



NOTES:

**New Canaan Country School
Upper School Math Dept
Mental Facts Handbook**

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This handbook belongs to:

Introduction

This booklet contains pages of math facts that Upper School students should know mentally—just as you have been learning the basic addition and subtraction facts and the multiplication tables. Your calculator is a wonderful tool, but there is no substitute for mental familiarity with these items. Your future math courses will be made easier if you can quickly recall many of these facts along with the ones mentioned earlier. Most of the pages contain material of a math literacy nature, although the knowledge of relative populations certainly is a social studies skill. Your Upper School math classes will require you to study this booklet in the ways each individual teacher chooses.

Populations (2007)

World	6.7 billion
USA	305 million
California	37 million
New York State	19.3 million
Connecticut	3.4 million
Wyoming	.52 million
New York City	8.3 million
Stamford	19.6 thousand
New Canaan	19.4 thousand

Converting within the Metric System

Kids	Have	Dropped	Over	Dead	Converting	Metric
K	H	D	O	D	C	M
kilo	hecto	deka	unit	deci	centi	milli
×1000	×100	×10	1	×.1	×.01	×.001
			meter			
			liter			
			gram			

to use: 148m = 14.8dkm
 m to dkm is a "jump" of 1 to the left
 ∴ move decimal 1 to the left

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* Does not include facts covered in the other Multiplication Tables

12's Multiplication Table

1	x	12	=	12
2	x	12	=	24
3	x	12	=	36
4	x	12	=	48
5	x	12	=	60
6	x	12	=	72
7	x	12	=	84
8	x	12	=	96
9	x	12	=	108
10	x	12	=	120
11	x	12	=	132
12	x	12	=	144

Customary Measurement Equivalents

1 foot	=	12 inches
1 yard	=	36 inches
1 yard	=	3 feet
1 mile	=	5280 feet
1 mile	=	1760 yards
1 sq. foot	=	144 sq. inches
1 sq. yard	=	9 sq. feet
1 acre	=	43,560 sq. feet
1 sq. mile	=	640 acres
1 pound	=	16 ounces
1 ton	=	2000 pounds
1 cup	=	8 fluid ounces
1 pint	=	2 cups
1 quart	=	2 pints
1 gallon	=	4 quarts

Common Metric Conversions

1 inch	≈	2.54 cm
1 meter	≈	39.37 in
1 kilometer	≈	0.6214 mile
1 kilogram	≈	2.2 lb
1 liter	≈	1.057 qt

Finding Common Percents

- a) 10% : move decimal 1 place left
- b) 5% : half of (a)
- c) 15% : sum of (a) and (b)
- d) 20% : \div by 5
or
double (a)
- e) 25% : \div by 4
- f) 50% : \div by 2

15's Multiplication Table

1	x	15	=	15
2	x	15	=	30
3	x	15	=	45
4	x	15	=	60
5	x	15	=	75
6	x	15	=	90
7	x	15	=	105
8	x	15	=	120
9	x	15	=	135
10	x	15	=	150
11	x	15	=	165
12	x	15	=	180
13	x	15	=	195
14	x	15	=	210
15	x	15	=	225

16's Multiplication Table

1	x	16	=	16
2	x	16	=	32
3	x	16	=	48
4	x	16	=	64
5	x	16	=	80
6	x	16	=	96
7	x	16	=	112
8	x	16	=	128
9	x	16	=	144
10	x	16	=	160
11	x	16	=	176
12	x	16	=	192
13	x	16	=	208
14	x	16	=	224
15	x	16	=	240
16	x	16	=	256

More Patterns in Decimal Equivalents

$\frac{1}{11}$	=	$\overline{.09}$
$\frac{2}{11}$	=	$\overline{.18}$
$\frac{3}{11}$	=	$\overline{.27}$
$\frac{4}{11}$	=	$\overline{.36}$
$\frac{5}{11}$	=	$\overline{.45}$
$\frac{6}{11}$	=	$\overline{.54}$
$\frac{7}{11}$	=	$\overline{.63}$
$\frac{8}{11}$	=	$\overline{.72}$
$\frac{9}{11}$	=	$\overline{.81}$
$\frac{10}{11}$	=	$\overline{.90}$

More Common Decimal Equivalents

$$\begin{aligned} \frac{3}{8} &= .375 \\ \frac{5}{8} &= .625 \\ \frac{7}{8} &= .875 \\ \frac{2}{3} &= \overline{.6} \\ \frac{5}{6} &= \overline{.83} \end{aligned}$$

