Table of Contents

Complementary Angles
Algebraic Expressions
Algebra Practice Problems
Greater Than or Less Than? Comparing Fractions
   Adding Exponents
Fraction Review: Addition, Subtraction, and Inequalities
   Measuring Angles
   Beginning Algebra
Comparing Algebraic Equations
   Number Sequences
   Graphing Ordered Pairs
   Graphing Ordered Pairs #2
   Comparing Decimal Numbers
   Combining Like Terms
Introduction to Algebraic Expressions
   Adding and Subtracting Mixed Numbers
Building Exponents: Squares, Cubes, and Roots
   Practice with Polynomials
Complementary and Supplementary Angles
   Area and Circumference of a Circle
   Properties of Parallelograms
   Linear Equations: Add and Subtract
   Linear Equations Practice
   Triangle Angles
   Multiplying Monomials
   Probability Darts 4
   Multiplying Monomials #4
   Dividing Monomials #4
Complementary Angles

Solve for angle $x$.

1. $x = \underline{60}$
   
   $x = \underline{60}$
   
   (90 - 30 = 60)

2. $x = \underline{25}$

3. $x = \underline{55}$

4. $x = \underline{15}$

5. $x = \underline{50}$

6. $x = \underline{63}$

7. $x = \underline{62}$

8. $x = \underline{45}$

9. $x = \underline{80}$

More worksheets at www.education.com/worksheets
Algebraic Expressions

Simplify the following expressions.

1.) $5a + 6a =$  
2.) $3a + a =$  
3.) $8a - 3a =$  
4.) $10a - 2a =$  
5.) $9a + 4a =$  
6.) $11a - 7a =$  
7.) $4b + 3b =$  
8.) $12b - 6b =$  
9.) $5b + 9b =$

Complete the following expressions.

1.) $12 \times 3 - 5 + 4 =$  
2.) $4 + 7 \times 2 - 8 =$  
3.) $5 - 7 + 2 \times 10 =$  
4.) $15 \div 3 + 8 \times 5 =$  
5.) $11 \times 3 - 12 \div 4 =$  
6.) $5 + 9 - 16 \div 2 =$

Combine like terms to simplify the following expressions.

1.) $3a(a + 4) - 2a + 7 =$  
2.) $5a + 3a - 15 \div 3 =$  
3.) $4(3 + 9) + 10a - 4a =$  
4.) $(21 \div 7)(4a + a) - 12 =$  
5.) $17 + 4(3 + a) - a =$  
6.) $10a - 4a + 27 \div 3 =$
Complete the algebraic equations. If the answer is a fraction, reduce and convert it to a mixed number.

1.) \(x + 7 - 4(x + 1) = -10\) 
2.) \(5x - 4 + 2(x - 4) = 16\)

3.) \(20 + 3x - 15 + x = 27\) 
4.) \(11 - 2x + 8x + 5 = 32\)

5.) \(5(2x - 7) + 42 - 3x = 2\) 
6.) \(2(4x - 2) - 5x = -18\)

7.) \(30 - 6(x + 3) + 2x = 8\) 
8.) \(23 + 4(x - 3) - x = 11\)

9.) \(2x - 14 + 3(x + 1) = -4\) 
10.) \(6(2x + 2) + 12 = 50\)
Greater Than $>$, Less Than $<$ or Equal $=$

Directions: 1. Multiply or divide to find a common denominator.
2. Then compare the numerator.
3. Write $>$, $<$, or $=$ in the circle.

\[
\begin{array}{cccc}
\frac{3}{4} & \bigcirc & \frac{1}{4} & \frac{5}{7} & \bigcirc & \frac{6}{7} & \frac{2}{10} & \bigcirc & \frac{8}{10} \\
\frac{2}{6} & \bigcirc & \frac{2}{3} & \frac{1}{2} & \bigcirc & \frac{5}{8} & \frac{5}{18} & \bigcirc & \frac{1}{3} \\
\frac{4}{5} & \bigcirc & \frac{22}{25} & \frac{5}{6} & \bigcirc & \frac{33}{42} & \frac{80}{100} & \bigcirc & \frac{4}{5} \\
\frac{15}{21} & \bigcirc & \frac{4}{7} & \frac{4}{16} & \bigcirc & \frac{12}{24} & \frac{36}{81} & \bigcirc & \frac{18}{27} \\
\frac{21}{35} & \bigcirc & \frac{16}{40} & \frac{28}{49} & \bigcirc & \frac{18}{21} & \frac{60}{144} & \bigcirc & \frac{12}{24} \\
\frac{2}{5} & \bigcirc & \frac{4}{7} & \frac{5}{9} & \bigcirc & \frac{3}{4} & \frac{4}{6} & \bigcirc & \frac{7}{8} \\
\frac{9}{13} & \bigcirc & \frac{5}{8} & \frac{8}{10} & \bigcirc & \frac{6}{9} & \frac{7}{11} & \bigcirc & \frac{2}{4} \\
\frac{25}{10} & \bigcirc & \frac{20}{10} & \frac{46}{6} & \bigcirc & \frac{14}{4} & \frac{57}{7} & \bigcirc & \frac{62}{9}
\end{array}
\]
Adding Exponents

Adding exponents may seem like a daunting task at first, but once we know a few key terms, you will find that adding exponents is not so bad at all.

- Exponentiations are always written with a base number and an exponent: $b^n$
- When multiplying two exponentiations with the same base number, we can simply add their exponents to find our answer quickly.

Example: $4^3 \times 4^2 = ?$

This equation is the same as writing, $4^{(3+2)} = 4^5 = 4 \times 4 \times 4 \times 4 \times 4 = 1,024$

For each problem below, first add the exponents if the bases are the same in the equation. Write out your result and solve the problem.

1) $2^3 \times 2^2 = ?$

2) $3^4 \times 3^5 = ?$

3) $4^5 \times 4^0 = ?$

4) $4^3 \times 4^1 = ?$

5) $5^4 \times 5^1 = ?$

6) $5^2 \times 5^3 = ?$

7) $5^5 \times 5^0 = ?$

8) $6^2 \times 6^2 = ?$
### Fraction Review

For each problem below, add or subtract fractions and then compare results. Write greater than (>), less than (<), or equal to (=).

<table>
<thead>
<tr>
<th>Problem</th>
<th>Solution</th>
<th>Problem</th>
<th>Solution</th>
<th>Problem</th>
<th>Solution</th>
</tr>
</thead>
<tbody>
<tr>
<td>1) (\frac{6}{4} - 3\frac{1}{20} \quad 6\frac{1}{4} - 3\frac{1}{20})</td>
<td>&gt;</td>
<td>4) (\frac{3}{4} + 3\frac{4}{6} \quad 2\frac{1}{2} + 3\frac{1}{2})</td>
<td>&gt;</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2) (\frac{6}{10} + 8\frac{1}{4})</td>
<td>&gt;</td>
<td>5) (9\frac{5}{6} + 5\frac{2}{3} \quad 8\frac{7}{9} - 4\frac{1}{3})</td>
<td>&gt;</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3) (8\frac{3}{4} - 3\frac{5}{7})</td>
<td>&gt;</td>
<td>6) (5\frac{1}{4} - 1\frac{1}{8})</td>
<td>&gt;</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

For each problem below, find the missing factor by computing the inverse operation.

