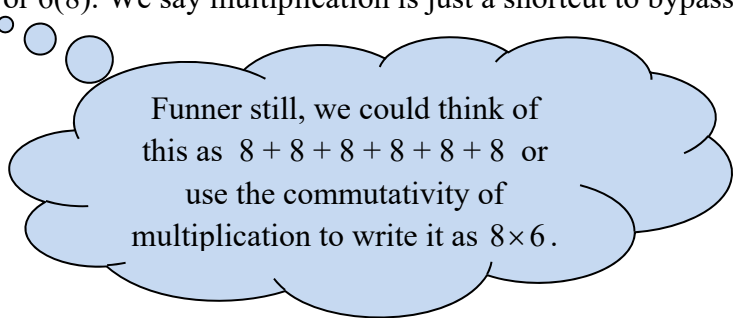


Multiplication is repeated addition.

Let's say you have 8 boxes of pencils with 6 pencils in each box. How many total pencils do you have?

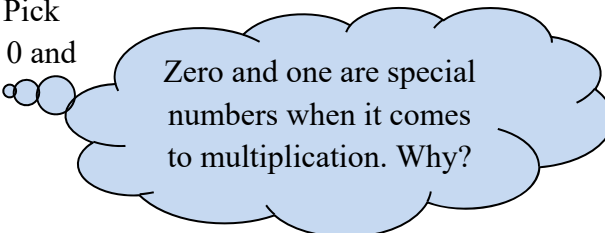
You could write this as  $6 + 6 + 6 + 6 + 6 + 6 + 6 + 6$  or, way more simpler,  $6 \times 8$ . You might also see this **product** written as  $6 \cdot 8$  or  $6(8)$ . We say multiplication is just a shortcut to bypass repeated addition.



Funner still, we could think of this as  $8 + 8 + 8 + 8 + 8 + 8$  or use the commutativity of multiplication to write it as  $8 \times 6$ .

It would be nice to know basic products of the whole numbers through 12 by rote. Practice them online or with flash cards.

What happens when you multiply by 0 or 1? Pick any number greater than 1 and multiply it by 0 and then by 1. What do you get?



Zero and one are special numbers when it comes to multiplication. Why?

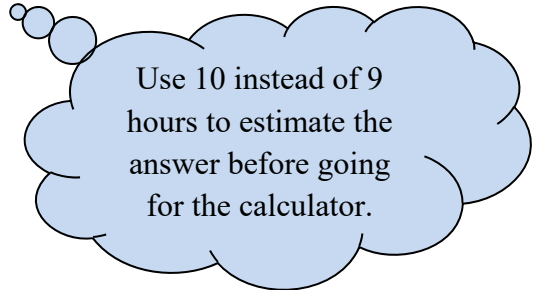
Once again, if we estimate the numbers we are working with, we can get an **estimate** of the final product that will help us gauge if we are right. Let's try that out in the next example.

**Multiplying by 10, 100, 1000, etc.:**

Recall that when we multiply a number by a multiple of 10, we can simply add zeroes to the end of the number. For instance,  $75 \times 10 = 750$ ,  $75 \times 100 = 7500$ , and  $75 \times 1000 = 75,000$ .

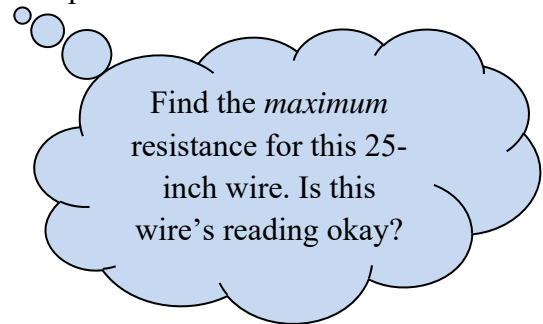
expl 1: Margaret is paid \$85 per hour for a plumbing job. If she works 9 hours, how much should she be paid? Include units, of course.

Estimate:

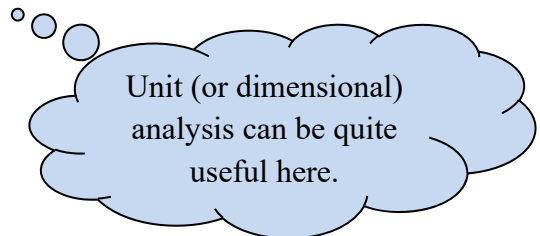


Calculator:

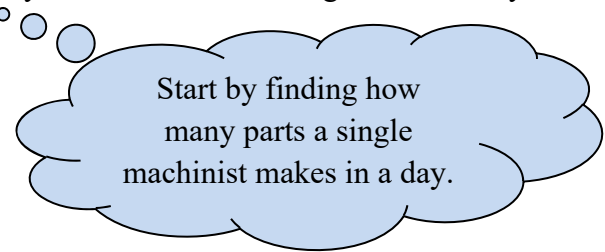
expl 2: The maximum resistance for a new spark plug wire is 850 ohms per inch. A 25-inch wire had a resistance of 21,500 ohms. Does that fall within the acceptable limit?



expl 3: If a machine produces 14 bolts per minute, how many bolts will it produce in a 24-hour period?



expl 4: The Perilous & Perplexing Parts Company boasts that a single machinist can produce 3 parts per hour. How many parts should be produced by 15 machinists working an 8-hour day?



expl 5: Evelyn's Envelopes sells envelopes in packages of 50, 100, or 200 envelopes. A shipping box has 12 packages of the first size, 10 packages of the second size, and 25 packages of the third size. How many total envelopes is in this box?

**Optional Handouts:**

You will find on [www.stlmath.com](http://www.stlmath.com) links to an outside source to print a multiplication table for facts through 9x9 and two different formats for tables for facts through 12x12. Use them if you are rusty on these basic products.