

PRISM GREEN (UPGRADE) REFERENCE NOTES (add your own notes if you want)

+	1	2	3	4	5	6	7	8	9	10		X	1	2	3	4	5	6	7	8	9	10
1	2	3	4	5	6	7	8	9	10	11		1	2	3	4	5	6	7	8	9	10	
2	3	4	5	6	7	8	9	10	11	12		2	4	6	8	10	12	14	16	18	20	
3	4	5	6	7	8	9	10	11	12	13		3	6	9	12	15	18	21	24	27	30	
4	5	6	7	8	9	10	11	12	13	14		4	8	12	16	20	24	28	32	36	40	
5	6	7	8	9	10	11	12	13	14	15		5	10	15	20	25	30	35	40	45	50	
6	7	8	9	10	11	12	13	14	15	16		6	12	18	24	30	36	42	48	54	60	
7	8	9	10	11	12	13	14	15	16	17		7	14	21	28	35	42	49	56	63	70	
8	9	10	11	12	13	14	15	16	17	18		8	16	24	32	40	48	56	64	72	80	
9	10	11	12	13	14	15	16	17	18	19		9	18	27	36	45	54	63	72	81	90	
10	11	12	13	14	15	16	17	18	19	20		10	20	30	40	50	60	70	80	90	100	

FRACTIONS

Common Multiples and LCM

4:	4	8	12	16	20	24
6:	6	12	18	24	30	36

The LCM of 4 and 6 is 12.

Reduce fraction to lowest terms means to make the numerator and denominator as low as possible without changing their proportion. Just keep dividing top and bottom by prime numbers.

Ex 1: $\frac{12}{16} = \frac{6}{8} = \frac{3}{4}$

Ex 2: $\frac{30}{60} = \frac{15}{30} = \frac{5}{10} = \frac{1}{2}$

*Divide top / bottom by 2, then 3, then 5. The GCF is 2*3*5 is 30*

Number	Reciprocal
6	1/6
21	1/21
7	1/7

Proper Fractions. Means the numerator is less than the denominator. **Ex:** 1/6

Improper Fraction. Means the numerator is *more* than the denominator. **Ex:** 3/2 (three halves of a pizza)

Mixed fraction (carpenter's fractions). Use whole numbers mixed with a proper fraction. *Ex:* one pizza and another half pizza *or* one and a half pizzas, *or* 1½ pizzas.

Adding and Subtracting Fractions. Must have the same denominator. Find a LCM of the denominators (also called a **Lowest Common Denominator**) and make equivalent fractions of the same denominator.

Ex1: $\frac{1}{2} + \frac{1}{4} = \frac{2}{4} + \frac{1}{4} = \frac{3}{4}$ **Ex2:** $\frac{1}{3} + \frac{2}{7} = \frac{7}{21} + \frac{6}{21} = \frac{13}{21}$

Multiplying Fractions. Multiply numerators together for new numerator, multiply denominators together for new denominator.

Ex1: $\frac{1}{2} * \frac{3}{4} = \frac{1*3}{2*4} = \frac{3}{8}$ One half of three-quarters of a pizza is three-eighths of a pizza

Reciprocals. The reciprocal of a number means that number divided into one, 'flipped'. If seven people share 1 one thing, they each get 1/7th of the thing. A number multiplied by its reciprocal is just one. $7 * \frac{1}{7} = \frac{7}{1} * \frac{1}{7} = \frac{7}{7} = 1$

Dividing By Fractions. Just *multiply* by a reciprocal. $\frac{(\frac{1}{3})}{(\frac{2}{3})} = \frac{1}{3} \div \frac{2}{3} = \frac{1}{3} * \frac{3}{2} = \frac{3}{6} = \frac{1}{2}$

Dividing something by one half means really multiplying the something by two! Dividing by one third same as multiply by 3

Fractions to Decimals. Just convert to 10^{ths} or 100^{ths} or 1,000^{ths} using ratios or just use a calculator or else use long division.

Ex1: $\frac{3}{5} = \frac{6}{10} = 10 \overline{)0.6} = 0.6$ **Ex2:** $\frac{1}{8} = \frac{125}{1000} = 0.125$

$\frac{3}{5} = 3 \div 5 = 5 \overline{)3.0}$

Decimals to Fractions.
Ex: 0.25 'means' 25/100ths and then reduce to lowest terms: $\frac{25}{100} = \frac{5}{20} = \frac{1}{4}$

A good calculator will actually do the conversion for you if you are desperate.

Percent (%). Just French for 'per hundred'. **65%** means **65/100**, that is all.
Percent to decimal: divide by 100, *or* move decimal point 2 places left.