<table>
<thead>
<tr>
<th>Problem</th>
<th>Solution</th>
<th>Problem</th>
<th>Solution</th>
</tr>
</thead>
<tbody>
<tr>
<td>1) (4\frac{1}{2} - \quad = 2\frac{7}{8})</td>
<td>=</td>
<td>3) (\quad + 8\frac{7}{8} = 13\frac{3}{8})</td>
<td>=</td>
</tr>
<tr>
<td>2) (\quad + 1\frac{1}{2} = 11)</td>
<td>=</td>
<td>4) (7\frac{5}{8} - \quad = 5\frac{3}{8})</td>
<td>=</td>
</tr>
</tbody>
</table>
Measuring Angles

Use your protractor to measure each angle.

1. This angle is ______ degrees.

2. This angle is ______ degrees.

3. This angle is ______ degrees.

4. This angle is ______ degrees.

5. This angle is ______ degrees.

6. This angle is ______ degrees.

7. This angle is ______ degrees.

8. This angle is ______ degrees.

9. This angle is ______ degrees.

10. This angle is ______ degrees.
Algebraic Equations

Write out an algebraic equation for each sentence.

1.) Three more than twice a number is eleven.

2.) Five times a number decreased by three is seven.

3.) Fifteen is ten increased by a number.

Complete the following algebraic equations.

1.) $3X + 10 = 22$

2.) $24 - 4X = 4$

3.) $5 - 2X + 17 = 18$

Complete the following word problems using an algebraic equation.

1.) Tanya wants to make an apple pie and has 5 apples. She needs 12 apples to finish the pie. How many more apples does she need?

2.) Steven wants to buy a game for $34.00. He has saved up $20.00. How much more money does he need to buy the game?

3.) Sarah is selling lemonade. She has sold a total of 14 cups. 4 cups were sold to adults and she sold 2 batches of lemonade to other children. How many cups were in each batch?
Algebra: Greater Than, Less Than or Equal To

Determine the relationship between the algebraic equations. Place > (greater than), < (less than) or = (equal to) in the space provided.

Where \( x = 3 \)

1.) \( 5x + 4 \) _____ \( 3x + 15 \)  
2.) \( 2x + x \) _____ \( 6x - 5 \)

3.) \( x + 23 \) _____ \( 5x - 4 \)  
4.) \( 6x - 2 \) _____ \( 4x + 4 \)

5.) \( 7x - 2 \) _____ \( 4x + 4 \)  
6.) \( 3x + 5 \) _____ \( 6x - 4 \)

Where \( x = 7 \)

1.) \( 3x - x \) _____ \( 4x - 14 \)  
2.) \( 2x + 10 \) _____ \( 5x - 5 \)

3.) \( 2x + 12 \) _____ \( 3x - 4 \)  
4.) \( 6x - 18 \) _____ \( 4x - 4 \)

5.) \( x + x + 7 \) _____ \( 5x \)  
6.) \( 8x \) _____ \( 3x + 2x + 15 \)
### Number Sequences

Fill in the missing number that completes the sequence.

**Ex. 1 , 2 , ___ , 4 : the missing number is 3**

<p>| | | | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2</td>
<td>4</td>
<td>___</td>
<td>8</td>
</tr>
<tr>
<td>2</td>
<td>1</td>
<td>5</td>
<td>___</td>
<td>13</td>
</tr>
<tr>
<td>3</td>
<td>3</td>
<td>6</td>
<td>___</td>
<td>12</td>
</tr>
<tr>
<td>4</td>
<td>5</td>
<td>___</td>
<td>15</td>
<td>20</td>
</tr>
<tr>
<td>5</td>
<td>1</td>
<td>___</td>
<td>9</td>
<td>27</td>
</tr>
<tr>
<td>6</td>
<td>4</td>
<td>___</td>
<td>16</td>
<td>32</td>
</tr>
<tr>
<td>7</td>
<td>6</td>
<td>8</td>
<td>___</td>
<td>20</td>
</tr>
<tr>
<td>8</td>
<td>4</td>
<td>5</td>
<td>___</td>
<td>10</td>
</tr>
<tr>
<td>9</td>
<td>4</td>
<td>9</td>
<td>16</td>
<td>___</td>
</tr>
<tr>
<td>10</td>
<td>8</td>
<td>27</td>
<td>64</td>
<td>125</td>
</tr>
<tr>
<td>11</td>
<td>0</td>
<td>1</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>12</td>
<td>30</td>
<td>28</td>
<td>26</td>
<td>24</td>
</tr>
<tr>
<td>13</td>
<td>16</td>
<td>12</td>
<td>8</td>
<td>___</td>
</tr>
<tr>
<td>14</td>
<td>27</td>
<td>26</td>
<td>24</td>
<td>21</td>
</tr>
<tr>
<td>15</td>
<td>32</td>
<td>30</td>
<td>26</td>
<td>18</td>
</tr>
<tr>
<td>16</td>
<td>500</td>
<td>100</td>
<td>20</td>
<td>___</td>
</tr>
<tr>
<td>17</td>
<td>48</td>
<td>24</td>
<td>12</td>
<td>___</td>
</tr>
<tr>
<td>18</td>
<td>81</td>
<td>27</td>
<td>9</td>
<td>___</td>
</tr>
<tr>
<td>19</td>
<td>256</td>
<td>64</td>
<td>16</td>
<td>___</td>
</tr>
</tbody>
</table>

Copyright 2012-2013 Education.com

Created by : education.com
Plot the ordered pairs below in the graph above to reveal a letter.

1. (3, -6) 
2. (-7, 0) 
3. (-4, 8) 
4. (9, 0) 
5. (4, 9) 
6. (-7, 3) 
7. (0, 9) 
8. (7, 7) 
9. (-6, -2) 
10. (0, -6) 
11. (6, -5) 
12. (-5, 7) 
13. (-4, -5) 
14. (9, -1) 
15. (3, 1) 
16. (8, -3) 
17. (9, 1) 
18. (8, 5) 
19. (7, 1) 
20. (-2, -6)
Plot the ordered pairs below in the graph above.

1.) (8, 3)        2.) (4, -6)        3.) (-3, 2)        4.) (-5, -7)        5.) (7, 4)
6.) (7, -4)       7.) (-3, 5)        8.) (-8, -4)        9.) (6, -2)        10.) (9, 9)
11.) (-2, -6)     12.) (10, 4)       13.) (0, 0)        14.) (3, 2)        15.) (-1, -2)
16.) (-4, 2)      17.) (-6, -3)      18.) (8, -8)        19.) (-10, -5)      20.) (-9, 4)
Comparing Decimals

Compare decimals. Write a, <, > or =.

1.  5.25 ________ 5.43
2.  7.467 ________ 7.674
3.  0.14 ________ 0.15
4.  1.555876 ________ 1.555876
5.  71.05 ________ 72.00
6.  6.1 ________ 6.13
7.  9.120 ________ 9.12
8.  4.311 ________ 4.311
9.  5.8000001 ________ 5.800002
10. 3 ________ .03
11. 9.3540 ________ 9.5430
Combining Like Terms

1.) \(x + 2x =\)  
2.) \(2x - x =\)  
3.) \(4x + 2x =\)

4.) \(6x - 3x =\)  
5.) \(5x + x =\)  
6.) \(2x + 2x =\)

7.) \(7x - 5x =\)  
8.) \(3x - 2x =\)  
9.) \(x + x =\)

10.) \(x^2 + 2x^2 =\)  
11.) \(4x^2 - 3x^2 =\)  
12.) \(3x^2 + 2x^2 =\)

13.) \(2x^2 + 2x + x^2 + x =\)  
14.) \(5x + x^2 - 2x + x^2 =\)

15.) \(3x + 2x - x + 2x^2 =\)  
16.) \(6x + 3x^2 - x - x^2 =\)

17.) \(4x + 3 + x^2 - x =\)  
18.) \(2x + 3x + 9 + x =\)

19.) \(2x^2 + 3 + 3x - 1 =\)  
20.) \(2x + 5 + x^2 - x =\)

21.) \(2x + 4y - x + y =\)  
22.) \(2y + x + 3x - y =\)

23.) \(x + y + 2y - 4 =\)  
24.) \(5 + 2x + y + 2x - 1 =\)

25.) \(3y + 2 + 2y + 5 =\)  
26.) \(2x + 2y + x^2 - x + x^2 =\)
Introduction to Algebraic Expressions

Calculating an equation or expression using the following order:
1. Anything in parentheses
2. Exponents
3. Multiplication and division, from left to right
4. Addition and subtraction, from left to right

Using the order of operations, complete the following algebra problems.

