

1. Convert each of the following numbers to base 10. Subscripts indicate the base of the given numbers.

- a)  $10_7 = \underline{\hspace{2cm}}_{10}$     b)  $20_8 = \underline{\hspace{2cm}}_{10}$     c)  $14_5 = \underline{\hspace{2cm}}_{10}$     d)  $21_7 = \underline{\hspace{2cm}}_{10}$   
 e)  $17_8 = \underline{\hspace{2cm}}_{10}$     f)  $42_9 = \underline{\hspace{2cm}}_{10}$     g)  $71_8 = \underline{\hspace{2cm}}_{10}$     h)  $37_9 = \underline{\hspace{2cm}}_{10}$

2. Convert each of the base 10 numbers given below into the base indicated.

- a)  $15_{10} = \underline{\hspace{2cm}}_5$     b)  $15_{10} = \underline{\hspace{2cm}}_6$     c)  $15_{10} = \underline{\hspace{2cm}}_8$     d)  $15_{10} = \underline{\hspace{2cm}}_9$   
 e)  $32_{10} = \underline{\hspace{2cm}}_9$     f)  $42_{10} = \underline{\hspace{2cm}}_7$     g)  $42_{10} = \underline{\hspace{2cm}}_8$     h)  $42_{10} = \underline{\hspace{2cm}}_9$

3. Perform the following computations in base 5. *Both questions and answers are in base 5!*

- a)  $4 + 4 =$                       b)  $3 + 3 + 4 =$                       c)  $4 \times 3 =$                       d)  $4 \times 3 \times 2 =$   
 e)  $14 - 3 =$                       f)  $10 - 2 =$                       g)  $11 - 3 =$                       h)  $12 - 4 =$

4. Perform the following computations in base 8.

- a)  $7 + 5 =$                       b)  $7 + 6 + 3 + 5 =$                       c)  $6 \times 5 =$                       d)  $7 \times 3 \times 3 =$   
 e)  $10 - 7 =$                       f)  $11 - 4 =$                       g)  $10 - 5 =$                       h)  $14 - 6 =$

5. Perform the addition problems in the indicated base.

- |                   |                    |                   |                    |                    |
|-------------------|--------------------|-------------------|--------------------|--------------------|
| a) base 6         | b) base 6          | c) base 7         | d) base 8          | e) base 9          |
| <b>14</b>         | <b>131</b>         | <b>31</b>         | <b>377</b>         | <b>377</b>         |
| <b>20</b>         | <b>423</b>         | <b>16</b>         | <b>416</b>         | <b>416</b>         |
| <b>33</b>         | <b>344</b>         | <b>54</b>         | <b>505</b>         | <b>505</b>         |
| <b>12</b>         | <b>112</b>         | <b>42</b>         | <b>236</b>         | <b>236</b>         |
| <b>41</b>         | <b>224</b>         | <b>16</b>         | <b>567</b>         | <b>567</b>         |
| <u><b>+23</b></u> | <u><b>+340</b></u> | <u><b>+53</b></u> | <u><b>+360</b></u> | <u><b>+360</b></u> |

6. Convert each of the following numbers to base 10. Subscripts indicate the base of the given numbers.

- a)  $10_{11} = \underline{\hspace{2cm}}_{10}$     b)  $37_{11} = \underline{\hspace{2cm}}_{10}$     c)  $46_{12} = \underline{\hspace{2cm}}_{10}$     d)  $46_{14} = \underline{\hspace{2cm}}_{10}$   
 e)  $A3_{12} = \underline{\hspace{2cm}}_{10}$     f)  $3A_{11} = \underline{\hspace{2cm}}_{10}$     g)  $AB_{12} = \underline{\hspace{2cm}}_{10}$     h)  $CE_{15} = \underline{\hspace{2cm}}_{10}$

7. Convert each of the base 10 numbers given below into the base indicated.

- a)  $77_{10} = \underline{\hspace{2cm}}_{11}$     b)  $42_{10} = \underline{\hspace{2cm}}_{11}$     c)  $32_{10} = \underline{\hspace{2cm}}_{11}$     d)  $77_{10} = \underline{\hspace{2cm}}_{12}$   
 e)  $104_{10} = \underline{\hspace{2cm}}_{11}$     f)  $125_{10} = \underline{\hspace{2cm}}_{12}$     g)  $160_{10} = \underline{\hspace{2cm}}_{16}$     h)  $166_{10} = \underline{\hspace{2cm}}_{15}$

8. Perform the following computations in base 11.

a)  $8 + 9 + \mathbf{A} =$

b)  $7 + 6 + 5 + 4 =$

c)  $9 \times 8 =$

d)  $\mathbf{A} \times 4 \times 2 =$

e)  $10 - 1 =$

f)  $1\mathbf{A} - 3 =$

g)  $15 - 9 =$

h)  $19 - \mathbf{A} =$

9. a) base 11

$$\begin{array}{r} 377 \\ 416 \\ 505 \\ 236 \\ 567 \\ + 360 \\ \hline \end{array}$$

b) base 12

$$\begin{array}{r} 377 \\ 416 \\ 505 \\ 236 \\ 567 \\ + 360 \\ \hline \end{array}$$

c) base 12

$$\begin{array}{r} \mathbf{AB} \\ 8\mathbf{A} \\ \mathbf{B5} \\ 73 \\ \mathbf{A5} \\ + \mathbf{BB} \\ \hline \end{array}$$

d) base 15

$$\begin{array}{r} 3\mathbf{AB} \\ 80\mathbf{A} \\ \mathbf{B19} \\ 787 \\ 399 \\ + \mathbf{B0B} \\ \hline \end{array}$$

e) base 15

$$\begin{array}{r} 317 \\ 802 \\ 569 \\ 787 \\ 399 \\ + 121 \\ \hline \end{array}$$