Ex1: $75\% = \frac{75}{100} = 0.75$ **Ex2:** 2.35% means 0.0235

Decimal to Percent. Multiply by 100%, *or* move decimal point two places right.
Ex1: 0.025 * 100% = 2.5% **Ex2:** 0.625 * 100% = 62.5%

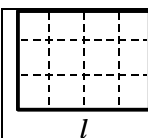
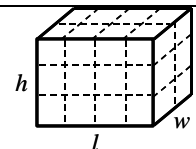
Percent %	Decimal	Fraction
37.5%	0.375	3/8
50	0.5	1/2
2.5%	0.025	1/40
100%	1.0	1

METRIC SYSTEM AND CONVERSION

Mega [M]	Millions of...
Kilo [k]	Thousand of..
Deca [d]	Tens of...
Centi [c]	Hundredths of..
Milli [m]	Thousandths of...

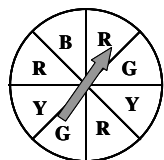
METRIC LENGTH or MASS or VOLUME			
km or kg or kL	m or g or L	cm or cg or cL	mm or mg or mL
0.001	1	100	1,000
0.002	2	200	2,000
0.01	10	1,000	10,000
1	1,000	100,000	1,000,000
5	5,000	500,000	5*10 ⁶
10	10,000	1*10 ⁶	1*10 ⁷

Examples:
 1,000 mm = 1 L
 200 mm = 20 cm
 35 mm = 3.5 cm
 5.2 g = 5,200 mg
 4500 L = 4.5 kL
 523 g = 0.523 kg
 1,234 m = 1.234 km

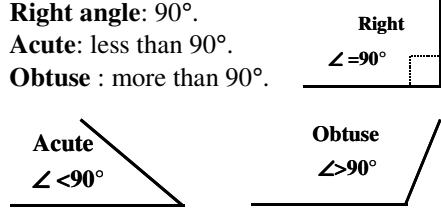
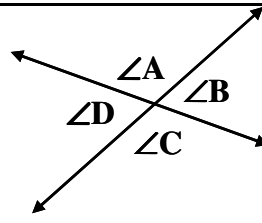
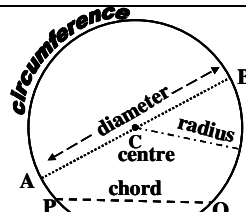
AREA AND VOLUME		
<p>Area: the amount of surface that is covered. Square units; unit².</p> <p>Volume: the amount of capacity of a 3D object to hold stuff. Cubic units; unit³.</p> <p>Prism: two identical flat surfaces connected together along their edges by rectangles.</p>	<p>Area of rectangle or square $Area = l * w$</p>  <p>Area = 4 cm * 3cm Area = 12 cm²</p>	<p>Volume of an rectangular prism or cube $Volume = l * w * h$</p>  <p>Volume = 4 cm * 2cm * 3cm Area = 24 cm³</p>


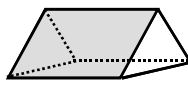



Time. 60 second = 1 min; 60 min = 1 hr. **Ex1:** 320 min = 5 hr 20 min. **Ex2:** 126 sec = 2 min 6 sec.

Probability and Statistics

<p>$probability = \frac{\# \text{ of favourable outcomes}}{\# \text{ of all possible outcomes}}$</p>  <p>$prob(R) = \frac{3}{8} = 0.375 = 37.5\%$</p> <p>$prob(Y) = \frac{2}{8} = \frac{1}{4} = 0.25 = 25\%$</p>	<p>Mean. Type of average or central representative number; if we all pooled our stuff and shared evenly. $mean = \frac{\text{sum of all the } \#s}{\text{number of } \#s}$.</p> <p>Ex: Mean of 3, 5, 10, 12. $mean \equiv \bar{x} = \frac{30}{4} = 7.5$</p> <p>Median. The centre value when the data is in increasing order. If two middle numbers, the mean of those.</p> <p>Mode. The value that is the most frequent.</p> <p>Ex: 1, 5, 8, 7, 3, 7, 8, 2, 8. The mode is 8; it happens times.</p> <p>Range: How spread out the data is. The difference between the largest value and smallest value.</p> <p>Ex: 15, 5, 8, 9, 3, 7, 8, 3, 8. The range is 15 - 3 = 12.</p>
<p>Median. The centre value when the data is arranged in increasing order. If two middle numbers, the <i>mean</i> of those.</p> <p>Ex: 1, 2, 3, 9, 20. The median value is 3. (the <i>mean</i> is 7)</p> <p>Ex: 1, 2, 3, 9, 20, 31. The median is $\frac{3+9}{2} = 6$ (the <i>mean</i> is 11)</p>	<p>Median. The centre value when the data is in increasing order. If two middle numbers, the mean of those.</p> <p>Ex: 1, 5, 8, 7, 3, 7, 8, 2, 8. The mode is 8; it happens times.</p> <p>Range: How spread out the data is. The difference between the largest value and smallest value.</p> <p>Ex: 15, 5, 8, 9, 3, 7, 8, 3, 8. The range is 15 - 3 = 12.</p>

