Sections 7.1 and 7.2

7.1 Algebraic Language and Formulas

Literal Numbers (Variables) - letter inserted for numbers

Operations with algebra...Add....Subtract....Multiply

1) \(x + x + x = 3x\)  \(2 + 2 + 2 = 6\)

2) \(x - x = 0\)
Multiply

\[ 4x \quad 5y \]

\[ 3(x + y) \]

grouping...( ) {} []

parenthesis braces brackets

\[ 4(a + b) \]
\[ 5[2(1+x)] \]
\[ 5(2(1+x)) \]
Division

\[
\frac{3x}{x} = 3, \quad \frac{3(x)}{2} = 3, \quad \frac{3(x)}{5}
\]

Do NOT go for these errors!

\[
\frac{2x - y}{y} \rightarrow \frac{2x - y}{y}
\]

Expression

\[
\rightarrow \text{mathematical statement with no equal sign}
\]

\[
\rightarrow \text{simplify}
\]

\[
2x + y, \quad x - 3y
\]
Terms - parts of the expression... usually separated by a + or -

\[ 3x - y - 2\text{ terms} \rightarrow 3x + y \]

\[ 5a + 4b - c \rightarrow 3\text{ terms} \]

\[ 3xy + 2x - 5 \rightarrow 3\text{ terms} \]

\[ 3(x+y) - 2 \rightarrow 2\text{ terms} \]

\[ 5(x^2 + 3x - 5) + 12 \]

Factors - terms divided into smaller quantities

\[ 3x - y \]

factors \( \rightarrow 3 \) \( x \)

\[ 5a + 4b \]

factors \( \rightarrow 5 \) \( a \) \( 4 \) \( b \)

\[ x^2 + 3x - 5 \]

factors \( \rightarrow x \) \( x \) \( 3 \) \( x \) \( -5 \)
Evaluating Formulas

If the simple interest formula is \( I = PRT \), what interest would I get if I had \$3500 \( P \) at 5\% \( R \) for 3 years \( T \)?

\[
I = 3500 (.05) (3)
\]

\[
I = \$525
\]

If I had \$3000 \( P \) at 7\% \( R \) for 2 years \( T \)?

\[
I = 3000 (.07) (2)
\]

\[
I = 420
\]
If perimeter is figured by the formula $P = 2L + 2W$, what is the perimeter of a rectangle with a width (W) of 8 cm and a length (L) of 5 cm?

\[
P = 2(5) + 2(8) \\
P = 10 + 16 \\
P = 26 \text{ cm}
\]

The cost for an item is figured by $C = S - M$. If the selling price (S) is $55.50 and the markup (M) is $15.20.

\[
C = 55.50 - 15.20 \\
C = $40.30
\]
Find the volume from the given formula when $\pi = 3.14$, $D = 8.45$, and $H = 10.50$. Use precision.

$$V = \frac{\pi D^2 H}{4}$$

$$V = \frac{3.14(8.45)^2(10.50)}{4}$$

$$V = \frac{3.14(71.4025)(10.50)}{4}$$

$$V = \frac{2354.140425}{4} = 588.53510$$

$$V = 588.54 \text{ in}^3$$

This formula is used to figure the area of a circular object with a hole in it. What if this object has a big radius ($R$) of 2.75in and a small radius ($r$) of 1.3in. Use 3.14 for $\pi$. Answer with significant digits.

$$A = \pi (R^2 - r^2)$$

$$A = 3.14(2.75^2 - 1.3^2)$$

$$A = 3.14(7.5625 - 1.69)$$

$$A = 3.14(5.8725)$$

$$A = 18.43965 \text{ in}^2$$

$$18 \text{ in}^2$$
This formula will convert Celsius to Fahrenheit. If I am heading to Europe and the temperature is forecasted as 37 degrees C....what should I pack?

\[ F = \frac{9}{5}C + 32 \]

\[ F = \frac{9}{5}(37) + 32 \]
\[ F = 66.6 \text{°} \]

So you have started talking to a person from Japan about Montana. They ask about the weather and you say it was a high of 10 yesterday...but realize that is not the same for them so they will not understand. What should you tell them the temp was?

\[ C = \frac{5}{9}(F - 32) \]

\[ C = \frac{5}{9}(10-32) \]
\[ C = \frac{5}{9}(-22) \]
\[ C = -12.2 \text{°} \]
Section 7.2
Adding and Subtracting Expressions

Like Terms
- Variables and exponents are the same

\[ x + x^2 \text{ - unlike} \]
\[ y + y \text{ - like} \]
\[ 3x^2y + 4xy \text{ - unlike} \]
\[ 5a^2b + 3ab^2 \text{ - unlike} \]
\[ 3ab + 5ab \text{ - like} \]

\[ 3x^2 + 5x^2 + 6 - 3y \]
\[ 8x^2 + 6 - 3y \]
\[ 5y - 6 + y^2 \]
\[ 5y - 2y - 6 + y^2 \]
\[ 3y - 6 + y^2 \]
Parenthesis

\[ 3(x + y) + 2y \]
\[ 3x + 3y + 2y \]
\[ 3x + 5y \]
\[ 5 - 6(a + 3b) \]
\[ 5 - 6a - 18b \]

\[ 2x + 4a - 5(a + b - 3c) \]
\[ 2x + 4a - 5a - 5b + 15c \]
\[ 2x - a - 5b + 15c \]
\[ 3(x + 2y - a) + 4(a + 3b - x) \]
\[ 3x + 6y - 3a + 4a + 12b - 4x \]
\[ -1x + a + 6y + 12b \]