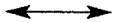
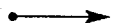
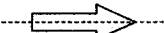
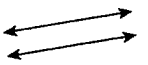
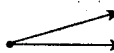
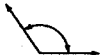
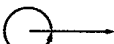
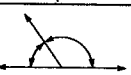


FYS207 Units - Conversion Factors - Geometric Shapes

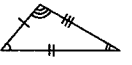
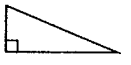
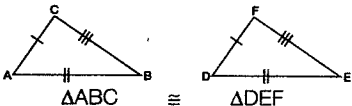
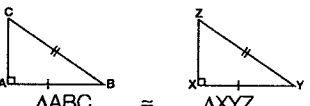


Geometric Shapes / Sizes / Models

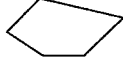
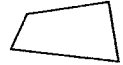
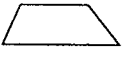
LINES • ANGLES • CIRCLES

			
LINE	RAY	LINE OF SYMMETRY	PARALLEL LINES
			
LINE SEGMENT	ANGLE / VERTEX	1° DEGREE	RIGHT ANGLE
			
ACUTE less than 90°	STRAIGHT 180°	COMPLEMENTARY add up to 90°	ARC
			
OBTUSE greater than 90°, less than 180°	COMPLETE 360°	SUPPLEMENTARY add up to 180°	CIRCLE
			
		SEMICIRCLE	RADIUS
			
			DIAMETER
			
			CHORD

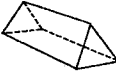
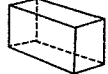
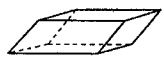
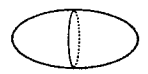
TRIANGLES

	
SCALED TRIANGLE	RIGHT TRIANGLE
	
ISOSCELES TRIANGLE	EQUILATERAL TRIANGLE
	
$\triangle ABC \cong \triangle DEF$	
4 CONGRUENCY CASES 1. side, side, side SSS 2. side, angle, side SAS 3. angle, side, angle ASA 4. hypotenuse, side HyS	
	
$\triangle ABC \cong \triangle XYZ$	

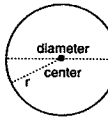
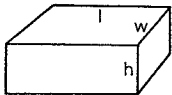
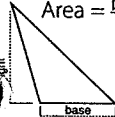
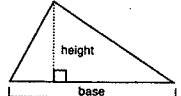
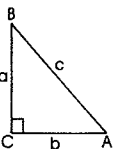
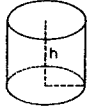
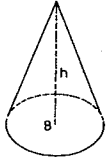
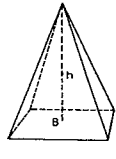
POLYGONS

	
POLYGON	QUADRILATERAL
	
TRAPEZOID	PARALLELOGRAM
	
RECTANGLE	RHOMBUS
	
SQUARE	REGULAR PENTAGON
	
REGULAR HEXAGON	REGULAR OCTAGON

3 - D MODELS

	
TRIANGULAR PYRAMID	RECTANGULAR PYRAMID
	
TRIANGULAR PRISM	RECTANGULAR PRISM
	
CUBE	PARALLELEPIPED
	
CYLINDER	CONE
	
SPHERE	ELLIPSOID

Measurements

 Perimeter = $2(l + w)$ Area = lw	 Circumference of a circle = $2\pi r$ Area of a circle = πr^2
 Volume = lwh Surface area = $2(lh + lw + hw)$	 Surface area of sphere = $4\pi r^2$ Volume of a sphere = $\frac{4\pi r^3}{3}$
Area = $\frac{\text{base} \times \text{height}}{2}$   $c^2 = a^2 + b^2$ (Pythagorean theorem) 	 Surface area of cylinder = $2\pi rh + 2\pi r^2$ Volume of cylinder = $\pi r^2 h$  Volume of a cone = $\frac{Bh}{3}$  Volume of a pyramid = $\frac{Bh}{3}$ (B = area of base)

Multiplication Chart

	1	2	3	4	5	6	7	8	9	10	11	12
1	1	2	3	4	5	6	7	8	9	10	11	12
2	2	4	6	8	10	12	14	16	18	20	22	24
3	3	6	9	12	15	18	21	24	27	30	33	36
4	4	8	12	16	20	24	28	32	36	40	44	48
5	5	10	15	20	25	30	35	40	45	50	55	60
6	6	12	18	24	30	36	42	48	54	60	66	72
7	7	14	21	28	35	42	49	56	63	70	77	84
8	8	16	24	32	40	48	56	64	72	80	88	96
9	9	18	27	36	45	54	63	72	81	90	99	108
10	10	20	30	40	50	60	70	80	90	100	110	120
11	11	22	33	44	55	66	77	88	99	110	121	132
12	12	24	36	48	60	72	84	96	108	120	132	144
13	13	26	39	52	65	78	91	104	117	130	143	156
14	14	28	42	56	70	84	98	112	126	140	154	168
15	15	30	45	60	75	90	105	120	135	150	165	180

