20 – (–5)
8. –8 – (–6)
9. 25 – (–14)
10. –75 – 50
11. 15 – 65
12. 19 – (–10)

Evaluate each expression if \( m = -2 \), \( n = 10 \), and \( p = 5 \).

13. \( m - 6 \)
14. \( 9 - n \)
15. \( p - (-8) \)
16. \( p - m \)
17. \( m - n \)
18. \( -25 - p \)
Multiply Integers

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

Example 1
Find 5(–2).
5(–2) = –10 The integers have different signs. The product is negative.

Example 2
Find –3(7).
–3(7) = –21 The integers have different signs. The product is negative.

Example 3
Find –6(–9).
–6(–9) = 54 The integers have the same sign. The product is positive.

Example 4
Find (–7)^2.
(–7)^2 = (–7)(–7) There are 2 factors of –7.
= 49 The product is positive.

Example 5
–2(–3)(4) = 6(4) Multiply –2 and –3.
= 24 Multiply 6 and 4.

Exercises

Multiply.

1. –5(8)  
2. –3(–7)  
3. 10(–8)  
4. –8(3)  
5. –12(–12)  
6. (–8)^2  
7. –5(7)  
8. 3(–2)  
9. –6(–3)  
10. 5(–4)(5)  
11. –4(–4)  
12. 2(–3)(5)  
13. –2(–3)  
14. 9(–4)  
15. (–3)(–4)  
16. –3(–3)(5)  
17. –2(5)^2  
18. (–3)(–4)(5)
Divide Integers

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

Example 1
Find \(30 \div (-5)\).

\[
30 \div (-5) \quad \text{The integers have different signs.}
\]

\[
30 \div (-5) = -6 \quad \text{The quotient is negative.}
\]

Example 2
Find \(-100 \div (-5)\).

\[
-100 \div (-5) \quad \text{The integers have the same sign.}
\]

\[
-100 \div (-5) = 20 \quad \text{The quotient is positive.}
\]

Exercises

Divide.

1. \(-12 \div 4\)
2. \(-14 \div (-7)\)
3. \(\frac{18}{-2}\)
4. \(-6 \div (-3)\)
5. \(-10 \div 10\)
6. \(\frac{-80}{-20}\)
7. \(350 \div (-25)\)
8. \(-420 \div (-3)\)
9. \(\frac{540}{45}\)
10. \(\frac{-256}{16}\)

ALGEBRA

Evaluate each expression if \(d = -24\), \(e = -4\), and \(f = 8\).

11. \(12 \div e\)
12. \(40 \div f\)
13. \(d \div 6\)
14. \(d \div e\)
15. \(f \div e\)
16. \(e^2 \div f\)
17. \(\frac{-d}{e}\)
19. \(\frac{f + 8}{-4}\)
18. $ \frac{ef}{2}$

20. $\frac{d-e}{5}$
Terminating and Repeating Decimals

To write a fraction as a decimal, divide the numerator by the denominator. Division ends when the remainder is zero. You can use bar notation to indicate that a number pattern repeats indefinitely. A bar is written over the digits that repeat.

Example 1
Write \( \frac{3}{20} \) as a decimal.

\[
\begin{align*}
20 & \mid 3.00 \\
20 & \quad \text{Divide by 20.} \\
100 & \\
100 & \\
0 & \text{The remainder is 0.}
\end{align*}
\]

So, \( \frac{3}{20} = 0.15 \).

Example 2
Write \( \frac{5}{9} \) as a decimal.

\[
\begin{align*}
9 & \mid 5.000 \\
45 & \quad \text{The remainder after each step is 5.} \\
45 & \\
45 & \\
5 &
\end{align*}
\]

You can use bar notation 0.5 to indicate that 5 repeats forever.

So, \( \frac{5}{9} = 0.\overline{5} \).

Example 3
Write \(-0.32\) as a fraction in simplest form.

\[
\begin{align*}
-0.32 & = -\frac{32}{100} \\
& = -\frac{8}{25} \quad \text{Simplify.}
\end{align*}
\]

The 2 is in the hundredths place.

Exercises
Write each fraction or mixed number as a decimal. Use bar notation if the decimal is a repeating decimal.

