

Dear Parents,

I am writing to inform you that your child will be a member of our Pre-Algebra class for the 2009-2010 school year. Dr. Edmondson and the middle school math team feel that your child would be best suited for the Pre-Algebra course for next year after reviewing your student's current math grade, Algebra Placement Test, standardized test scores along with your child's study and work habits. Our goal is for each student to be successful and challenged at a level best suited to address his/her needs.

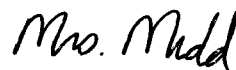
In order for your child to be ready for Pre-Algebra, we are suggesting that he/she have mastered certain prerequisite skills. Although we feel that your child has mastered the following skills, there may be need for "freshening up" on these skills over the summer. The prerequisite skills include:

- Mental math skills
- Order of operations
- Integer operations (adding, subtracting, multiplying and dividing negative and positive numbers)
- Multiply/divide decimals
- Fraction operations (addition, subtraction, multiplication and division)
- Simplifying fractions

I am attaching several pages with brief summaries of some of the skills to assist your child in reviewing these concepts. Additional information on these skills and practice quizzes are available with the online 7<sup>th</sup> grade textbook. Your child should have the address and password for the textbook in the front of his/her agenda book. Summer assignment packets will be collected on the first day of school. Your child should show all work and calculators should not be used.

We hope that you have a wonderful summer. I look forward to having your child in class this fall. Feel free to contact me if you have any further questions in this regard.

Thank you,



Mrs. Mudd

**Study Guide and Intervention****Order of Operations**

Use the **order of operations** to evaluate numerical expressions.

1. Do all operations within grouping symbols first.
2. Evaluate all powers before other operations.
3. Multiply and divide in order from left to right.
4. Add and subtract in order from left to right.

**EXAMPLE 1** Evaluate  $(10 - 2) - 4 \cdot 2$ .

$$\begin{aligned} (10 - 2) - 4 \cdot 2 &= 8 - 4 \cdot 2 && \text{Subtract first since } 10 - 2 \text{ is in parentheses.} \\ &= 8 - 8 && \text{Multiply 4 and 2.} \\ &= 0 && \text{Subtract 8 from 8.} \end{aligned}$$

**EXAMPLE 2** Evaluate  $8 + (1 + 5)^2 \div 4$ .

$$\begin{aligned} 8 + (1 + 5)^2 \div 4 &= 8 + 6^2 \div 4 && \text{First, add 1 and 5 inside the parentheses.} \\ &= 8 + 36 \div 4 && \text{Find the value of } 6^2. \\ &= 8 + 9 && \text{Divide 36 by 4.} \\ &= 17 && \text{Add 8 and 9.} \end{aligned}$$

**EXERCISES**

Evaluate each expression.

1.  $(1 + 7) \times 3$

2.  $28 - 4 \cdot 7$

3.  $5 + 4 \cdot 3$

4.  $(40 \div 5) - 7 + 2$

5.  $35 \div 7(2)$

6.  $3 \times 10^3$

7.  $45 \div 5 + 36 \div 4$

8.  $42 \div 6 \times 2 - 9$

9.  $2 \times 8 - 3^2 + 2$

10.  $5 \times 2^2 + 32 \div 8$

11.  $3 \times 6 - (9 - 8)^3$

12.  $3.5 \times 10^2$

# Study Guide and Intervention

## Adding Integers

For integers with the same sign:

- the sum of two positive integers is positive.
- the sum of two negative integers is negative.

For integers with different signs, subtract their absolute values. The sum is:

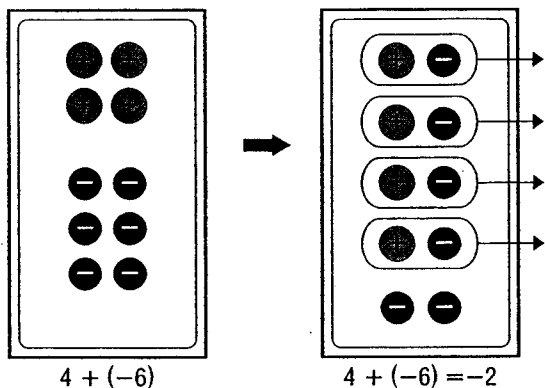
- positive if the positive integer has the greater absolute value.
- negative if the negative integer has the greater absolute value.

