Name: Key Class: _____

M8-U6: Notes #5 – Scientific Notations Operations: Multiplication & Division

Date: _____

Perform the following operations; leave your answer in scientific notation.

Example 1: $(3\times10^{8})(3) =$

9×10^{8}

Example 2: $(9)(2\times10^{5}) =$

18×10^{5}

$(1.8\times10)\times10^{5}$

1.8×10^{6}

Try-It!

a) $(2\times10^{6})(4) =$

8×10^{6}

b) $(4\times10^{8})(6) =$

24×10^{8}

$(2.4\times10^{1})\times10^{8}$

2.4×10^{9}

Example 3: $(3\times10^{8})(3\times10^{4}) =$

9×10^{12}

Example 4: $(7\times10^{7})(5\times10^{-5}) =$

35×10^{2}

$(3.5\times10^{1})\times10^{2}$

3.5×10^{3}

Try-It!

a) $(6\times10^{7})(2\times10^{4}) =$

12×10^{11}

$(1.2\times10^{1})\times10^{11}$

1.2×10^{12}

b) $(4\times10^{-7})(8\times10^{5}) =$

32×10^{-2}

$(3.2\times10^{1})\times10^{-2}$

3.2×10^{-1}

Example 5: $(1.5\times10^{-2})(3\times10^{-4})=$

4.5×10^{-6}

Try-It: $(9.5\times10^{-4})(2\times10^{-5})=$

19×10^{-9}

$(1.9\times10^{1})\times10^{-9}$

1.9×10^{-8}

Example 6: In 2010, the population in the United States will be about 3.09×10^{8}. Spending for health care will be about \$8754 per person. About how much will the US spend on health care in 2010?

$(3\times10^{8})(9000)$

$(3\times10^{8})(9\times10^{3})$

27×10^{11}

$(2.7\times10^{1})\times10^{11}$

2.7×10^{12}

The US will spend 2.7×10^{12} dollars on health care in 2010.

40,000

Try-It: The average American household spends about \$41,356 each year. If there are about 1.2×10^{8} households, what is the approximate amount of money spent by American households in one year?

$40{,}000 = 4\times10^{4}$

$(4\times10^{4})(1\times10^{8})$

4×10^{12}

The approximate amount of money spent by American households in 1 year is 4×10^{12} or 4 trillion dollars.

Perform the following operations; leave your answer in scientific notation. ÷ #s, subtract exponents

Example 7: $\frac{8\times10^{9}}{4}=$

2×10^{9}

Try-It!: $\frac{6\times10^{-9}}{2}=$

3×10^{-9}

Example 8: $\frac{6\times10^{9}}{2\times10^{7}}=$

3×10^{2}

Try-It!: $\frac{9\times10^{12}}{3\times10^{5}}=$

3×10^{7}

Example 9: $\frac{4.9\times10^{8}}{7\times10^{5}}=$

$.7\times10^{3}$

$(7\times10^{-1})\times10^{3}$

7×10^{2}

Try-It!: $\frac{4.2\times10^{12}}{6\times10^{8}}=$

$.7\times10^{4}$

$(7\times10^{-1})\times10^{4}$

7×10^{3}

Example 10: $\frac{1.6\times10^{7}}{2\times10^{9}}=$

$.8\times10^{-2}$

$8\times10^{-1}\times10^{-2}$

8×10^{-3}

Try-It!: $\frac{2.8\times10^{7}}{2\times10^{11}}=$

1.4×10^{-4}

Example 11: $\frac{8.6\times10^{12}}{2\times10^{-4}}=$

$4.3\times10^{12+(+4)}$

4.3×10^{16}

Try-It!: $\frac{1.2\times10^{7}}{4\times10^{-11}}=$

$.3\times10^{7+(+11)}$

$.3\times10^{18}$

$(3\times10^{-1})\times10^{18}=$ 3×10^{17}

Example 12: There are about 9 billion devices (9×10^{9}) connected to the Internet. If a wireless router can support 300 devices, how many wireless routers are necessary to connect all 9 billion devices wirelessly?

$300=3\times10^{2}$

$\frac{9\times10^{9}}{3\times10^{2}}=3\times10^{7}$

There are 3×10^{7} wireless routers to connect 9 billion devices.

Acceptable: 30,000,000 wireless routers or 30 million

Practice: Perform the following operations; leave your answer in scientific notation.

1) $(2\times10^{6})(3\times10^{3}) =$

6×10^{9}

2) $(4\times10^{6})(10^{-3}) =$

4×10^{3}

3) $(5\times10^{7})(3.1\times10^{14}) =$

15.5×10^{21}

$(1.55\times10^{1})\times10^{21}$

1.55×10^{22}

4) $(9.2\times10^{-7})(3\times10^{-16}) =$

27.6×10^{-23}

$(2.76\times10^{1})\times10^{-23}$

2.76×10^{-22}

5) $\frac{2.7\times10^{8}}{9\times10^{4}} =$

$.3\times10^{4}$

$(3\times10^{-1})\times10^{4} = 3\times10^{3}$

6) $\frac{3.5\times10^{6}}{5\times10^{-8}} =$

$.7\times10^{6+(+8)}$

$.7\times10^{14}$

$(7\times10^{-1})\times10^{14}$

7×10^{13}

7) $\frac{9.64\times10^{-5}}{2\times10^{-8}} =$

$4.82\times10^{-5+(+8)}$

4.82×10^{3}

8) $\frac{(6\times10^{12})(3\times10^{4})}{2\times10^{8}} =$

$\frac{18\times10^{16}}{2\times10^{8}} = 9\times10^{8}$

9) The distance light travels in one year (one light year) is about 5.88×10^{12} miles. The closest star to Earth (other than the Sun) is Alpha Centauri, which is 4.35 light years from Earth. About how many miles from Earth is Alpha Centauri?

6

estimated to 4

$(6\times10^{12})\times 4$

24×10^{12}

$(2.4\times10)\times10^{12}$

2.4×10^{13} miles

The distance between Earth and alpha Centuri is about 2.4×10^{13} miles.

10) A conservative estimate of the number of stars in the universe is 6×10^{22}. The average human can see about 3,000 stars at night with his naked eye. About how many times more stars are there in the universe, compared to the stars a human can actually see?

$3{,}000 = 3\times10^{3}$

$\frac{6\times10^{22}}{3\times10^{3}} = 2\times10^{19}$

There is 2×10^{19} more stars in the universe than the human eye can see.