

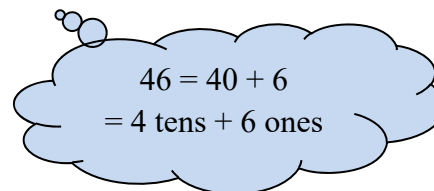
What is a whole number?

Can you write them in set notation (using those lovely, curly set brackets $\{\dots\}$)?

Decimal System:

Our numbers are based on sets of ten, because of our ten little fingers. For instance, the number 46 means 4 groups of ten and 6 singles (ones). This is called **expanded form**. Recall, this uses the **digits** 0, 1, 2, 3, 4, 5, 6, 7, 8, and 9.

expl 1: Expand 435 and 1,286.



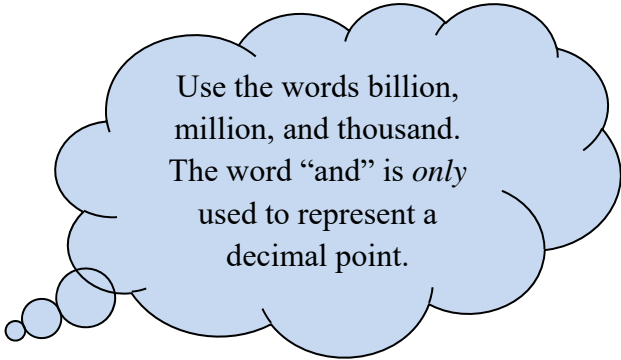
The place where a digit is has meaning. We talk of the ones, tens, hundreds, thousands, ten thousands, etc.

expl 2: Label each digit in the number 35,783 with its place.

Recall, numbers are broken up into chunks of three digits, using commas to separate. We have, starting at the fourth digit from the decimal point on right and going to the left, thousands, millions, billions, trillions, etc.

expl 3: Write out the following numbers

a.) 47,635,098,459



Use the words billion, million, and thousand. The word “and” is *only* used to represent a decimal point.

b.) -52,726

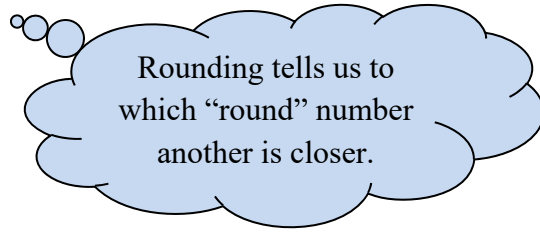
expl 4: Read aloud and write in correct numerical form.

seven thousand, three hundred eighty-two

Rounding:

Can you round 734 to the nearest hundred?

To fully understand what we are doing, plot a real number line with 0, 700, and 800 marked roughly to scale. Then place, as accurately as you can, the number 734 on the line. To which number, 700 or 800, is 734 closer?



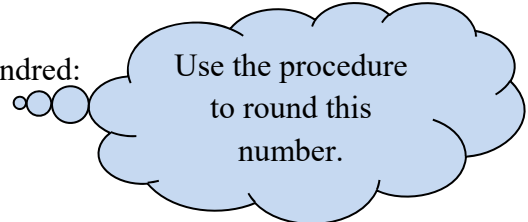
Rounding tells us to which “round” number another is closer.

Book's Procedure for Rounding:

Step 1: Determine place to which we are to round. Mark below the number to the right of this place with some mark like ^ (or underline the place to which we are rounding)

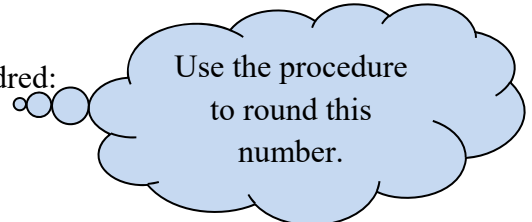
Step 2: If the digit to the right (of your mark) is less than 5, replace all digits to the right with zeros.

Example: 734 rounded to the nearest hundred:

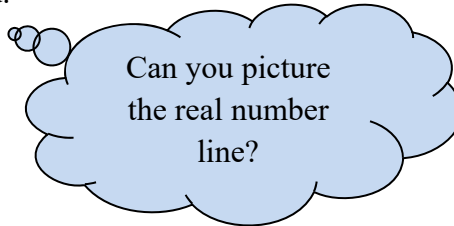


OR Step 3: If the digit to the right of your mark is 5 or more, increase the digit to the left of your mark (or the one you underlined) by 1. Replace all digits to the right of that with zeros.