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

### EXAMPLE 1 Find $4 + (-6)$ .

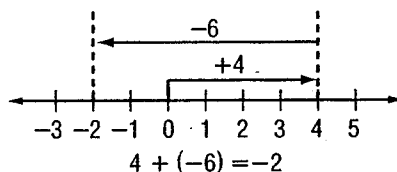
**Method 1** Use counters.

Combine a set of 4 positive counters and a set of 6 negative counters on a mat.



**Method 2** Use a number line.

- Start at 0.
- Move 4 units right.
- Then move 6 units left.



### 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.  $-35 + -20$

Evaluate each expression if  $a = 8$ ,  $b = -8$ , and  $c = 4$ .

10.  $a + 15$

11.  $b + (-9)$

12.  $a + b$

13.  $b + c$

14.  $-10 + c$

15.  $12 + b$

# Study Guide and Intervention

## Subtracting Integers

To subtract an integer, add its opposite.

**EXAMPLE 1** Find  $6 - 9$ .

$$\begin{aligned} 6 - 9 &= 6 + (-9) \\ &= -3 \end{aligned}$$

To subtract 9, add  $-9$ .  
Simplify.

**EXAMPLE 2** Find  $-10 - (-12)$ .

$$\begin{aligned} -10 - (-12) &= -10 + 12 \\ &= 2 \end{aligned}$$

To subtract  $-12$ , add 12.  
Simplify.

**EXAMPLE 3** Evaluate  $a - b$  if  $a = -3$  and  $b = 7$ .

$$\begin{aligned} a - b &= -3 - 7 \\ &= -3 + (-7) \\ &= -10 \end{aligned}$$

Replace  $a$  with  $-3$  and  $b$  with 7.  
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.  $-25 - p$

**Study Guide and Intervention****Multiplying Integers**

The product of two integers with **different** signs is **negative**.

The product of two integers with the **same** sign is **positive**.

**EXAMPLE 1** Multiply  $5(-2)$ .

$5(-2) = -10$       The integers have different signs. The product is negative.

**EXAMPLE 2** Multiply  $-3(7)$ .

$-3(7) = -21$       The integers have different signs. The product is negative.

**EXAMPLE 3** Multiply  $-6(-9)$ .

$-6(-9) = 54$       The integers have the same sign. The product is positive.

**EXAMPLE 4** Multiply  $(-7)^2$ .

$(-7)^2 = (-7)(-7)$       There are 2 factors of  $-7$ .  
 $= 49$       The product is positive.

**EXAMPLE 5** Simplify  $-2(6c)$ .

$-2(6c) = (-2 \cdot 6)c$       Associative Property of Multiplication.  
 $= -12c$       Simplify.

**EXAMPLE 6** Simplify  $2(5x)$ .

$2(5x) = (2 \cdot 5)x$       Associative Property of Multiplication.  
 $= 10x$       Simplify.

**EXERCISES****Multiply.**

- |            |               |             |
|------------|---------------|-------------|
| 1. $-5(8)$ | 2. $-3(-7)$   | 3. $10(-8)$ |
| 4. $-8(3)$ | 5. $-12(-12)$ | 6. $(-8)^2$ |

**ALGEBRA Simplify each expression.**

- |             |               |              |
|-------------|---------------|--------------|
| 7. $-5(7a)$ | 8. $3(-2x)$   | 9. $4(6f)$   |
| 10. $7(6b)$ | 11. $-6(-3y)$ | 12. $7(-8g)$ |

**ALGEBRA Evaluate each expression if  $a = -3$ ,  $b = -4$ , and  $c = 5$ .**

- |            |             |           |
|------------|-------------|-----------|
| 13. $-2a$  | 14. $9b$    | 15. $ab$  |
| 16. $-3ac$ | 17. $-2c^2$ | 18. $abc$ |

**3-7****Study Guide and Intervention****Dividing Integers**

The quotient of two integers with different signs is negative.

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

**EXAMPLE 1** Divide  $30 \div (-5)$ .

$30 \div (-5)$

The integers have different signs.

$30 \div (-5) = -6$

The quotient is negative.

**EXAMPLE 2** Divide  $-100 \div (-5)$ .

$-100 \div (-5)$

The integers have the same sign.