Patterns In Decimal Equivalents

$$\begin{array}{ccc} \frac{1}{9} = \overline{.1} & \frac{1}{99} = \overline{.01} & \frac{1}{999} = \overline{.001} \\ \frac{2}{9} = \overline{.2} & \frac{2}{99} = \overline{.02} & \frac{2}{999} = \overline{.002} \\ \vdots & \vdots & \vdots \\ \frac{8}{9} = \overline{.8} & \frac{98}{99} = \overline{.98} & \frac{998}{999} = \overline{.998} \end{array}$$

More Factors of Products Less Than 100

2	x	13	=	26
2	x	14	=	28
2	x	17	=	34
2	x	18	=	36
2	x	19	=	38
3	x	13	=	39
2	x	21	=	42
3	x	14	=	42
2	x	23	=	46
2	x	24	=	48
3	x	17	=	51
2	x	26	=	52
4	x	13	=	52
2	x	27	=	54
3	x	18	=	54
2	x	28	=	56
4	x	14	=	56
3	x	19	=	57
2	x	29	=	58
2	x	31	=	62
3	x	21	=	63
2	x	32	=	64
5	x	13	=	65
2	x	34	=	68
4	x	17	=	68
3	x	23	=	69
2	x	35	=	70
5	x	14	=	70
2	x	36	=	72
3	x	24	=	72
4	x	18	=	72

More Factors of Products Less Than 100

(continued)

2	x	37	=	74
2	x	38	=	76
4	x	19	=	76
2	x	39	=	78
3	x	26	=	78
6	x	13	=	78
3	x	27	=	81
2	x	41	=	82
2	x	42	=	84
3	x	28	=	84
4	x	21	=	84
6	x	14	=	84
5	x	17	=	85
2	x	43	=	86
3	x	29	=	87
2	x	44	=	88
4	x	22	=	88
2	x	45	=	90
3	x	30	=	90
7	x	13	=	91
2	x	46	=	92
4	x	23	=	92
3	x	31	=	93
2	x	47	=	94
5	x	19	=	95
2	x	48	=	96
3	x	32	=	96
4	x	24	=	96
2	x	49	=	98
7	x	14	=	98
3	x	33	=	99

Decimal Equivalents for 1/n

$\frac{1}{2}$	=	0.5
$\frac{1}{3}$	=	$0.\overline{3}$
$\frac{1}{4}$	=	0.25
$\frac{1}{5}$	=	0.2
$\frac{1}{6}$	=	$0.1\overline{6}$
$\frac{1}{7}$	=	$0.1\overline{42857}$
$\frac{1}{8}$	=	0.125
$\frac{1}{9}$	=	$0.\overline{1}$
$\frac{1}{10}$	=	0.1
$\frac{1}{11}$	=	$0.0\overline{9}$
$\frac{1}{12}$	=	$0.08\overline{3}$
$\frac{1}{20}$	=	0.05
$\frac{1}{25}$	=	0.04
$\frac{1}{40}$	=	0.025
$\frac{1}{50}$	=	0.02
$\frac{1}{100}$	=	0.01

Powers of 2 and 3

2^0	=	1
2^1	=	2
2^2	=	4
2^3	=	8
2^4	=	16
2^5	=	32
2^6	=	64
2^7	=	128
2^8	=	256
2^9	=	512
2^{10}	=	1024

3^0	=	1
3^1	=	3
3^2	=	9
3^3	=	27
3^4	=	81
3^5	=	243

Primes Less Than 100

2	3	5	7	11
13	17	19	23	29
31	37	41	43	47
53	59	61	67	71
73	79	83	89	97

The First 25 Perfect Squares

1^2	=	1
2^2	=	4
3^2	=	9
4^2	=	16
5^2	=	25
6^2	=	36
7^2	=	49
8^2	=	64
9^2	=	81
10^2	=	100
11^2	=	121
12^2	=	144
13^2	=	169
14^2	=	196
15^2	=	225
16^2	=	256
17^2	=	289
18^2	=	324
19^2	=	361
20^2	=	400
21^2	=	441
22^2	=	484
23^2	=	529
24^2	=	576
25^2	=	625

The First 10 Perfect Cubes

1^3	=	1
2^3	=	8
3^3	=	27
4^3	=	64
5^3	=	125
6^3	=	216
7^3	=	343
8^3	=	512
9^3	=	729
10^3	=	1000