## C. <u>Scientific notation</u>:

Note that scientific form always looks like

$a \times 10^n$, where $1 \le a < 10$, and $n$ is an integer power of 10.

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*example:* $32800 = 3.2800 \times 10^4$ if the zeros in the ten's and one's places are significant. If the one's zero is not significant, write: $3.280 \times 10^4$; if neither is significant: $3.28 \times 10^4$.

*example:* $.0040301 = 4.031 \times 10^{-3}$

*example:* $2 \times 10^2 = 200$

*example:* $9.9 \times 10^{-1} = .99$

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Problems 81-84: Write in scientific notation:

81. $93,000,000 =$   | 83. $5.07 =$

82. $.000042 =$   | 84. $-32 =$

Problems 85-87: Write in standard notation:

85. $1.4030 \times 10^3 =$   | 87. $4 \times 10^{-6} =$

86. $9.11 \times 10^{-2} =$   |

## Answers

81. $9.3 \times 10^{7}$

82. $4.2 \times 10^{-5}$

83. 5.07

84. $-3.2 \times 10$

85. 1403.0

86. 0.0911

87. .000004

To compute with numbers written in scientific form, separate the parts, compute, then recombine:

example: $(3.14 \times 10^5)(2)$

$= (3.14)(2) \times 10^5 = 6.28 \times 10^5$

example: $\frac{4.28 \times 10^6}{2.14 \times 10^2} = \frac{4.28}{2.14} \cdot \frac{10^6}{10^2} = 2.00 \times 10^4$

Problems 88-95: Write answer in scientific notation

88. $10^{40} \times 10^2 =$

89. $\frac{10^{40}}{10^{10}} =$

90. $\frac{1.86 \times 10^4}{3 \times 10} =$

91. $\frac{3.6 \times 10^5}{1.8 \times 10^3} =$

92. $\frac{1.8 \times 10^8}{3.6 \times 10^5} =$

93. $\left(4 \times 10^3\right)^2 =$

94. $\left(1.5 \times 10^2\right) \times \left(5 \times 10^3\right) =$

95. $\left(1.25 \times 10^2\right)\left(4 \times 10^{-2}\right) =$

3

## Answers

88. $10^{42}$

89. $10^{30}$

90. $6.2 \times 10^{2}$

91. $2.0 \times 10^{2}$

92. $5.0 \times 10^{2}$

93. $1.6 \times 10^{7}$

94. $7.5 \times 10^{5}$

95. 5

## D. Square roots or perfect squares:

$\sqrt{a} = b$ means $b^2 = a$, where $b \ge 0$. Thus

$\sqrt{49} = 7$, because $7^2 = 49$. Also, $-\sqrt{49} = -7$.

Note: $\sqrt{49}$ does *not* equal $-7$, (even though $(-7)^2$ *does* $= 49$) because $-7$ is not $\ge 0$.

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*example:* If $\sqrt{a} = 10$, then $a = 100$, because

$10^2 = a = 100$

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Problems 96-99: Find the value and tell why:

96. If $\sqrt{a} = 5$ then $a =$

97. If $\sqrt{x} = 4$, then $x =$

98. If $\sqrt{36} = b$, then $b =$

99. If $\sqrt{169} = y$, then $y =$

## Answers

96. $25$; $5^2 = 25$
97. $16$; $4^2 = 16$
98. $6$; $6^2 = 36$
99. $13$; $13^2 = 169$

Problems 100-110: Find the value:

100. $\sqrt{81} =$

101. $8^2 =$

102. $\sqrt{8^2} =$

103. $\sqrt{(-7)^2} =$

104. $\sqrt{6^2 + 8^2} =$

105. $\sqrt{3^2 + 4^2} =$

106. $\sqrt{3^2 + 4^2 + 12^2} =$

107. $\sqrt{17^2 - 15^2} =$

108. $\sqrt{13^2 - 12^2} =$

109. $\sqrt{4^3} =$

110. $\sqrt{3^4} =$

Answers

100. 9
101. 64
102. 8
103. 7
104. 10
105. 5
106. 13
107. 8
108. 5
109. 8
110.9