$-100 \div (-5) = 20$

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.  $\frac{-d}{e}$

18.  $ef \div 2$

19.  $\frac{f^2}{e^2}$

20.  $\frac{de}{f}$

# Study Guide and Intervention

## Simplifying Fractions

Fractions that have the same value are called **equivalent fractions**. A fraction is in **simplest form** when the GCF of the numerator and denominator is 1.

**EXAMPLE 1** Write  $\frac{36}{54}$  in simplest form.

First, find the GCF of the numerator and denominator.

factors of 36: 1, 2, 3, 4, 6, 9, 12, 18, 36

factors of 54: 1, 2, 3, 6, 9, 18, 27, 54

The GCF of 36 and 54 is 18.

Then, divide the numerator and the denominator by the GCF.

$$\frac{36}{54} = \frac{36 \div 18}{54 \div 18} = \frac{2}{3} \quad \text{So, } \frac{36}{54} \text{ written in simplest form is } \frac{2}{3}.$$

**EXAMPLE 2** Write  $\frac{8}{12}$  in simplest form.

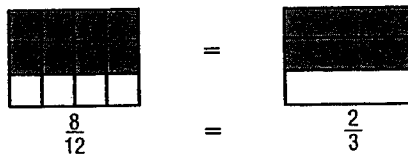
$$8 = (2) \cdot (2) \cdot 2$$

$$12 = (2) \cdot (2) \cdot 3$$

$$\text{GCF: } 2 \cdot 2 = 4$$

$$\frac{8}{12} = \frac{8 \div 4}{12 \div 4} = \frac{2}{3}$$

So,  $\frac{8}{12}$  written in simplest form is  $\frac{2}{3}$ .



### EXERCISES

Write each fraction in simplest form.

1.  $\frac{42}{72}$

2.  $\frac{40}{64}$

3.  $\frac{21}{35}$

4.  $\frac{25}{100}$

5.  $\frac{99}{132}$

6.  $\frac{17}{85}$

# Study Guide and Intervention

## Adding and Subtracting Fractions

*Like fractions* are fractions that have the same denominator. To add or subtract like fractions, add or subtract the numerators and write the result over the denominator.

Simplify if necessary.

To add or subtract *unlike fractions*, rename the fractions with a least common denominator. Then add or subtract as with like fractions.

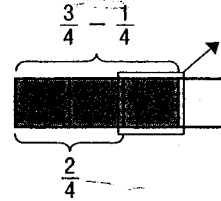
**EXAMPLE 1** Subtract  $\frac{3}{4} - \frac{1}{4}$ . Write in simplest form.

$$\begin{aligned} \frac{3}{4} - \frac{1}{4} &= \frac{3-1}{4} \\ &= \frac{2}{4} \\ &= \frac{1}{2} \end{aligned}$$

Subtract the numerators.

Write the difference over the denominator.

Simplify.



**EXAMPLE 2** Add  $\frac{2}{3} + \frac{1}{12}$ . Write in simplest form.

The least common denominator of 3 and 12 is 12.

$$\frac{2}{3} = \frac{2 \times 4}{3 \times 4} = \frac{8}{12}$$

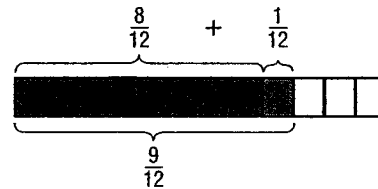
Rename  $\frac{2}{3}$  using the LCD.

$$\frac{2}{3} \rightarrow \frac{8}{12}$$

$$+\frac{1}{12} \rightarrow +\frac{1}{12}$$

$$\frac{9}{12} \text{ or } \frac{3}{4}$$

Add the numerators and simplify.



### EXERCISES

Add or subtract. Write in simplest form.

1.  $\frac{5}{8} + \frac{1}{8}$

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

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

4.  $\frac{7}{8} - \frac{5}{6}$

5.  $\frac{5}{9} + \frac{5}{6}$

6.  $\frac{3}{8} - \frac{1}{12}$

7.  $\frac{3}{10} + \frac{7}{12}$

8.  $\frac{2}{5} - \frac{1}{3}$

9.  $\frac{7}{15} + \frac{5}{6}$

10.  $\frac{7}{9} - \frac{1}{2}$

**Study Guide and Intervention****Adding and Subtracting Mixed Numbers**

To add or subtract mixed numbers:

1. Add or subtract the fractions. Rename using the LCD if necessary.
2. Add or subtract the whole numbers.
3. Simplify if necessary.