1. \((5 + 9) - 3^2 + 4 \times 6\)  
2. \(24 - 2 + (4 \times 2)\)  
3. \(8 \times 4 - 9 + 5^2\)

Ex. \(14 - 3^2 + 4 \times 6\)  
\(14 - 9 + 4 \times 6\)  
\(14 - 9 + 24\)  
\(5 + 24 = 29\)

4. \(5 + (7 + 9) - 1 \times 2^3\)  
5. \(6 + 12 \div 3 + (17 - 5)\)  
6. \(4^2 + 4 \times 3 - 5\)

Monomials that have the same variables with the same exponent. Combining like terms reduces multiple monomials into one monomial.

Simplify the following algebraic expressions by combining like terms.

1. \(7 + 2x - 1 + 5x + 3x^2\)  
2. \(10x + 8 - 2x + x^3 + 5\)  
3. \(8 - 3 - 2x + 10x\)

Ex. \(7 - 1 + 2x + 5x + 3x^2\)  
\(6 + 7x + 3x^2\)

4. \(2x^2 + 3x + x^2 - x + 4\)  
5. \(x + x + 2x^3 + 3x\)  
6. \(9 + x^3 - 3 + x^3 - 2x\)
Adding and Subtracting Mixed Numbers

Adding and subtracting mixed fractions with unlike denominators may seem impossible, but if you follow these three simple steps, you will be a pro!

- First, convert your mixed fraction to an improper fraction.
- Next, find a common denominator and add or subtract the fractions.
- Last, convert the answer back to a mixed fraction.

Quick Reminder: An improper fraction has a numerator that is greater than or equal to the denominator.

Example:

\[
3 \frac{1}{4} + 2 \frac{1}{2} = ?
\]

Convert to an improper fraction.

\[
3 \frac{1}{4} = \frac{13}{4}
2 \frac{1}{2} = \frac{5}{2}
\]

Find a common denominator.

\[
\frac{13}{4} \quad \text{and} \quad \frac{10}{4}
\]

Now, add them.

\[
\frac{13}{4} + \frac{10}{4} = \frac{23}{4}
\]

Convert back to a mixed fraction.

\[
5 \frac{3}{4}
\]

For each problem below, follow the steps used in the example to find your solution. Be sure to show all your work in the space provided.

1) \(3 \frac{5}{8} + 1 \frac{3}{4} = ?\)

2) \(6 \frac{5}{6} - 3 \frac{1}{4} = ?\)

3) \(4 \frac{1}{3} + 3 \frac{2}{5} = ?\)

4) \(7 \frac{7}{8} - 6 \frac{1}{4} = ?\)

5) \(3 \frac{2}{3} + 2 \frac{5}{7} = ?\)

6) \(5 \frac{4}{5} - 3 \frac{1}{3} = ?\)

7) \(4 \frac{1}{4} + 1 \frac{1}{3} = ?\)

8) \(11 \frac{5}{6} - 5 \frac{1}{2} = ?\)
Squares, Cubes, and Roots

Squares, cubes, square roots, and cube roots may seem like difficult math problems at first, but once you learn how to solve them, you will find that they are both easy and fun!

- The **square** of a number is the number times itself.
- The **square root** of a number is a number that can be multiplied by itself to give the original number. It is the inverse operation of squaring a number.
- The **cube** of a number is the number multiplied by itself twice.
- The **cube root** of a number is, a value that when cubed, gives the original number. It is the inverse operation of cubing a number.

**Examples**

<table>
<thead>
<tr>
<th>Square: $5^2 = 5 \times 5 = 25$</th>
<th>Square Root: $\sqrt{25} = 5^2 (5 \times 5 = 25)$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cube: $5^3 = 5 \times 5 \times 5 = 125$</td>
<td>Cube Root: $\sqrt[3]{125} = 5^3 (5 \times 5 \times 5 = 125)$</td>
</tr>
</tbody>
</table>

Write the **square** or **cube** of each number.

1) $13^2 = ______$
2) $4^3 = ______$
3) $9^2 = ______$
4) $5^3 = ______$
5) $2^2 = ______$
6) $6^3 = ______$
7) $48^2 = ______$
8) $3^3 = ______$
9) $7^2 = ______$

Write the **square root** of each number.

1) $\sqrt{16} = ______$
2) $\sqrt{9} = ______$
3) $\sqrt{25} = ______$
4) $\sqrt{81} = ______$
5) $\sqrt{1} = ______$
6) $\sqrt{4} = ______$
7) $\sqrt{49} = ______$
8) $\sqrt{36} = ______$
9) $\sqrt{100} = ______$

Write the **cube root** of each number.

1) $\sqrt[3]{64} = ______$
2) $\sqrt[3]{1} = ______$
3) $\sqrt[3]{125} = ______$
4) $\sqrt[3]{216} = ______$
5) $\sqrt[3]{8} = ______$
6) $\sqrt[3]{1,728} = ______$
7) $\sqrt[3]{343} = ______$
8) $\sqrt[3]{0} = ______$
9) $\sqrt[3]{729} = ______$
Playing with Polynomials

Identify the polynomials.

\[ x^2 + 3 \quad \frac{2}{x + 2} \quad 4x^4 \quad 6x + 2y \quad 10x \quad \frac{2}{x} \]

Multiple Choice

A polynomial can have a polynomial does not use
a.) constants a.) division
b.) exponents b.) addition
c.) variables c.) multiplication
d.) all of the above d.) subtraction

True or False

____ Polynomials can have an infinite number of terms.
____ A monomial is a polynomial that has one term.
____ If you add or multiply polynomials, the result is a polynomial.
____ A polynomial has to have a variable.

Put the following polynomials in standard form.

\[ 3x + 2x^4 + 7 \]
\[ 10 + 2x + 5x^2 \]
\[ x^3 + 4x + 2x^2 + 5 \]
\[ x + 7 + 3x^2 + 5x^4 \]
Complementary and Supplementary Angles

Complementary Angles

Two angles are complementary if they add up to 90 degrees (a right angle).

If $\angle a + \angle b = 90^\circ$, then $\angle a$ and $\angle b$ are complementary angles.

**Examples:**
- $60^\circ$ and $30^\circ$ angles are complementary angles
- $80^\circ$ and $10^\circ$ angles are complementary angles
- $20^\circ$ and $30^\circ$ angles are not complementary angles

**Practice Problems:** solve for the missing complementary angle, $x$.

$\angle 45 + \angle x = 90^\circ; \angle x = ____$
$\angle x + \angle 32 = 90^\circ; \angle x = ____$
$\angle 80 + \angle x = 90^\circ; \angle x = ____$

Supplementary Angles

Two angles are supplementary if they add up to 180 degrees.

If $\angle a + \angle b = 180^\circ$, then $\angle a$ and $\angle b$ are supplementary angles.