SMART THINKING

Mathematics



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

3 - numerator	1 = 1.0 = 100%
5 - denominator	1/2 = 0.5 = 50%
To add or subtract different fractions, first obtain a common denominator:	1/3 = 0.3̄ = 33.3̄%
$\frac{1}{3} + \frac{2}{5} = \frac{5}{15} + \frac{6}{15} = \frac{11}{15}$	1/4 = 0.25 = 25%
To multiply :	1/5 = 0.2 = 20%
$\frac{1}{3} \times \frac{2}{5} = \frac{1 \times 2}{3 \times 5} = \frac{2}{15}$	1/6 = 0.16̄ = 16.6̄%
To divide , multiply the first with the reciprocal of the second fraction:	1/8 = 0.125 = 12.5%
$\frac{2}{3} \div \frac{1}{6} = \frac{2}{3} \times \frac{6}{1} = 4$	1/9 = 0.1̄ = 11.1̄%
	1/10 = 0.1 = 10%
	1/12 = 0.083̄ = 8.3̄%
	2/3 = 0.6̄ = 66.6̄%
	3/4 = 0.75 = 75%

Squares and Square Roots

n	n ²	√n	n	n ²	√n	n	n ²	√n
1	1	1	7	49	2.646	15	225	3.873
2	4	1.414	8	64	2.828	20	400	4.472
3	9	1.732	9	81	3	25	625	5
4	16	2	10	100	3.162	100	10,000	10
5	25	2.236	11	121	3.317	1/2	1/4	0.707
6	36	2.449	12	144	3.464	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 m² = 10,000 cm²
 1 hectare (ha) = 10,000 m²
 1 km² = 100 ha
 1 metric ton (t) = 1,000 kg

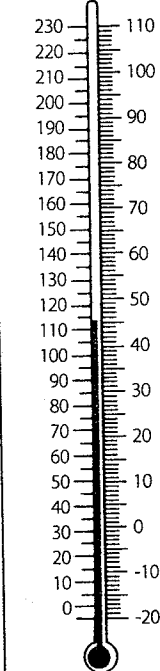
English system

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 ft² = 144 in²
 1 yd² = 9 ft²
 1 acre = 4,840 yd²

LENGTH / AREA			WEIGHT / CAPACITY		
to go from	to	multiply by	to go from	to	multiply by
cm	→ in	0.3937	g	→ oz	0.0353
in	→ cm	2.54	oz	→ g	28.35
m	→ ft	3.2808	kg	→ lbs	2.2046
ft	→ m	0.3048	lbs	→ kg	0.4536
km	→ mi	0.6214	t	→ T	1.1023
mi	→ km	1.609	T	→ t	0.9072
m ²	→ ft ²	10.76	ml	→ fl oz	0.0338
ft ²	→ m ²	0.0929	fl oz	→ ml	29.575
km ²	→ mi ²	0.3861	l	→ gal	0.2642
mi ²	→ km ²	2.59	gal	→ l	3.785

Temperature

FAHRENHEIT CELSIUS



°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

APPENDIX 7

Table for length conversion

Unit	mm	cm	m	km	in	ft	yd	mi
1 millimeter	1	0.1	0.001	10^{-6}	0.0397	0.00328	0.00109	6.21×10^{-7}
1 centimeter	10	1	0.01	0.0001	0.3937	0.0328	0.0109	6.21×10^{-6}
1 meter	1000	100	1	0.001	39.37	3.281	1.094	6.21×10^{-4}
1 kilometer	10^6	10^5	1000	1	39,370	3281	1093.6	0.621
1 inch	25.4	2.54	0.0254	2.54×10^{-5}	1	0.0833	0.0278	1.58×10^{-5}
1 foot	304.8	30.48	0.3048	3.05×10^{-4}	12	1	0.333	1.89×10^{-4}
1 yard	914.4	91.44	0.9144	9.14×10^{-4}	36	3	1	5.68×10^{-4}
1 mile	1.61×10^6	1.01×10^5	1.61×10^3	1.6093	63,360	5280	1760	1

