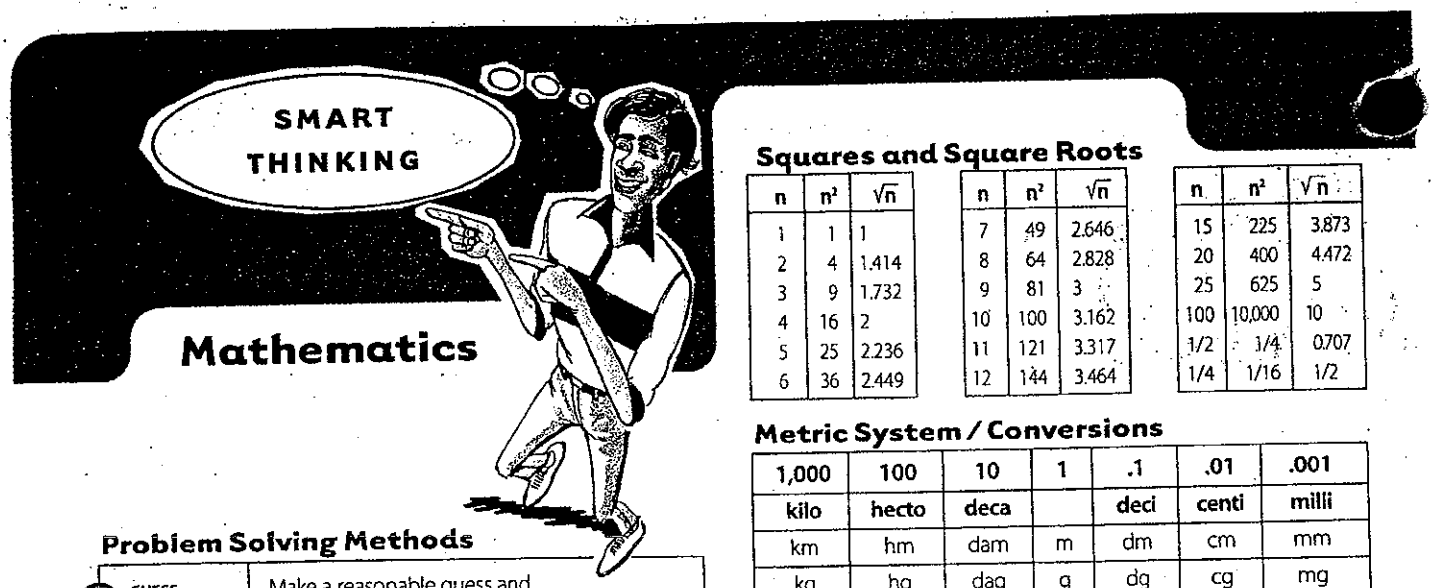
In Class Exercise: POP QUIZ!

Assume that you are dealing with a vertical walled reservoir having a surface area of 500,000 square meters and that an inflow of 1.0 cubic meters per second occurs.

How many hours will it take to raise the reservoir level by 30 cm?



Problem Solving Methods

1 GUESS & CHECK	Make a reasonable guess and check it out; if incorrect, try again.
2 LOOK FOR A PATTERN	The key is to find any differences between given pieces of information.
3 WRITE A NUMBER SENTENCE	Take the written information and write it out in math; ignore irrelevant information.
4 MAKE A DIAGRAM OR MODEL	Drawing a picture or a graph may help solve a problem more easily. You could also make a table to sort information.
5 WORK BACKWARD	Start at the end of a problem and work your way back to the beginning to find the solution.

Think logically... Act it out if you can... Be a smart estimator... Always test your answer.

Order of Operation / Symbols

1 Do operations within parentheses.	( )	< Is smaller than
2 Do powers (exponents) and roots.	^{2} √	> Is greater than
3 Do multiplication and division in order from left to right.	x ÷	= Is equal to
4 Do addition and subtraction in order from left to right.	+ −	≈ Approximate
		≤ Is smaller or equal
		≥ Is greater or equal

Fractions, Decimals, Percentages

$\frac{3}{5}$ – numerator
– denominator

To ***add*** or ***subtract*** different fractions, first obtain a common denominator:

$\frac{1}{3}+\frac{2}{5}=\frac{5}{15}+\frac{6}{15}=\frac{11}{15}$

To ***multiply:***

$\frac{1}{3}\times\frac{2}{5}=\frac{1\times 2}{3\times 5}=\frac{2}{15}$

To ***divide,*** multiply the first with the reciprocal of the second fraction:

$\frac{2}{3}\div\frac{1}{6}=\frac{2}{3}\times\frac{6}{1}=4$

1	= 1.0	= 100%
1/2	= 0.5	= 50%
1/3	= $0.\overline{3}$	= $33.\overline{3}$%
1/4	= 0.25	= 25%
1/5	= 0.2	= 20%
1/6	= $0.1\overline{6}$	= $16.\overline{6}$%
1/8	= 0.125	= 12.5%
1/9	= $0.\overline{1}$	= $11.\overline{1}$%
1/10	= 0.1	= 10%
1/12	= $0.08\overline{3}$	= $8.\overline{3}$%
2/3	= $0.\overline{6}$	= $66.\overline{6}$%
3/4	= 0.75	= 75%

Squares and Square Roots

n	n^2	$\sqrt{n}$
1	1	1
2	4	1.414
3	9	1.732
4	16	2
5	25	2.236
6	36	2.449

n	n^2	$\sqrt{n}$
7	49	2.646
8	64	2.828
9	81	3
10	100	3.162
11	121	3.317
12	144	3.464

n	n^2	$\sqrt{n}$
15	225	3.873
20	400	4.472
25	625	5
100	10,000	10
1/2	1/4	0.707
1/4	1/16	1/2

Metric System / Conversions

1,000	100	10	1	.1	.01	.001
kilo	**hecto**	**deca**		**deci**	**centi**	**milli**
km	hm	dam	m	dm	cm	mm
kg	hg	dag	g	dg	cg	mg
kl	hl	dal	l	dl	cl	ml

Metric system

1 m^2 = 10,000 cm^2
1 hectare (ha) = 10,000 m^2
1 km^2 = 100 ha
1 metric ton (t) = 1,000 kg

English system

1 foot (ft)	= 12 inches (in) 1'	= 12"
1 yard (yd)	= 3 feet	= 36 inches
1 mile (mi)	= 1,760 yards	= 5,280 feet
1 tablespoon (T)	= 3 teaspoons (t)	
1 cup (c)	= 16 T	= 8 fluid ounces (fl oz)
1 pint (pt)	= 2 c	
1 quart (qt)	= 2 pt	= 4 c = 32 fl oz
1 gallon (gal)	= 4 qt	
1 ft^2	= 144 in^2	
1 yd^2	= 9 ft^2	
1 acre	= 4,840 yd^2	

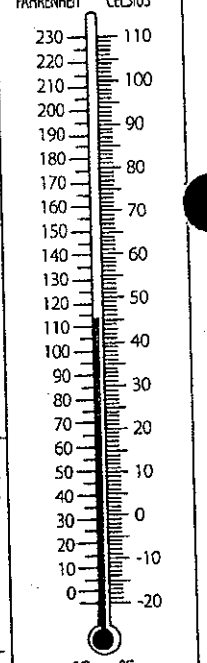
LENGTH / AREA

to go from	to	multiply by
cm	→ in	0.3937
in	→ cm	2.54
m	→ ft	3.2808
ft	→ m	0.3048
km	→ mi	0.6214
mi	→ km	1.609
m^2	→ ft^2	10.76
ft^2	→ m^2	0.0929
km^2	→ mi^2	0.3861
mi^2	→ km^2	2.59

WEIGHT / CAPACITY

to go from	to	multiply by
g	→ oz	0.0353
oz	→ g	28.35
kg	→ lbs	2.2046
lbs	→ kg	0.4536
t	→ T	1.1023
T	→ t	0.9072
ml	→ fl oz	0.0338
fl oz	→ ml	29.575
l	→ gal	0.2642
gal	→ l	3.785

Temperature



°C → °F: n x 1.8; add 32
°F → °C: n – 32; multiply by 0.5555

Common Units *used with the International System*

UNITS OF MEAS.	ABBREV.	RELATION	UNITS OF MEAS.	ABBREV.	RELATION
meter*	m	length	degree Celsius	°C	temperature
hectare	ha	area	kelvin	K	thermodynamic temp.
tonne	t	mass	pascal	Pa	pressure, stress
kilogram	kg	mass	joule	J	energy, work
nautical mile	M	distance (navigation)	newton	N	force
knot	kn	speed (navigation)	watt	W	power, radiant flux
liter*	L	volume or capacity	ampere	A	electric current
second	s	time	volt	V	electric potential
hertz	Hz	frequency	ohm	Ω	electric resistance
candela	cd	luminous intensity	coulomb	C	electric charge

*Canadian preferred spelling: metre, litre.