

VIII. More computing with scientific notation – Addition/Subtraction and Raising a power

To raise a power:  $(a \times 10^m)^n = a^n \times 10^{mn}$



Model Problems:  $(2 \times 10^5)^3 = 2^3 \times 10^{5 \cdot 3} = 8 \times 10^{15}$

Practice:

<p>1) <math>(4 \times 10^8)^2</math>  <math>16 \times 10^8 = 1.6 \times 10^9</math></p>	<p>2) <math>(3 \times 10^{12})^3</math>  <math>27 \times 10^{12} = 2.7 \times 10^{13}</math></p>
<p>3) <math>(4 \times 10^6)^2</math>  <math>16 \times 10^6 = 1.6 \times 10^7</math></p>	<p>4) <math>(6 \times 10^{40})^5</math>  <math>7776 \times 10^{40}</math>  <math>7.776 \times 10^{43}</math></p>

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<p>5) <math>(5 \times 10^{10})^{-1}</math>  <math>2 \times 10^{-10} = 2 \times 10^{-11}</math></p>	<p>6) <math>(2 \times 10^4)^{-3}</math>  <math>125 \times 10^{-12} = 125 \times 10^{-13}</math></p>
<p>7) <math>\frac{(2 \times 10^8)^4}{4 \times 10^{-2}}</math>  <math>\frac{16 \times 10^{32}}{4 \times 10^{-2}}</math>  <math>4 \times 10^{34}</math></p>	<p>8) <math>\frac{(3 \times 10^8)(8 \times 10^{-3})}{(2 \times 10^7)^2}</math>  <math>\frac{24 \times 10^5}{4 \times 10^{14}} = 6 \times 10^{-9}</math></p>
<p>32 - -2</p>	<p>5 - 14</p>

MATHS GENIUS IN THE MAKING



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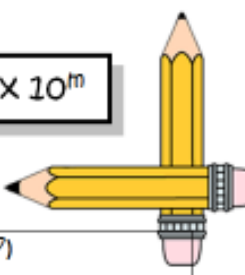
To add or subtract:  $(a \times 10^m) + (b \times 10^m) = a + b \times 10^m$

Model Problems:  $(2 \times 10^5) + (5 \times 10^5) = (2+5) \times 10^5 = 7 \times 10^5$

Practice:

1) $(4 \times 10^4) + (9 \times 10^4)$ $13 \times 10^4 = 1.3 \times 10^5$	2) $(2.4 \times 10^7) + (3.1 \times 10^7)$ $5.5 \times 10^7$
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40,000	
90,000	
130,000	



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3) $(5.5 \times 10^3) - (3 \times 10^3)$ $2.5 \times 10^3$	4) $(5 \times 10^5) + 460,000$ $(4.6 \times 10^5)$ $9.6 \times 10^5$
5) $(8 \times 10^4) + (3 \times 10^5)$ $(.8 \times 10^5)$ $3.8 \times 10^5$	6) $(8.4 \times 10^3) + (2 \times 10^5)$ $(.084 \times 10^5)$ $2.084 \times 10^5$
7) $(9 \times 10^7) - 750,000$ $(.075 \times 10^7)$ $8.925 \times 10^7$	8) $(6.2 \times 10^{-4}) + 0.0004 \times 10^0$ $(4 \times 10^{-4})$ $10.2 \times 10^{-4}$ $1.02 \times 10^{-3}$

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Problem Solving:

1) Alaska is the largest state in the United States with an area of about  $1.5 \times 10^6$  square kilometers. Rhode Island is the smallest state with an area of about 2,700 square kilometers. About how many times larger is Alaska than Rhode Island?

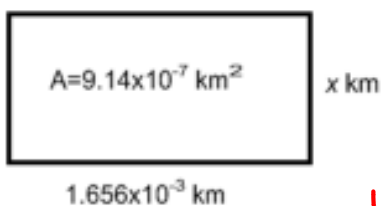
about 3,000 or  $3 \times 10^3$



$$\frac{1.5 \times 10^6}{3 \times 10^3} = \underbrace{.5 \times 10^3}_{\text{w}} = \boxed{\text{about } 500 \text{ times larger}}$$

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2) The rectangle has an area of  $9.14 \times 10^{-7}$  square kilometers. What is the approximate length of the missing side?



$$\frac{9.14 \times 10^{-7}}{1.656 \times 10^{-3}} \quad -7 - -3$$

about  $\boxed{5.5 \times 10^{-4} \text{ km}}$

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