APPENDIX 8

Table for area conversion

Unit	cm ²	m ²	km ²	ha	in ²	ft ²	yd ²	mi ²	ac
1 sq. centimeter	1	0.0001	10^{-10}	10^{-8}	0.155	1.08×10^{-3}	1.2×10^{-4}	3.86×10^{-11}	2.47×10^{-8}
1 sq. meter	10^4	1	10^{-6}	10^{-4}	1550	10.76	1.196	3.86×10^{-7}	2.47×10^{-4}
1 sq. kilometer	10^{10}	10^6	1	100	1.55×10^9	1.076×10^7	1.196×10^6	0.3861	247.1
1 hectare	10^8	10^4	0.01	1	1.55×10^7	1.076×10^5	1.196×10^4	3.861×10^{-3}	2.471
1 sq. inch	6.452	6.45×10^{-4}	6.45×10^{10}	6.45×10^{-8}	1	6.94×10^{-3}	7.7×10^{-4}	2.49×10^{-10}	1.574×10^{-7}
1 sq. foot	929	0.0929	9.29×10^{-8}	9.29×10^{-6}	144	1	0.111	3.587×10^{-8}	2.3×10^{-5}
1 sq. yard	8361	0.8361	8.36×10^{-7}	8.36×10^{-5}	1296	9	1	3.23×10^{-7}	2.07×10^{-4}
1 sq. mile	2.59×10^{10}	2.59×10^6	2.59	259	4.01×10^9	2.79×10^7	3.098×10^6	1	640
1 acre	4.04×10^7	4047	4.047×10^{-3}	0.4047	6.27×10^6	43,560	4840	1.562×10^{-3}	1

APPENDIX 9

Table for volume conversion

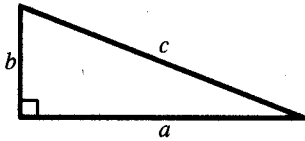
Unit	mL	liters	m ³	in ³	ft ³	gal	ac-ft	million gal
1 milliliter	1	0.001	10^{-6}	0.06102	3.53×10^{-5}	2.64×10^4	8.1×10^{-10}	2.64×10^{-10}
1 liter	10^3	1	0.001	61.02	0.0353	0.264	8.1×10^{-7}	2.64×10^{-7}
1 cu. meter	10^6	1000	1	61,023	35.31	264.17	8.1×10^{-4}	2.64×10^{-4}
1 cu. inch	16.39	1.64×10^{-2}	1.64×10^{-5}	1	5.79×10^{-4}	4.33×10^{-3}	1.218×10^{-8}	4.329×10^{-9}
1 cu. foot	28,317	28.317	0.02832	1728	1	7.48	2.296×10^{-5}	7.48×10^6
1 U.S. gallon	3785.4	3.785	3.78×10^{-3}	231	0.134	1	3.069×10^{-6}	10^6
1 acre-foot	1.233×10^9	1.233×10^6	1233.5	75.27×10^6	43,560	3.26×10^5	1	0.3260
1 million gallons	3.785×10^9	3.785×10^6	3785	2.31×10^8	1.338×10^5	10^6	3.0684	1

APPENDIX 10

Table for time conversion

Unit	sec	min	hours	days	years
1 second	1	1.67×10^{-2}	2.77×10^{-4}	1.157×10^{-5}	3.17×10^{-8}
1 minute	60	1	1.67×10^{-2}	6.94×10^{-4}	1.90×10^{-6}
1 hour	360	60	1	4.17×10^{-2}	1.14×10^{-4}
1 day	8.64×10^4	1440	24	1	2.74×10^{-3}
1 year	3.15×10^7	5.256×10^5	8760	365	1

GEOMETRIC FORMULAS

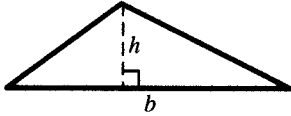


Right Triangle

● Triangles

Pythagorean Theorem

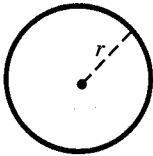
$$a^2 + b^2 = c^2$$



Any Triangle

Area

$$A = \frac{1}{2}bh$$



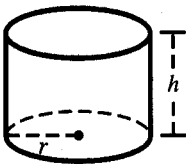
● Circles

Area

$$A = \pi r^2$$

Circumference

$$C = 2\pi r$$



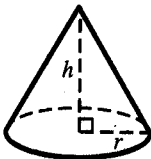
● Cylinders

Surface Area

$$S = 2\pi r^2 + 2\pi rh$$

Volume

$$V = \pi r^2 h$$



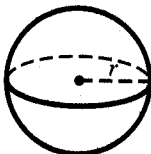
● Cones

Surface Area

$$S = \pi r^2 + \pi r \sqrt{r^2 + h^2}$$

Volume

$$V = \frac{1}{3}\pi r^2 h$$



● Spheres

Surface Area

$$S = 4\pi r^2$$

Volume

$$V = \frac{4}{3}\pi r^3$$