**Examples:**
- $150^\circ$ and $30^\circ$ angles are supplementary angles
- $80^\circ$ and $100^\circ$ angles are supplementary angles
- $70^\circ$ and $90^\circ$ angles are not supplementary angles

**Practice Problems:** solve for the missing supplementary angle, $x$.

$\angle x + \angle 75 = 180^\circ; \angle x = ____$
$\angle x + \angle 50 = 180^\circ; \angle x = ____$
$\angle x + \angle 45 = 180^\circ; \angle x = ____$

**Determine whether $\angle a$ and $\angle b$ are complementary or supplementary.**

$\angle a = 50, \angle b = 40$ ____________
$\angle a = 80, \angle b = 100$ ____________
$\angle a = 35, \angle b = 145$ ____________
$\angle a = 75, \angle b = 15$ ____________
$\angle a = 20, \angle b = 70$ ____________
$\angle a = 60, \angle b = 120$ ____________
$\angle a = 65, \angle b = 115$ ____________
$\angle a = 65, \angle b = 25$ ____________
COOKIES CIRCLES
Area, Circumference, Diameters

Fill in the missing information about these cookies!

Formulas:

Diameter = (2)(radius)  Circumference = (π)(diameter)  Area = πr²

For this assignment please use π = 3.14

1. Diameter: 8.5
   Circumference: __________
   Area: __________

2. Diameter: 6.25
   Circumference: __________
   Area: __________

3. Diameter: 8
   Circumference: __________
   Area: __________

4. Diameter: 11.5
   Circumference: __________
   Area: __________
Solve for $x$ using your knowledge of parallelogram.

**EXAMPLE:**

1. $\angle BAD = 115^\circ$

2. $\angle ADC = 138^\circ$

3. $\angle BCD = 100^\circ$

4. $\angle DCB = 94^\circ$

5. $\angle BCA = 47^\circ$

6. $\angle BAC = 2x$

7. $\angle ADC = 225^\circ - 2x$
1. \(-6 = x + 10\)  \(x = -16\)  

2. \(-5 + x = 7\) \(x = \) 

3. \(15 = x + 3\) \(x = \) 

4. \(x - 12 = -2\) \(x = \) 

5. \(x - 4 = -8\) \(x = \) 

6. \(-9 + x = 8\) \(x = \) 

7. \(x + 7 = -18\) \(x = \) 

8. \(x - 17 = -1\) \(x = \) 

9. \(-6 + x = 7\) \(x = \) 

10. \(-16 = x - 6\) \(x = \)
Master Training

Linear Equations

Addition / Subtraction

Solve:

1. $15 = x + 19$
   \[ x = -4 \]

2. $x - 16 = -10$
   \[ x = 6 \]

3. $-14 = x - 7$
   \[ x = -7 \]

4. $x - 10 = -2$
   \[ x = 8 \]

5. $x + 25 = -5$
   \[ x = -30 \]

6. $x - 8 = -13$
   \[ x = -5 \]

7. $4 + x = 8$
   \[ x = 4 \]

8. $19 + x = -7$
   \[ x = -26 \]

9. $x - 12 = -3$
   \[ x = 9 \]

10. $-17 = x + 5$
    \[ x = -22 \]

Training Complete
Find the unknown angles in the following triangles. Write down the missing angle and what type of triangle it is!

EXAMPLE:

\[
\begin{align*}
50^\circ & \quad x \\
x & = 40 \\
\text{RIGHT ANGLE} \\
\text{TRIANGLE}
\end{align*}
\]
Example:

\[(4x^2y^5)(4x^3y) = \]

1. Multiply the coefficients.
   \[(4x^2y^5)(4x^3y) = 16\]

2. Multiply the variables by adding the exponents.
   \[(x^2)(x^3) = x^{2+3} = x^5\]
   \[(y^5)(y) = y^{5+1} = y^6\]
   Answer: \[16x^5y^6\]

Multiply the monomials.

1. \((3)(4x) = \) \[\] 2. \((5xy^3)(2x^2y) = \) \[\]
3. \((xy^8)(7xy^3) = \) \[\] 4. \((y^3)(y^3) = \) \[\]
5. \((3x)(4x^4y) = \) \[\] 6. \((6xy^4)(2x^3y^6) = \) \[\]
7. \((x^4y^5)(xy) = \) \[\] 8. \((2xy^5)(8x^3y) = \) \[\]
9. \((10xy^5)(2xy) = \) \[\] 10. \((7x)(2xy) = \) \[\]
Probability Darts

Find the portion of the dart board that each panel occupies and use your knowledge of degrees and fractions to answer the following questions about probability.

REMEMBER: Probability is the likelihood a given outcome will occur. It is expressed as a fraction.

Use the information above to answer the questions below.

1. Is the next dart thrown more likely to hit a vowel or a consonant?

2. What is the probability that the next dart thrown hits panel C or panel B?

3. Which panels have a probability less than or equal to $\frac{1}{6}$ that they will be hit? What is the probability that the next dart thrown hits one of them?
Example:

\((4x^2y^5)(4x^2)(4x^3y) = \)

1. Multiply the coefficients.

\((4x^2y^5)(4x^2)(4x^3y) = 64\)

2. Multiply the variables by adding the exponents.

\((x^2)(x^2)(x^3) = x^{2+2+3} = x^7\)
\((y^5)(y) = y^{5+1} = y^6\)

Answer: \(64x^7y^6\)

Multiply the monomials.

1. \((3x^4)(7x^4y^5)(3y^7) = \) \[\underline{\text{_________}}\]

2. \((2xy)(3xy)(6x^8y^4) = \) \[\underline{\text{_________}}\]

3. \((5x^6y)(xy)(3xy^2) = \) \[\underline{\text{_________}}\]

4. \((8xy)(11xy^6)(11y) = \) \[\underline{\text{_________}}\]

5. \((7x^6)(xy)(x^2y) = \) \[\underline{\text{_________}}\]

6. \((8x^3y^9)(x^7y)(x^5y^8) = \) \[\underline{\text{_________}}\]

7. \((5x^3y^6)(9x^4y)(xy) = \) \[\underline{\text{_________}}\]

8. \((6x^5y)(xy^9)(x) = \) \[\underline{\text{_________}}\]

9. \((x)(x^8)(10x^7y) = \) \[\underline{\text{_________}}\]

10. \((8x^2y)(xy^7)(x^3y) = \) \[\underline{\text{_________}}\]
1. Divide the coefficients.

Example:

\[
\frac{4x^3y^5}{2x^2y} = \frac{4}{2} = 2
\]

2. Divide the variables by subtracting the exponents.

\[
\frac{x^3}{x^2} = x^{3-2} = x \quad \frac{y^5}{y} = y^{5-1} = y^4
\]

Answer: \(2xy^4\)

Divide the monomials.

1. \(\frac{6x^2y^5}{2xy^2} = \) \[\] 
2. \(\frac{3x^4y^2}{1xy} = \) \[\]
3. \(\frac{12x^3y}{3x^2y} = \) \[\]
4. \(\frac{9x^4y^6}{3x^3y^6} = \) \[\]
5. \(\frac{6x^4y^6}{3x^2y^4} = \) \[\]
6. \(\frac{7x^3y^2}{7x^3y} = \) \[\]
7. \(\frac{2x^{11}y^7}{x^8y^3} = \) \[\]
8. \(\frac{15xy^{14}}{5y^3} = \) \[\]
9. \(\frac{18x^2y^3}{3xy^3} = \) \[\]
10. \(\frac{4y^{15}}{2y^{10}} = \) \[\]
6th Grade Math Practice Packet

Complementary Angles
Algebraic Expressions
Algebra Practice Problems
Greater Than or Less Than? Comparing Fractions
Adding Exponents
Measuring Angles
Beginning Algebra
Comparing Algebraic Equations
Number Sequences
Graphing Ordered Pairs
Graphing Ordered Pairs #2
Comparing Decimal Numbers
Combining Like Terms
Introduction to Algebraic Expressions
Practice with Polynomials
Complementary and Supplementary Angles
Area and Circumference of a Circle
Properties of Parallelograms
Linear Equations: Add and Subtract
Linear Equations Practice
Triangle Angles
Multiplying Monomials
Probability Darts 4
Multiplying Monomials #4
Dividing Monomials #4
Complementary Angles

Solve for angle $x$.