**EXAMPLE 1** Find  $14\frac{1}{2} + 18\frac{2}{3}$ .

$$\begin{array}{r} 14\frac{1}{2} \rightarrow 14\frac{3}{6} \\ + 18\frac{2}{3} \rightarrow + 18\frac{4}{6} \\ \hline 32\frac{7}{6} \text{ or } 33\frac{1}{6} \end{array}$$

Rename the fractions.

Add the whole numbers and add the fractions.

Simplify.

**EXAMPLE 2** Find  $21 - 12\frac{5}{8}$ .

$$\begin{array}{r} 21 \rightarrow 20\frac{8}{8} \\ - 12\frac{5}{8} \rightarrow - 12\frac{5}{8} \\ \hline 8\frac{3}{8} \end{array}$$

Rename 21 as  $20\frac{8}{8}$ .

First subtract the whole numbers and then the fractions.

**EXERCISES**

Add or subtract. Write in simplest form.

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

2.  $14\frac{2}{9} - 6\frac{1}{9}$

3.  $9\frac{1}{5} - 4\frac{3}{5}$

4.  $7\frac{1}{8} + 5\frac{3}{8}$

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

6.  $5\frac{1}{2} - 5\frac{1}{3}$

7.  $5\frac{1}{2} - 3\frac{1}{4}$

8.  $6\frac{1}{3} + 2\frac{1}{6}$

9.  $9 - 3\frac{2}{5}$

10.  $2\frac{2}{3} + 7\frac{1}{2}$

11.  $6\frac{1}{2} - 6\frac{1}{3}$

12.  $18\frac{1}{2} + 5\frac{5}{8}$

**Study Guide and Intervention****Multiplying Fractions and Mixed Numbers**

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

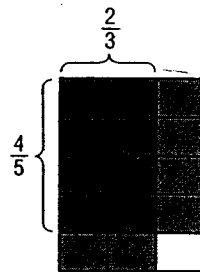
$$\frac{5}{6} \times \frac{3}{5} = \frac{5 \times 3}{6 \times 5} = \frac{15}{30} = \frac{1}{2}$$

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

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

**EXAMPLE 1** Find  $\frac{2}{3} \times \frac{4}{5}$ . Write in simplest form.

$$\begin{aligned} \frac{2}{3} \times \frac{4}{5} &= \frac{2 \times 4}{3 \times 5} && \leftarrow \text{Multiply the numerators.} \\ & && \leftarrow \text{Multiply the denominators.} \\ &= \frac{8}{15} && \text{Simplify.} \end{aligned}$$



**EXAMPLE 2** Find  $\frac{1}{3} \times 2\frac{1}{2}$ . Write in simplest form.

$$\begin{aligned} \frac{1}{3} \times 2\frac{1}{2} &= \frac{1}{3} \times \frac{5}{2} && \text{Rename } 2\frac{1}{2} \text{ as an improper fraction, } \frac{5}{2}. \\ &= \frac{1 \times 5}{3 \times 2} && \text{Multiply.} \\ &= \frac{5}{6} && \text{Simplify.} \end{aligned}$$

**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.  $4\frac{1}{5} \times \frac{1}{7}$

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

11.  $2\frac{1}{3} \times \frac{4}{6}$

12.  $\frac{1}{8} \times 2\frac{3}{4}$

**Study Guide and Intervention****Dividing Fractions and Mixed Numbers**

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 1** 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  $\frac{9}{2}$ .

$$= \frac{\overset{5}{\cancel{10}}}{\underset{1}{\cancel{3}}} \cdot \frac{\overset{3}{\cancel{9}}}{\underset{1}{\cancel{2}}}$$

Divide out common factors.

$$= 15$$

Multiply.

**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.  $5 \div \frac{1}{2}$

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

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

12.  $4\frac{1}{4} \div \frac{3}{8}$

13.  $4\frac{6}{7} \div 2\frac{3}{7}$

14.  $12 \div 2\frac{1}{2}$

15.  $4\frac{1}{6} \div 3\frac{1}{6}$

Objective: To estimate and compute decimal quotients.

**EXAMPLES****Here's how to estimate and compute decimal quotients.****A** Estimate the quotient.

$76.15 \div 5 = \blacksquare$

Use nearby whole numbers  
that are easy to divide  
mentally.