1. \( \frac{8}{10} \)
2. \( -\frac{3}{5} \)
3. \( \frac{7}{11} \)

4. \( 4\frac{7}{8} \)
5. \( -\frac{13}{15} \)
6. \( 3\frac{47}{99} \)

Write each decimal as a fraction in simplest form.
7. –0.14

8. 0.3

9. 0.94

NO Calculator!
Show all work on this worksheet or on separate sheet!
Add and Subtract Unlike Fractions

To add or subtract fractions with different denominators,
• Rename the fractions using the least common denominator (LCD).
• Add or subtract as with like fractions.
• If necessary, simplify the sum or difference.

Example
Find $\frac{2}{3} + \frac{1}{4}$.

Method 1 Use a model.
\[
\begin{array}{c}
\frac{2}{3} \\
+ \ \frac{1}{4} \\
\hline
\frac{11}{12}
\end{array}
\]

Method 2 Use the LCD.
\[
\frac{2}{3} + \frac{1}{4} = \frac{2 \cdot 4}{3 \cdot 4} + \frac{1 \cdot 3}{4 \cdot 3}
\]
Rename using the LCD, 12.
\[
= \frac{8}{12} + \frac{3}{12} \text{ or } \frac{11}{12}
\]
Add the fractions.

Exercises
Add or subtract. Write in simplest form.

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

3. $\frac{7}{15} + (-\frac{5}{6})$
4. $\frac{2}{5} - \frac{1}{3}$

5. $\frac{5}{9} + (-\frac{5}{12})$
6. $\frac{11}{12} - \frac{3}{4}$

7. $\frac{7}{8} - (-\frac{1}{3})$
8. $\frac{7}{9} - \frac{1}{2}$
9. \( \frac{3}{10} + \frac{7}{12} \)

10. \( \frac{3}{5} + \frac{2}{3} \)
Multiply Fractions

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

\[
\frac{5}{6} \times \frac{3}{5} = \frac{5 \times 3}{6 \times 5} = \frac{15}{30} = \frac{1}{2}
\]

To multiply mixed numbers, rename each mixed number as an improper fraction. Then multiply the fractions.

\[
2 \frac{2}{3} \times 1 \frac{1}{4} = \frac{8}{3} \times \frac{5}{4} = \frac{40}{12} = \frac{3}{3}
\]

Example 1
Find \(\frac{2}{3} \times \frac{4}{5}\). Write in simplest form.

\[
\frac{2}{3} \times \frac{4}{5} = \frac{2 \times 4}{3 \times 5} \quad \text{← Multiply the numerators.}
\]

\[
= \frac{8}{15} \quad \text{← Multiply the denominators. Simplify.}
\]

Example 2
Find \(\frac{1}{3} \times 2\frac{1}{2}\). Write in simplest form.

\[
\frac{1}{3} \times 2\frac{1}{2} = \frac{1 \times 5}{2} \quad \text{Rename } 2\frac{1}{2} \text{ as an improper fraction, } \frac{5}{2}
\]

\[
= \frac{5}{3 \times 2} \quad \text{Multiply.}
\]

\[
= \frac{5}{6} \quad \text{Simplify.}
\]

Exercises
Multiply. Write in simplest form.

1. \(\frac{2}{3} \times \frac{2}{3}\)
2. \(\frac{1}{2} \times \frac{7}{8}\)
3. \(-\frac{1}{3} \times \frac{3}{5}\)
4. \(\frac{5}{9} \times 4\)
5. \(1\frac{2}{3} \times (-\frac{3}{5})\)
6. \(3\frac{3}{4} \times 1\frac{1}{6}\)
7. \(\frac{3}{4} \times 1\frac{2}{3}\)
8. \(-3\frac{1}{3} \times (-2\frac{1}{2})\)
9. \(4\frac{1}{5} \times \frac{1}{7}\)
NO Calculator!
Show all work on this worksheet or on separate sheet!