10. Perform the following computations in base indicated.

a) base 7

$$\begin{array}{r} 340156 \\ - 105142 \\ \hline \end{array}$$

b) base 7

$$\begin{array}{r} 546265 \\ - 261446 \\ \hline \end{array}$$

c) base 7

$$\begin{array}{r} 654321 \\ - 123456 \\ \hline \end{array}$$

d) base 9

$$\begin{array}{r} 426071 \\ - 283145 \\ \hline \end{array}$$

e) base 9

$$\begin{array}{r} 870543 \\ - 362648 \\ \hline \end{array}$$

f) base 9

$$\begin{array}{r} 654321 \\ - 123456 \\ \hline \end{array}$$

g) base 11

$$\begin{array}{r} 654321 \\ - 123456 \\ \hline \end{array}$$

h) base 11

$$\begin{array}{r} \mathbf{A47128} \\ - \mathbf{3A67A4} \\ \hline \end{array}$$

i) base 11

$$\begin{array}{r} 700000 \\ - 3291\mathbf{A5} \\ \hline \end{array}$$

j) base 8

$$\begin{array}{r} 3710574 \\ -1354667 \\ \hline \end{array}$$

k) base 9

$$\begin{array}{r} 3742574 \\ -1354667 \\ \hline \end{array}$$

l) base 12

$$\begin{array}{r} B57AB098 \\ -A6158B3A \\ \hline \end{array}$$

11. Perform the following computations in base indicated.

a) base 5

$$\begin{array}{r} 341204 \\ \times 4 \\ \hline \end{array}$$

b) base 7

$$\begin{array}{r} 345651 \\ \times 5 \\ \hline \end{array}$$

c) base 8

$$\begin{array}{r} 4762176 \\ \times 7 \\ \hline \end{array}$$

d) base 5

$$\begin{array}{r} 3412 \\ \times 32 \\ \hline \end{array}$$

e) base 6

$$\begin{array}{r} 3412 \\ \times 32 \\ \hline \end{array}$$

f) base 7

$$\begin{array}{r} 6534 \\ \times 56 \\ \hline \end{array}$$

g) base 8

$$\begin{array}{r} 6534 \\ \times 56 \\ \hline \end{array}$$

h) base 8

$$\begin{array}{r} 1763 \\ \times 217 \\ \hline \end{array}$$

i) base 9

$$\begin{array}{r} 4781 \\ \times 356 \\ \hline \end{array}$$

j) base 12

$$\begin{array}{r} 34A \\ \times B4 \\ \hline \end{array}$$

k) base 11

$$\begin{array}{r} 39105 \\ \times A8 \\ \hline \end{array}$$

l) base 12

$$\begin{array}{r} 42A1B \\ \times B92 \\ \hline \end{array}$$

**Answers:**

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1. a)  $7_{10}$     b)  $16_{10}$     c)  $9_{10}$     d)  $15_{10}$     e)  $15_{10}$     f)  $38_{10}$     g)  $57_{10}$     h)  $34_{10}$
2. a)  $30_5$     b)  $23_6$     c)  $17_8$     d)  $16_9$     e)  $35_9$     f)  $60_7$     g)  $52_8$     h)  $46_9$
3. a) 13    b) 20    c) 22    d) 44    e) 11    f) 3    g) 3    h) 3
4. a) 14    b) 25    c) 36    d) 77    e) 1    f) 5    g) 3    h) 6
5. a) 231    b) 2502    c) 311    d) 3127    e) 2684
6. a)  $11_{10}$     b)  $40_{10}$     c)  $54_{10}$     d)  $62_{10}$     e)  $123_{10}$     f)  $43_{10}$     g)  $131_{10}$     h)  $194_{10}$
7. a)  $70_{11}$     b)  $39_{11}$     c)  $2A_{11}$     d)  $65_{12}$     e)  $95_{11}$     f)  $A5_{12}$     g)  $A0_{16}$     h)  $B1_{15}$
8. a) 25    b) 20    c) 66    d) 73    e) A    f) 17    g) 7    h) A
9. a) 2239    b) 2017    c) 509    d) 301C    e) 1DD5
10. a) 232014    b) 254516    c) 530532    d) 132825    e) 506784    f) 530754  
     g) 530976    h) 650434    i) 381906    j) 2333705    k) 2376806    l) B65215A
11. a) 3020331    b) 2431545    c) 42637562    d) 230234    e) 202024    f) 545163  
     g) 463210    h) 432275    i) 1863086    j) 32694    k) 3806197    l) 41A1A26A