Example: 762 rounded to the nearest hundred:

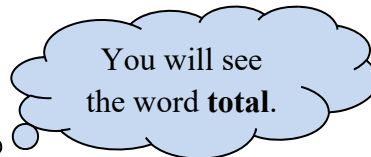


expl 5: Round 8,750 to the nearest thousand.

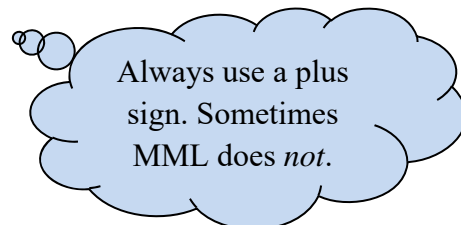


Addition:

Definition: Sum: the answer to an addition problem

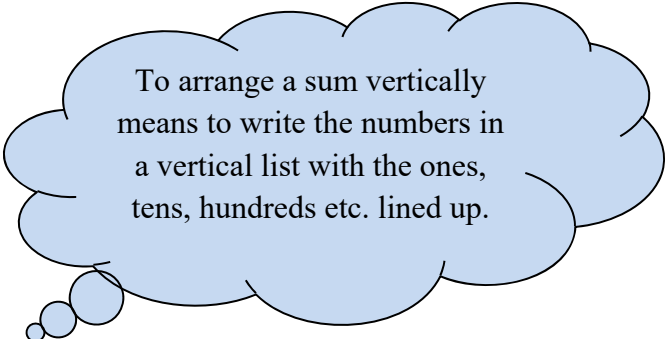


It would be nice to know how to add one and two-digit numbers by hand. However, you are allowed to use the calculator (or whatever device you might have at a job site, perhaps your phone). You should know how to use the device's calculator function. If you have questions, ask and we can figure it out.



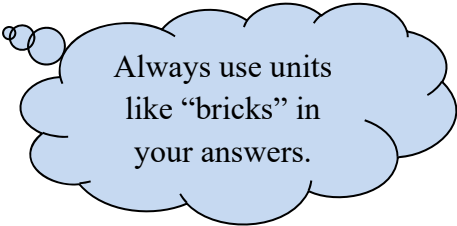
Estimation and Mental Math:

If we need to do $47 + 32$ in the field, it would be helpful to be able to quickly estimate it. Round each number to something you can quickly add.



Applications:

expl 6: The Happy Helper building materials supplier has four piles of bricks with 1250, 865, 742, and 257 bricks. What is the total number of bricks?



expl 7: Margaret is competing at a track-and-field competition. She ran the 100-meter hurdles in 12.80 seconds, earning her 1155 points. She performed a high jump of 1.84 meters, earning her 1030 points. She then threw a shot-put to a distance of 14.92 meters, earning her 856 points. What is her point total? (Extra point: How big of a butt-kicker is she?)

Units of Measure:

We will be specific as to what our numbers are counting. Are we measuring in centimeters or inches or bales of hay? We will get in more detail as we go but this will get us started.

Type of Measurement	U.S. Customary Units	Metric Units
Length or distance	inch (in.* or ") foot (ft or ') yard (yd) mile (mi)	millimeter (mm) centimeter (cm) meter (m) kilometer (km)
Weight	ounce (oz) pound (lb) ton (t)	microgram (μg) milligram (mg) gram (g) kilogram (kg)
Area	square inch (sq in.) square foot (sq ft) square yard (sq yd) acre (a)	square centimeter (sq cm) square meter (sq m) square kilometer (sq km) hectare (ha)
Capacity or volume	fluid ounces (fl oz) pint (pt) quart (qt) gallon (gal) bushel (bu) cubic inch (cu in.) cubic foot (cu ft) cubic yard (cu yd)	cubic centimeter (cu cm, cc) milliliter (mL) liter (L) cubic meter (cu m)
Velocity or speed	miles per hour (mph or mi/hr) beats per minute (bpm) cycles per second (hertz) revolutions per minute (rpm or rev/min)	meters per second (m/sec) kilometers per hour (km/hr)
Temperature	degrees Fahrenheit ($^{\circ}\text{F}$)	degrees Celsius ($^{\circ}\text{C}$)
Power, energy, and heat	ohm (Ω) watt (W) volt (V) ampere (A) horsepower (hp) British thermal unit (Btu)	cubic foot per meter (cfm) kilohertz (kHz) picofarad (pF) kilowatt (kW)
Pressure	pounds per square inch (psi or lb/in. ²)	pascal (Pa)
Amount of lumber	board feet (bf or fbm)	

*For abbreviations that might be mistaken for a word (e.g., "in" for inches), a period is included at the end of the abbreviation. For abbreviations that would not be mistaken for a word (e.g., "ft"), no period is added.