$75 \div 5 = 15$

The quotient is near 15.

**B** Compute the quotient.

$$\begin{array}{r} 15.23 \\ 5 \overline{)76.15} \\ \underline{-5} \phantom{.15} \\ 26 \phantom{.15} \\ \underline{-25} \phantom{.15} \\ 11 \phantom{.15} \\ \underline{-10} \phantom{.15} \\ 15 \phantom{.15} \\ \underline{-15} \phantom{.15} \\ 0 \end{array}$$

Place the decimal point for  
the quotient. Then divide as  
you would whole numbers.

Use estimation to choose the quotient. Circle the correct answer.

1.  $16.35 \div 3$

0.545

5.45

54.5

2.  $84.64 \div 8$

0.1058

1.058

10.58

3.  $648.8 \div 8$

8.11

81.1

811

4.  $3.564 \div 6$

0.0594

0.594

5.94

Divide.

5.  $18.8 \div 8$

6.  $18.05 \div 5$

7.  $0.369 \div 3$

8.  $163.2 \div 24$

9.  $12.24 \div 17$

10.  $39.2 \div 98$

11.  $22.95 \div 9$

12.  $18.9 \div 54$

13.  $397.44 \div 64$

14.  $5.2 \div 65$

15.  $911.4 \div 98$

16.  $883.6 \div 94$

17.  $8.5 \div 25$

18.  $47.4 \div 79$

19.  $479.4 \div 47$

20.  $8.28 \div 23$

Here are scrambled answers for exercises 5-12: 0.123 0.35 0.4 0.72 2.35 2.55 3.61 6.8

**Objective:** To estimate and compute decimal products.

<b>EXAMPLES</b>	<b>Here's how to estimate and compute decimal products.</b>	
<p><b>A</b> Estimate the product: <math>3.8 \times 2.1 = \blacksquare</math>  <math>4 \times 2 = 8</math> ←</p>	<p><i>Round each decimal to the nearest whole number and multiply.</i></p>	
<p><b>B</b> Compute the product: <math>3.8 \times 2.1</math></p>	<p>Multiply as whole numbers.</p>	<p>Count the digits to the right of the decimal points.</p>
$\begin{array}{r} 3.8 \\ \times 2.1 \\ \hline 38 \\ 76 \\ \hline 798 \end{array}$	$\begin{array}{r} 3.8 \\ \times 2.1 \\ \hline 38 \\ 76 \\ \hline 798 \end{array}$	<p>Count off the same number of digits in the product.</p>
		$\begin{array}{r} 3.8 \\ \times 2.1 \\ \hline 38 \\ 76 \\ \hline 7.98 \end{array}$

Complete these examples.

1.  $0.98$   
 $\times 2.6$   
 $\hline$   
 $\hline$   
 $\hline$   
 $2.248$

2.  $0.49$   
 $\times 0.14$   
 $\hline$   
 $\hline$   
 $\hline$   
 $0.028?$

You must write a zero here to place the decimal point.

3.  $0.53$   
 $\times 26$   
 $\hline$   
 $\hline$   
 $\hline$   
 $12.??$

By estimating, find the three wrong calculator answers.

4. a.  $0.52 \times 3.4$  1.768

b.  $0.98 \times 5$  0.49

c.  $6.8 \times 5.2$  3.536

d.  $9.01 \times 3.1$  27.931

e.  $0.85 \times 19$  1.615

f.  $18 \times 6.4$  115.2

**Multiply.**

5.  $3.9 \times 2.3$

6.  $3 \times 6.1$

7.  $0.54 \times 8.2$

8.  $7.5 \times 0.05$

9.  $58 \times 4.2$

10.  $0.08 \times 9$

11.  $0.86 \times 30$

12.  $4.68 \times 1.3$

13.  $2.9 \times 13$

14.  $0.76 \times 0.07$

15.  $9.2 \times 1.9$

16.  $3.04 \times 4.4$

17.  $2.68 \times 31.2$

18.  $9.2 \times 50$

19.  $0.009 \times 1.3$

20.  $68.4 \times 0.61$

21.  $2.01 \times 0.99$

22.  $9.7 \times 0.006$

23.  $88 \times 3.7$

24.  $0.95 \times 3.9$

Here are scrambled answers for exercises 5–12: 0.375 0.72 4.428 6.084 8.97 18.3 25.8 243.6