1. $x = 60$
   
   \((90 - 30 = 60)\)

2. $x = 65$

3. $x = 35$

4. $x = 75$

5. $x = 40$

6. $x = 27$

7. $x = 62$

8. $x = 45$

9. $x = 10$
Algebraic Expressions
(answer sheet)

Simplify the following expressions.

1.) \(5a + 6a = 11a\)
2.) \(3a + a = 4a\)
3.) \(8a – 3a = 5a\)
4.) \(10a – 2a = 8a\)
5.) \(9a + 4a = 13a\)
6.) \(11a – 7a = 4a\)
7.) \(4b + 3b = 7b\)
8.) \(12b – 6b = 6b\)
9.) \(5b + 9b = 14b\)

Complete the following expressions.

1.) \(12 \times 3 – 5 + 4 = 35\)
2.) \(4 + 7 \times 2 – 8 = 10\)
3.) \(5 – 7 + 2 \times 10 = 18\)
4.) \(15 \div 3 + 8 \times 5 = 45\)
5.) \(11 \times 3 – 12 \div 4 = 30\)
6.) \(5 + 9 – 16 \div 2 = 6\)

Combine like terms to simplify the following expressions.

1.) \(3a(a + 4) – 2a + 7 = 3a^2 + 10a + 7\)
2.) \(5a + 3a – 15 \div 3 = 8a – 5\)
3.) \(4(3 + 9) + 10a – 4a = 48 + 6a\)
4.) \((21 \div 7)(4a + a) – 12 = 15a – 12\)
5.) \(17 + 4(3 + a) – a = 29 + 3a\)
6.) \(10a – 4a + 27 \div 3 = 6a + 9\)
Algebra Practice Problems

Complete the algebraic equations. If the answer is a fraction, reduce and convert it to a mixed number.

(answer sheet)

1.) $x + 7 - 4(x + 1) = -10$
   $x + 7 - 4x - 4 = -10$
   $-3x + 3 = -10$
   $-3x = -13$
   $x = 4 \frac{1}{3}$

2.) $5x - 4 + 2(x - 4) = 16$
   $5x - 4 + 2x - 8 = 16$
   $7x - 12 = 16$
   $7x = 28$
   $x = 4$

3.) $20 + 3x - 15 + x = 27$
   $5 + 4x = 27$
   $4x = 22$
   $x = 5 \frac{1}{2}$

4.) $11 - 2x + 8x + 5 = 32$
   $16 + 6x = 32$
   $6x = 16$
   $x = 2 \frac{2}{3}$

5.) $5(2x - 7) + 42 - 3x = 2$
   $10x - 35 + 42 - 3x = 2$
   $7x + 7 = 2$
   $7x = -5$
   $x = -5/7$

6.) $2(4x - 2) - 5x = -18$
   $8x - 4 - 5x = -18$
   $3x - 4 = -18$
   $3x = -14$
   $x = -4 \frac{2}{3}$

7.) $30 - 6(x + 3) + 2x = 8$
   $30 - 6x - 18 + 2x = 8$
   $12 - 4x = 8$
   $-4x = -4$
   $x = 1$

8.) $23 + 4(x - 3) - x = 11$
   $23 + 4x - 12 - x = 11$
   $11 + 3x = 11$
   $3x = 0$
   $x = 0$

9.) $2x - 14 + 3(x + 1) = -4$
   $2x - 14 + 3x + 3 = -4$
   $5x - 11 = -4$
   $5x = 7$
   $x = 1 \frac{2}{5}$

10.) $6(2x + 2) + 12 = 50$
    $12x + 12 + 12 = 50$
    $12x + 24 = 50$
    $12x = 26$
    $x = 2 \frac{1}{6}$
Greater Than >, Less Than < or Equal =

Directions: 1. Multiply or divide to find a common denominator.
2. Then compare the numerator.
3. Write >, <, or = in the circle.

\[
\begin{align*}
\frac{3}{4} & > \frac{1}{4} & \frac{5}{7} & < \frac{6}{7} & \frac{2}{10} & < \frac{8}{10} \\
\frac{2}{6} & < \frac{2}{3} & \frac{4}{6} & \frac{4}{1} & < \frac{5}{8} & \frac{5}{18} & < \frac{1}{3} & \frac{6}{18} \\
\frac{20}{25} & < \frac{4}{5} & \frac{22}{25} & \frac{35}{42} & > \frac{33}{42} & \frac{80}{100} & = \frac{4}{5} & \frac{80}{100} \\
\frac{15}{21} & > \frac{4}{7} & \frac{12}{21} & \frac{12}{24} & < \frac{2}{4} & \frac{4}{9} & < \frac{36}{81} & \frac{18}{27} & = \frac{6}{9} \\
\frac{3}{5} & < \frac{21}{35} & \frac{16}{40} & \frac{2}{5} & \frac{4}{7} & < \frac{28}{49} & \frac{18}{21} & < \frac{6}{7} & \frac{5}{12} & < \frac{60}{144} & \frac{12}{24} & < \frac{6}{12} \\
\frac{14}{35} & < \frac{2}{7} & \frac{20}{36} & \frac{5}{9} & \frac{3}{4} & < \frac{27}{36} & \frac{16}{24} & < \frac{4}{6} & \frac{21}{7} & = \frac{8}{24} \\
\frac{72}{104} & > \frac{9}{13} & \frac{5}{8} & < \frac{65}{104} & \frac{72}{90} & > \frac{8}{10} & \frac{6}{9} & < \frac{60}{90} & \frac{28}{44} & > \frac{7}{11} & \frac{2}{4} & > \frac{22}{44} \\
\frac{25}{10} & > \frac{20}{10} & \frac{7}{6} & > \frac{4}{6} & \frac{46}{6} & > \frac{14}{4} & \frac{2}{4} & \frac{8}{7} & > \frac{57}{7} & \frac{62}{9} & > \frac{6}{9}
\end{align*}
\]
Adding Exponents

Adding exponents may seem like a daunting task at first, but once we know a few key terms, you will find that adding exponents is not so bad at all.

- Exponentiations are always written with a base number and an exponent: \( b^n \)
- When multiplying two exponentiations with the same base number, we can simply add their exponents to find our answer quickly.

Example: \( 4^3 \times 4^2 = ? \)

This equation is the same as writing, \( 4^{(3+2)} = 4^5 = 4 \times 4 \times 4 \times 4 \times 4 = 1,024 \)

For each problem below, first add the exponents if the bases are the same in the equation. Write out your result and solve the problem.