GEOMETRY

<p>Right angle: 90°.</p> <p>Acute: less than 90°.</p> <p>Obtuse: more than 90°.</p> 	 <p>For the any two intersecting lines: $\angle A$ is <i>opposite</i> $\angle C$; they are equal. $\angle B$ is <i>opposite</i> $\angle D$; they are equal. $\angle A$ is <i>supplementary</i> to $\angle D$. They add to 180°. $\angle A$ is <i>supplementary</i> to $\angle B$. They add to 180°. <i>Etc....</i></p>
 <p>Circle Circumference formula</p> <p>Circumference = $\pi * \text{diameter}$ $\approx 3.14 * d$ <i>or</i> Circumference = $2 * \pi * \text{radius}$ $\approx 6.28 * r$ $\pi = 3.14159265358979323....(\text{accurate})$</p>	<p>Solid Figures</p> <p>Cube: six square faces</p> <p>Rectangular Prism: six rectangular faces.</p> <p>Prism: Two faces joined by rectangles</p> <p>Pyramid. Faces with edges connected to a point above face.</p>

				
Rectangular Prism	Triangular Prism	Square Pyramid	Triangular Pyramid	Cylinder

ALGEBRA

<p>Properties of Numbers and Operations. $a * b = b * a$ [commutative for multiplication] $a + b = b + a$ [commutative for addition]</p> <p>$(a * b) * c = a * (b * c)$ [associative for mult.] $(a + b) + c = a + (b + c)$ [associative for add.]</p> <p>Identity for Adding or Multiplying: $a + 0 = a$ $a * 1 = a$ Zero Properties: $a * 0 = 0$ $0 \div a = 0$.</p> <p>Distributive property: $a * (b + c) = a * b + a * c$. Ex1: $3 * (\square + \ominus) = 3 * \square + 3 * \ominus$ Ex2: $2(3+4) = 2*3 + 2*4 = 14$</p>
<p>Evaluating expressions using order of operations BEDMAS [Brackets, Exponents, \div, \times, +, -] Ex: $4 + 3 * 2 = 10$.</p>
<p>Solving Equations using subtraction or adding. Just undo what is done to variable!</p> <p>Ex1: $x + 8 = 12$. Subtract 8 from both sides; $x = 12 - 8$; $x = 4$. Ex2: $x - 5 = 4$. Add 5 to both sides; $x = 4 + 5$; $x = 9$.</p> <p>Solving Equations using Multiplying or Dividing. Just undo what is done to variable!</p> <p>Ex1: $x \div 8 = 3$. Multiply both sides by 8; $x = 3 * 8$; $x = 24$. Ex2: $x * 5 = 40$. Divide both sides by 5; $x = 40 \div 5$; $x = 8$.</p>
<p>Integer Numbers. They include <i>negative numbers</i>, numbers below zero, (0 - 5), ie: 5 <i>below zero</i> or simply -5, or 5 that you don't have or you owe someone, a debit! Subtracting a negative is adding! Ex: $6 - (-5) = 6 + 5$ so it is 11.</p>
<p>Basic Operations with Integers (by example). $-3 + (-3) + (-4) = -10$; $(-5) * 4 = -20$; $(-3) * (-4) = 12$; etc.</p> <p>Adding two #s of same sign → keep same sign. Subtraction of two #s different signs → keep sign of number furthest from zero.</p> <p>Multiply or divide two #s of same sign → positive sign. Multiply or divide two #s of different sign → negative sign.</p>
<p>Exponents. Just lazy multiplying but quicker. Ex: $2 * 2 * 2 * 2 * 2 * 2 * 2$ is seven twos multiplied together. Easier just to show it as 2^7. a^m is called a power. 'a' is the base, 'm' is the exponent. To <i>square</i> a number means an exponent of 2; to <i>cube</i>, an exponent of 3. $4^2 = 4 * 4 = 16$; $5^3 = 5 * 5 * 5 = 125$. Buttons on your calculator: \wedge or y^x and x^2 depending on your calculator</p>