10. \( \frac{7}{5} \times 8 \)  
    \[ \frac{7}{5} \times 8 = \frac{56}{5} = 11.2 \]

11. \(-2 \cdot \frac{1}{4} \)  
    \[ -2 \cdot \frac{1}{4} = -\frac{1}{2} \]

12. \( 1 \times \frac{3^2}{4} \)  
    \[ 1 \times \frac{3^2}{4} = \frac{9}{4} = 2.25 \]
**Divide Fractions**

To divide by a fraction, multiply by its multiplicative inverse or reciprocal. To divide by a mixed number, rename the mixed number as an improper fraction.

Example

Find \(3 \frac{1}{3} \div \frac{2}{9}\). Write in simplest form.

\[
3 \frac{1}{3} \div \frac{2}{9} = \frac{10}{3} \div \frac{2}{9}
\]

Rename \(3 \frac{1}{3}\) as an improper fraction.

\[
= \frac{10}{3} \cdot \frac{9}{2}
\]

Multiply by the reciprocal of \(\frac{2}{9}\), which is \(\frac{9}{2}\).

\[
= \frac{10 \cdot 9}{3 \cdot 2}
\]

Divide out common factors.

\[
= \frac{5 \cdot 3}{1 \cdot 1}
\]

Multiply.

\[
= 15
\]

Exercises

Divide. Write in simplest form.

1. \(\frac{2}{3} \div \frac{1}{4}\)

2. \(\frac{2}{5} \div \frac{5}{6}\)

3. \(-\frac{1}{2} \div \frac{1}{5}\)

4. \(5 \div \left(-\frac{1}{2}\right)\)

5. \(\frac{5}{8} \div 10\)

6. \(7 \frac{1}{3} \div 2\)

7. \(\frac{5}{6} \div 3 \frac{1}{2}\)

8. \(36 \div 1 \frac{1}{2}\)

9. \(-2 \frac{1}{2} \div (-10)\)

10. \(\frac{5}{2} \div 1 \frac{4}{5}\)

11. \(6 \frac{2}{3} \div 3 \frac{1}{9}\)

12. \(4 \frac{1}{4} \div \frac{2}{8}\)
13. \( \frac{46}{7} \div \frac{27}{7} \)  

14. \( 12 \div \left(-\frac{2}{2}\right) \)  

15. \( \frac{4}{6} \div \frac{3}{6} \)
Algebraic Expressions

To evaluate an algebraic expression you replace each variable with its numerical value, then use the order of operations to simplify.

Example 1
Evaluate $6x - 7$ if $x = 8$.

\[
6x - 7 = 6(8) - 7 \quad \text{Replace } x \text{ with 8.}
\]

\[
= 48 - 7 \quad \text{Use the order of operations.}
\]

\[
= 41 \quad \text{Subtract 7 from 48.}
\]

Example 2
Evaluate $5m - 3n$ if $m = 6$ and $n = 5$.

\[
5m - 3n = 5(6) - 3(5) \quad \text{Replace } m \text{ with 6 and } n \text{ with 5.}
\]

\[
= 30 - 15 \quad \text{Use the order of operations.}
\]

\[
= 15 \quad \text{Subtract 15 from 30.}
\]

Example 3
Evaluate $\frac{ab}{3}$ if $a = 7$ and $b = 6$.

\[
\frac{ab}{3} = \frac{(7)(6)}{3} \quad \text{Replace } a \text{ with 7 and } b \text{ with 6.}
\]

\[
= \frac{42}{3} \quad \text{The fraction bar is like a grouping symbol.}
\]

\[
= 14 \quad \text{Divide.}
\]

Example 4
Evaluate $x^3 + 4$ if $x = 3$.

\[
x^3 + 4 = 3^3 + 4 \quad \text{Replace } x \text{ with 3.}
\]

\[
= 27 + 4 \quad \text{Use the order of operations.}
\]

\[
= 31 \quad \text{Add 27 and 4.}
\]

Exercises
Evaluate each expression if $a = 4$, $b = 2$, and $c = 7$.

1. $3ac$
2. $5b^3$
3. $abc$

4. $5 + 6c$
5. $\frac{ab}{8}$
6. $2a - 3b$

7. $\frac{b^4}{4}$
8. $c - a$
9. $20 - bc$
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<td><strong>13.</strong> $7c$</td>
<td><strong>14.</strong> $6a - b$</td>
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