1) \( 2^3 \times 2^2 = ? \)
\[
2^{(3+2)} = 2^5 = 2 \times 2 \times 2 \times 2 \times 2 = 32
\]

2) \( 3^1 \times 3^0 = ? \)
\[
3^{(1+0)} = 3^1 = 3
\]

3) \( 3^4 \times 3^5 = ? \)
\[
3^{(4+5)} = 3^9 = 3 \times 3 \times 3 \times 3 \times 3 \times 3 \times 3 \times 3 \times 3 = 19,683
\]

4) \( 4^6 \times 4^0 = ? \)
\[
4^{(6+0)} = 4^6 = 4 \times 4 \times 4 \times 4 \times 4 \times 4 = 4,096
\]

5) \( 4^4 \times 4^1 = ? \)
\[
4^{(4+1)} = 4^5 = 4 \times 4 \times 4 \times 4 \times 4 = 1,024
\]

6) \( 5^2 \times 5^3 = ? \)
\[
5^{(2+3)} = 5^5 = 5 \times 5 \times 5 \times 5 \times 5 = 3,125
\]

7) \( 5^5 \times 5^0 = ? \)
\[
5^{(5+0)} = 5^5 = 5 \times 5 \times 5 \times 5 \times 5 = 3,125
\]

8) \( 6^2 \times 6^2 = ? \)
\[
6^{(2+2)} = 6^4 = 6 \times 6 \times 6 \times 6 = 1,296
\]
Measuring Angles

Use your protractor to measure each angle.

1. This angle is \(90\) degrees.

2. This angle is \(45\) degrees.

3. This angle is \(130\) degrees.

4. This angle is \(75\) degrees.

5. This angle is \(20\) degrees.

6. This angle is \(59\) degrees.

7. This angle is \(67\) degrees.

8. This angle is \(210\) degrees.

9. This angle is \(236\) degrees.

10. This angle is \(30\) degrees.
**Algebraic Equations**

(Answer sheet)

Write out an algebraic equation for each sentence.

1.) Three more than twice a number is eleven. \[ 3 + 2X = 11 \]
2.) Five times a number decreased by three is seven. \[ 5X - 3 = 7 \]
3.) Fifteen is ten increased by a number. \[ 15 = 10 + X \]

Complete the following algebraic equations.

1.) \[ 3X + 10 = 22 \] \[ X = 4 \]
2.) \[ 24 - 4X = 4 \] \[ X = 5 \]
3.) \[ 5 - 2X + 17 = 18 \] \[ X = 2 \]

Complete the following word problems using an algebraic equation.

1.) Tanya wants to make an apple pie and has 5 apples. She needs 12 apples to finish the pie. How many more apples does she need?
\[ 5 + X = 12 \] \[ X = 7 \]

2.) Steven wants to buy a game for $34.00. He has saved up $20.00. How much more money does he need to buy the game?
\[ 34 = 20 + X \] \[ X = 14 \]

3.) Sarah is selling lemonade. She has sold a total of 14 cups. 4 cups were sold to adults and she sold 2 batches of lemonade to other children. How many cups were in each batch?
\[ 14 = 4 + 2X \] \[ X = 5 \]
Algebra: Greater Than, Less Than or Equal To
(answer sheet)
Determine the relationship between the algebraic equations. Place > (greater than), < (less than) or = (equal to) in the space provided.

Where x = 3

1.) 5x + 4 _< _ 3x + 15
   2x _____ 11
   6 _____ 11
2.) 2x + x _< _ 6x – 5
   5 _____ 3x
   5 _____ 9
3.) x + 23 _> _ 5x – 4
   27 _____ 4x
   27 _____ 12
4.) 6x – 2 _= _ 4x + 4
   2x _____ 6
   6 _____ 6
5.) 7x – 2 _> _ 4x + 4
   3x _____ 6
   9 _____ 6
6.) 3x + 5 _= _ 6x – 4
   9 _____ 3x
   9 _____ 9

Where x = 7

1.) 3x – x _= _ 4x – 14
   14 _____ 2x
   14 _____ 14
2.) 2x + 10 _< _ 5x – 5
   15 _____ 3x
   15 _____ 21
3.) 2x + 12 _> _ 3x – 4
   16 _____ x
   16 _____ 7
4.) 6x – 18 _= _ 4x – 4
   2x _____ 14
   14 _____ 14
5.) x + x + 7 _< _ 5x
   7 _____ 3x
   7 _____ 21
6.) 8x _> _ 3x + 2x + 15
   3x _____ 15
   21 _____ 15

Copyright 2012-2013 Education.com
Number Sequences
(answer sheet)
Fill in the missing number that completes the sequence.

Ex. 1, 2, __, 4: the missing number is 3

1.) 2, 4, __6__, 8 2.) 1, 5, __9__, 13 3.) 3, 6, __9__, 12
4.) 5, __10__, 15, 20 5.) 1, __3__, 9, 27 6.) 4, __8__, 16, 32
7.) 6, 8, __12__, 20 8.) 4, 5, __7__, 10 9.) 4, 9, 16, __25__
10.) 8, 27, 64, 125, __216__ 11.) 0, 1, 1, 2, 3, 5, __8__
12.) 30, 28, 26, 24, __22__ 13.) 16, 12, 8, __4__
14.) 27, 26, 24, 21, __17__ 15.) 32, 30, 26, 18, __2__
16.) 500, 100, 20, __4__ 17.) 48, 24, 12, __6__
18.) 81, 27, 9, __3__ 19.) 256, 64, 16, __4__
Plot the ordered pairs below in the graph above to reveal a letter.

1.) (3, -6)  
2.) (-7, 0)  
3.) (-4, 8)  
4.) (9, 0)  
5.) (4, 9)  
6.) (-7, 3)  
7.) (0, 9)  
8.) (7, 7)  
9.) (-6, -2)  
10.) (0, -6)  
11.) (6, -5)  
12.) (-5, 7)  
13.) (-4, -5)  
14.) (9, -1)  
15.) (3, 1)  
16.) (8, -3)  
17.) (9, 1)  
18.) (8, 5)  
19.) (7, 1)  
20.) (-2, -6)
Plot the ordered pairs below in the graph above.

1.) (8, 3)  
2.) (4, -6)  
3.) (-3, 2)  
4.) (-5, -7)  
5.) (7, 4)  
6.) (7, -4)  
7.) (-3, 5)  
8.) (-8, -4)  
9.) (6, -2)  
10.) (9, 9)  
11.) (-2, -6)  
12.) (10, 4)  
13.) (0, 0)  
14.) (3, 2)  
15.) (-1, -2)  
16.) (-4, 2)  
17.) (-6, -3)  
18.) (8, -8)  
19.) (-10, -5)  
20.) (-9, 4)
Comparing Decimals

Compare decimals. Write <, > or =.

1. 5.25  <  5.43
2. 7.467  <  7.674
3. 0.14  <  0.15
4. 1.555876  =  1.555876
5. 71.05  <  72.00
6. 6.1  <  6.13
7. 9.120  =  9.12
8. 4.311  =  4.311
9. 5.800001  <  5.800002
10. 3  >  0.03
11. 9.3540  <  9.5430
Combining Like Terms

1.) \(x + 2x = 3x\)
2.) \(2x - x = x\)
3.) \(4x + 2x = 6x\)
4.) \(6x - 3x = 3x\)
5.) \(5x + x = 6x\)
6.) \(2x + 2x = 4x\)
7.) \(7x - 5x = 2x\)
8.) \(3x - 2x = x\)
9.) \(x + x = 2x\)
10.) \(x^2 + 2x^2 = 3x^2\)
11.) \(4x^2 - 3x^2 = x^2\)
12.) \(3x^2 + 2x^2 = 5x^2\)
13.) \(2x^2 + 2x + x^2 + x = 3x^2 + 3x\)
14.) \(5x + x^2 - 2x + x^2 = 3x + 2x^2\)
15.) \(3x + 2x - x + 2x^2 = 4x + 2x^2\)
16.) \(6x + 3x^2 - x - x^2 = 5x + 2x^2\)
17.) \(4x + 3 + x^2 - x = 3x + 3 + x^2\)
18.) \(2x + 3x + 9 + x = 6x + 9\)
19.) \(2x^2 + 3 + 3x - 1 = 2x^2 + 2 + 3x\)
20.) \(2x + 5 + x^2 - x = x + 5 + x^2\)
21.) \(2x + 4y - x + y = x + 5y\)
22.) \(2y + x + 3x - y = y + 4x\)
23.) \(x + y + 2y - 4 = x + 3y - 4\)
24.) \(5 + 2x + y + 2x - 1 = 4 + 4x + y\)
25.) \(3y + 2 + 2y + 5 = 5y + 7\)
26.) \(2x + 2y + x^2 - x + x^2 = x + 2y + 2x^2\)
Introduction to Algebraic Expressions

**ANSWERS**

Calculating an equation or expression using the following order:
1. Anything in parentheses
2. Exponents
3. Multiplication and division, from left to right
4. Addition and subtraction, from left to right

Using the order of operations, complete the following algebra problems.

Ex. 1. \((5 + 9) - 3^2 + 4 \times 6\)
   1. \(14 - 3^2 + 4 \times 6\)
   2. \(14 - 9 + 4 \times 6\)
   3. \(14 - 9 + 24\)
   4. \(5 + 24 = 29\)

Ex. 2. \(24 - 2 + (4 \times 2)\)
   1. \(24 - 2 + 8\)
   2. \(22 + 8 = 30\)

Ex. 3. \(8 \times 4 - 9 + 5^2\)
   1. \(32 - 9 + 25\)
   2. \(23 + 25 = 48\)

Ex. 4. \(5 + (7 + 9) - 1 \times 2^3\)
   1. \(5 + 16 - 1 \times 2^3\)
   2. \(5 + 16 - 1 \times 8\)
   3. \(5 + 16 - 8\)
   4. \(21 - 8 = 13\)

Ex. 5. \(6 + 12 \div 3 + (17 - 5)\)
   1. \(6 + 12 \div 3 + 12\)
   2. \(6 + 4 + 12\)
   3. \(10 + 12 = 22\)

Ex. 6. \(4^2 + 4 \times 3 - 5\)
   1. \(16 + 4 \times 3 - 5\)
   2. \(16 + 12 - 5\)
   3. \(28 - 5 = 23\)

Monomials that have the same variables with the same exponent. Combining like terms reduces multiple monomials into one monomial.

**LIKE TERMS**

Simplify the following algebraic expressions by combining like terms.

Ex. 1. \(7 + 2x - 1 + 5x + 3x^2\)
   1. \(7 - 1 + 2x + 5x + 3x^2\)
   2. \(6 + 7x + 3x^2\)

Ex. 2. \(10x + 8 - 2x + x^3 + 5\)
   1. \(10x - 2x + 8 + 5 + x^3\)
   2. \(8x + 13 + x^3\)

Ex. 3. \(8 - 3 - 2x + 10x\)
   1. \(5 + 10x - 2x\)
   2. \(5 + 8x\)

Ex. 4. \(2x^2 + 3x + x^2 - x + 4\)
   1. \(2x^2 + x^2 + 3x - x + 4\)
   2. \(3x^2 + 2x + 4\)

Ex. 5. \(x + x + 2x^3 + 3x\)
   1. \(x + x + 3x + 2x^3\)
   2. \(5x + 2x^3\)

Ex. 6. \(9 + x^3 - 3 + x^3 - 2x\)
   1. \(9 - 3 + x^3 + x^3 - 2x\)
   2. \(6 + 2x^3 - 2x\)
Playing with Polynomials

Identify the polynomials.

\[ x^2 + 3 \quad \frac{2}{x + 2} \quad 4x^4 \quad 6x + 2y \quad 10x \quad \frac{2}{x} \]

Multiple Choice

A polynomial can have
a.) constants
b.) exponents
c.) variables
d.) all of the above

A polynomial does not use
a.) division
b.) addition
c.) multiplication
d.) subtraction

True or False

_F__ Polynomials can have an infinite number of terms.
_T__ A monomial is a polynomial that has one term.
_T__ If you add or multiply polynomials, the result is a polynomial.
_F__ A polynomial has to have a variable.

Put the following polynomials in standard form.

<table>
<thead>
<tr>
<th>Original Expression</th>
<th>Standard Form</th>
</tr>
</thead>
<tbody>
<tr>
<td>[ 3x + 2x^4 + 7 ]</td>
<td>[ 2x^4 + 3x + 7 ]</td>
</tr>
<tr>
<td>[ 10 + 2x + 5x^2 ]</td>
<td>[ 5x^2 + 2x + 10 ]</td>
</tr>
<tr>
<td>[ x^3 + 4x + 2x^2 + 5 ]</td>
<td>[ x^3 + 2x^2 + 4x + 5 ]</td>
</tr>
<tr>
<td>[ x + 7 + 3x^2 + 5x^4 ]</td>
<td>[ 5x^4 + 3x^2 + x + 7 ]</td>
</tr>
</tbody>
</table>
Complementary and Supplementary Angles

**Complementary Angles**

Two angles are complementary if they add up to 90 degrees (a right angle). If $\angle a + \angle b = 90^\circ$, then $\angle a$ and $\angle b$ are complementary angles.

**Examples:**
- $60^\circ$ and $30^\circ$ angles are complementary angles
- $80^\circ$ and $10^\circ$ angles are complementary angles
- $20^\circ$ and $30^\circ$ angles are not complementary angles

**Practice Problems:** solve for the missing complementary angle, $x$.

- $45 + x = 90^\circ$, $x = 45$
- $x + 32 = 90^\circ$, $x = 58$
- $80 + x = 90^\circ$, $x = 10$

**Supplementary Angles**

Two angles are supplementary if they add up to 180 degrees. If $\angle a + \angle b = 180^\circ$, then $\angle a$ and $\angle b$ are supplementary angles.

**Examples:**
- $150^\circ$ and $30^\circ$ angles are supplementary angles
- $80^\circ$ and $100^\circ$ angles are supplementary angles
- $70^\circ$ and $90^\circ$ angles are not supplementary angles

**Practice Problems:** solve for the missing supplementary angle, $x$.

- $x + 75 = 180^\circ$, $x = 105$
- $x + 50 = 180^\circ$, $x = 130$
- $x + 45 = 180^\circ$, $x = 135$

**Determine whether $\angle a$ and $\angle b$ are complementary or supplementary.**

- $\angle a = 50^\circ$, $\angle b = 40^\circ$ complementary
- $\angle a = 80^\circ$, $\angle b = 100^\circ$ supplementary
- $\angle a = 35^\circ$, $\angle b = 145^\circ$ supplementary
- $\angle a = 75^\circ$, $\angle b = 15^\circ$ complementary
- $\angle a = 20^\circ$, $\angle b = 70^\circ$ complementary
- $\angle a = 60^\circ$, $\angle b = 120^\circ$ supplementary
- $\angle a = 65^\circ$, $\angle b = 115^\circ$ supplementary
- $\angle a = 65^\circ$, $\angle b = 25^\circ$ complementary
Fill in the missing information about these cookies!

**Formulas:**
- Diameter = 2(radius)
- Circumference = $\pi$(diameter)
- Area = $\pi r^2$

For this assignment please use $\pi = 3.14$

<table>
<thead>
<tr>
<th>Diameter</th>
<th>Circumference</th>
<th>Area</th>
</tr>
</thead>
<tbody>
<tr>
<td>8.5</td>
<td>53.38</td>
<td>226.865</td>
</tr>
<tr>
<td>6.25</td>
<td>19.73</td>
<td>39.265</td>
</tr>
<tr>
<td>8</td>
<td>25.12</td>
<td>50.24</td>
</tr>
<tr>
<td>11.5</td>
<td>36.11</td>
<td>103.81625</td>
</tr>
</tbody>
</table>

For the cookie with the diameter of 6.25, the circumference is calculated as follows:

$\text{Circumference} = \pi \times \text{diameter} = 3.14 \times 6.25 = 19.73$
PROPERTIES OF PARALLELOGRAMS

Solve for $x$ using your knowledge of parallelogram.

EXAMPLE:

1. $x = 115^\circ$
2. $x = 42^\circ$
3. $x = 80^\circ$
4. $x = 86^\circ$
5. $x = 47^\circ$
6. $x = 66^\circ$
7. $x = 45^\circ$
1. \(-6 = x + 10\)  
   \(-6 = x + 10\)  
   \(-10\)  
   \(-16 = x\)

2. \(-5 + x = 7\)  
   \(-5 + x = 7\)  
   \(-10\)  
   \(-16 = x\)

3. \(15 = x + 3\)  
   \(15 = x + 3\)  
   \(-10\)  
   \(-16 = x\)

4. \(x - 12 = -2\)  
   \(x - 12 = -2\)  
   \(-10\)  
   \(-16 = x\)

5. \(x - 4 = -8\)  
   \(x - 4 = -8\)  
   \(-10\)  
   \(-16 = x\)

6. \(-9 + x = 8\)  
   \(-9 + x = 8\)  
   \(-10\)  
   \(-16 = x\)

7. \(x + 7 = -18\)  
   \(x + 7 = -18\)  
   \(-10\)  
   \(-16 = x\)

8. \(x - 17 = -1\)  
   \(x - 17 = -1\)  
   \(-10\)  
   \(-16 = x\)

9. \(-6 + x = 7\)  
   \(-6 + x = 7\)  
   \(-10\)  
   \(-16 = x\)

10. \(-6 + x = 7\)  
    \(-6 + x = 7\)  
    \(-10\)  
    \(-16 = x\)
1. $15 = x + 19$  \hspace{1cm} x = -4

2. $x - 16 = -10$  \hspace{1cm} x = 6

3. $-14 = x - 7$  \hspace{1cm} x = -7

4. $x - 10 = -2$  \hspace{1cm} x = 8

5. $x + 25 = -5$  \hspace{1cm} x = -30

6. $x - 8 = -13$  \hspace{1cm} x = -5

7. $4 + x = 8$  \hspace{1cm} x = 4

8. $19 + x = -7$  \hspace{1cm} x = -26

9. $x - 12 = -3$  \hspace{1cm} x = 9

10. $-17 = x + 5$  \hspace{1cm} x = -22
TRIANGLE ANGLES

Find the unknown angles in the following triangles. Write down the missing angle and what type of triangle it is!

EXAMPLE:

TRIANGLE ANGLES

50
x
20
x = 40
RIGHT ANGLE
TRIANGLE

65
x
x = 60
ACUTE
TRIANGLE

37
122
x
x = 21
OBTUSE
TRIANGLE

55
x
x = 55
ACUTE
TRIANGLE

31
x
x = 74
ACUTE
TRIANGLE

45
45
x
x = 45
ACUTE
TRIANGLE
1. Multiply the coefficients. 
   \((4x^2y^5)(4x^3y) = 16\)

Example:
\((4x^2y^5)(4x^3y) = \)

2. Multiply the variables by adding the exponents.
   \((x^2)(x^3) = x^{2+3} = x^5\)
   \((y^3)(y) = y^{5+1} = y^6\)

Answer: \(16x^5y^6\)

Multiply the monomials.

1. \((3)(4x) = \) \[\boxed{12x}\]

2. \((5xy^3)(2x^2y) = \) \[\boxed{10x^3y^4}\]

3. \((xy^6)(7xy^3) = \) \[\boxed{7x^2y^{11}}\]

4. \((y^3)(y^3) = \) \[\boxed{y^6}\]

5. \((3x)(4x^4y) = \) \[\boxed{12x^5y}\]

6. \((6xy^4)(2x^3y^6) = \) \[\boxed{12x^4y^{10}}\]

7. \((x^4y^5)(xy) = \) \[\boxed{x^5y^6}\]

8. \((2xy^5)(8x^3y) = \) \[\boxed{16x^4y^6}\]

9. \((10xy^5)(2xy) = \) \[\boxed{20x^2y^6}\]

10. \((7x)(2xy) = \) \[\boxed{14x^2y}\]
Use the information above to answer the questions below.

1. Is the next dart thrown more likely to hit a vowel or a consonant?
   - Vowel

2. What is the probability that the next dart thrown hits panel C or panel B?
   - \( \frac{1}{18} + \frac{1}{2} = \frac{5}{9} \)

3. Which panels have a probability less than or equal to \( \frac{1}{6} \) that they will be hit?
   - What is the probability that the next dart thrown hits one of them?
   - \( \frac{1}{36} + \frac{1}{8} + \frac{1}{18} + \frac{1}{9} = \frac{1}{4} \)

**Fractions**

- A: \( \frac{1}{36} \)
- B: \( \frac{1}{2} \)
- C: \( \frac{1}{18} \)
- D: \( \frac{1}{4} \)
- E: \( \frac{1}{18} \)
- F: \( \frac{1}{9} \)
1. Multiply the coefficients.
   
   \[ (4x^2y^5)(4x^2)(4x^3y) = 64 \]

2. Multiply the variables by adding the exponents.
   
   \[ (x^2)(x^2)(x^3) = x^{2+2+3} = x^7 \]
   \[ (y^2)(y) = y^{5+1} = y^6 \]
   
   Answer: \(64x^7y^6\)

Multiply the monomials.

1. \( (3x^4)(7x^4y^5)(3y^7) = 63x^{10}y^{12} \)
2. \( (2xy)(3xy)(6x^8y^4) = 36x^{10}y^6 \)
3. \( (5x^6y)(xy)(3xy^2) = 15x^8y^4 \)
4. \( (8xy)(11xy^6)(11y) = 968x^2y^8 \)
5. \( (7x^4)(xy)(x^2y) = 7x^9y^2 \)
6. \( (8x^3y^9)(x^7y)(x^5y^8) = 8x^{15}y^{18} \)
7. \( (5x^3y^6)(9x^4y)(xy) = 45x^8y^8 \)
8. \( (6x^2y)(xy^9)(x) = 6x^4y^{10} \)
9. \( (x)(x^6)(10x^7y) = 10x^{16}y \)
10. \( (8x^2y)(xy^7)(x^3y) = 8x^6y^9 \)
monomials
division

1. Divide the coefficients.

Example:

\[
\frac{4x^3y^5}{2x^2y} = \frac{4}{2} = 2
\]

2. Divide the variables by subtracting the exponents.

\[
\frac{x^3}{x^2} = x^{3-2} = x
\quad\text{and}\quad
\frac{y^5}{y} = y^{5-1} = y^4
\]

Answer: \(2xy^4\)

Divide the monomials.

1. \[\frac{6x^2y^5}{2xy^2} = \frac{3xy^3}\]

2. \[\frac{3x^4y^2}{1xy} = \frac{3x^3y}\]

3. \[\frac{12x^3y}{3x^2y} = 4x\]

4. \[\frac{9x^4y^6}{3x^3y^6} = 3x\]

5. \[\frac{6x^4y^6}{3x^2y^4} = 2x^2y^2\]

6. \[\frac{7x^3y^2}{7x^3y} = y\]

7. \[\frac{2x^{11}y^7}{x^8y^3} = 2x^3y^4\]

8. \[\frac{15xy^{14}}{5y^3} = 3xy^{11}\]

9. \[\frac{18x^2y^3}{3xy^3} = 6x\]

10. \[\frac{4y^{15}}{2y^{10}} = 2y^5\]