TIPS & STRATEGIES

Formulated for the NEW GRE!!!

1. Process of elimination

Use **process of elimination** to identify the wrong answers so you can focus on the possible right answers. Your GRE score will be determined by all the questions you answer correctly. You don't lose points for incorrect answers. Therefore, to maximize your GRE test score, it is best to answer every question.

2. On Screen Calculator

Most of the questions on the GRE don't require difficult computations, so don't use the calculator just because it is available. Use it for calculations that are tedious, such as long divisions and square roots.

3. Mark questions and Answer EVERY question

Go through the GRE sections rapidly first, stopping only to answer questions you can answer with certainity. Then go back and answer the questions that require greater thought, concluding with the difficult questions if you have time. The testing software has a "mark and review" feature that enables you revisit questions you are unsure about.

ALGEBRA REVIEW

COMBINING VARIABLES
adding, subtracting, multiplying, dividing

When adding or subtracting a variable, add or subtract the **coefficient** (number in front) of the variable.

$a + a = 2a$

$ab + ab = 2ab$

$a + c = a + c$

$a^2 + a^3 \neq a^5$

$b^9 - b^2 \neq b^7$

$a \times a = a^2$

$ab \times ab = a^2 b^2$

$a \times c = ac$

$a^2 \times a^3 = a^5$

$\dfrac{b^9}{b^2} = b^7$

Examples:

$4^{17} - 2^{28}$
$= 2^{2\,(17)} - 2^{28}$
$= 2^{34} - 2^{28}$
$= 2^{28}(2^6 - 1)$

$2^2 + 2^2 + 3^6 + 3^6 + 3^6$
$= 2(2^2) + 3(3^6)$
$= 2^3 + 3^7$

ALSO REMEMBER...

$a^0 = 1$ *(Anything with a zero exponent is equal to 1)*

$m^{-5} = \dfrac{1}{m^5}$　　$m^{\frac{x}{y}} = \left(\sqrt[y]{m}\right)^x$　　$n^{\frac{1}{2}} = \sqrt{n}$

FACTORING

Difference of two squares:

$a^2 - b^2 = (a + b)(a - b)$

F.O.I.L. (First-Outer-Inner-Last)

$(a - b)^2 = (a - b)(a - b)$

$(a + b)^2 = (a + b)(a + b)$

$a^3 + b^3 = (a + b)(a^2 - ab + b^2)$

$a^3 - b^3 = (a - b)(a^2 + ab + b^2)$

NOTE: $(a - b)^2$ is **NOT** equal to $(a^2 - b^2)$

WORD PROBLEMS - Translating word problems into math equations

WORDS	SYMBOL	EXAMPLE	EQUATION
is, was, has	=	Eva is the same age as Wall-E.	$E = W$
more than, older than, sum of	+	Eva has four *more* cookies *than* Wall-E	$E = 4 + W$
less than, differences, fewer than	-	Eva is 50 centimeters *less than* Wall-E's height	$E = W - 50$
of, product	X	Eva ate $\frac{2}{5}$ *of* the cake.	$E = \frac{2}{5} \times C$
for, per	/	The car was travelling 20 miles *per* hour.	$20 \frac{\text{miles}}{\text{hour}}$
what percent	$\frac{x}{100}$	What percent of 50 is 10	$\frac{x}{100} \cdot 50 = 10$

EXTRA TIPS...　Assign variables to each person or object compared or identified in the problem using the first letter of the person's (or object's) name.

Also Remember　If $0 < X < 1$ i.e 0.75
$(0.75)^2 < \sqrt{0.75}$

But $X > 1$ i.e 2.5
$(2.5)^2 > \sqrt{2.5}$

$\sqrt{2} = 1.4$

$\sqrt{3} = 1.7$

NUMBERS & OPERATIONS

INTEGERS

Integers are all whole numbers & their negative (including zero) e.g. -2, -1, 0, 1, 2, 3

Integers do not include fractions & decimals.

Zero is neither a positive or negative integer.

CONSECUTIVE INTEGERS

Consecutive integer expression:
n, n+1, n+2 *(n = any integer)*

Consecutive **EVEN / ODD** integer expression:
n, n+2, n+4 *(n = any even/odd integer)*

The average of a consecutive set of numbers is the middle number

10 , 11 , 12 , 13 , 14

When you divide the sum of a consecutive set by the number of values, the result is the middle number = AVERAGE

$5 + 6 + 7 + 8 + 9 = \dfrac{35}{5} = 7$

PRIME NUMBERS

A **prime number** is a positive integer greater than 1, which is only divisible by itself & 1. The number 1 itself is not a prime number.

Examples are 2, 3, 5, 7 …

NOTE: 2 is the first & only even prime number

FACTORS & MULTIPLES

FACTOR		MULTIPLE
2 x 2	=	4
2 x 3	=	6
2 x 4	=	8

RATIO & PROPORTIONS

The following forms are all the same:

FRACTION	RATIO	RATIO
$\frac{2}{5}$	2 : 5	2 to 5

The percent sign (%) means divided by 100; hence $56\% = \dfrac{56}{100}$

Proportion is when two ratios are set equal to one another: $\dfrac{x}{2} = \dfrac{9}{3}$

When two ratios equal to one another (proportion), use cross multiplication to find the unknown variable. Using the above example:
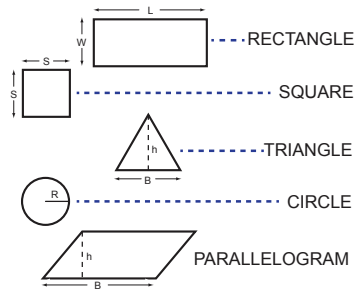$3x = 18$
$x = 6$

GEOMETRY REVIEW

AREA, PERIMETER, VOLUME

SHAPE	AREA (A)	PERIMETER (P)	VOLUME (V)
RECTANGLE	$A = L \times W$	$P = 2L + 2W$	$V = LWH_{of\ prism}$
SQUARE	$A = S^2$	$P = 4S$	$V = S^2 H_{of\ prism}$
TRIANGLE	$A = \frac{1}{2}Bh_{of\ triangle}$	$P = SOS$ *(sum of all sides)*	$V = \frac{1}{2}BhH_{of\ prism}$
CIRCLE	$A = \pi R^2$	$C = 2\pi R$	$V = \pi R^2 H_{of\ prism}$
PARALLELOGRAM	$A = B \times h_{of\ parallelogram}$	$P = SOS$	$V = BhH_{of\ prism}$

ANGLES & TRIANGLES

REMEMBER:
Sum of angles on a line = 180°
Complimentary angles: sum = 90°
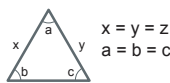Supplementary angles: sum = 180°
Sum of all angles in a triangle = 180°

VERTICAL ANGLES

a = 105
b = 75
$a + b = 180°$
75°
105°
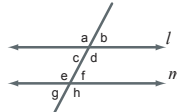
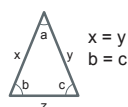### PARALLEL LINES

Lines l and m are parallel.
Vertical angles:
b = c   a = e   d = e
a = d   c = g   c = f
f = g   b = f   a = h
e = h   d = h   b = g
Hence, angles a, d, e, h are equal & angles b, c, f, g are equal.

EQUILATERAL TRIANGLE
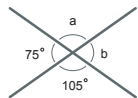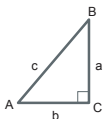
$x = y = z$
$a = b = c$

ISOSCELES TRIANGLE

$x = y$
$b = c$

RIGHT TRIANGLES & PYTHAGOREAN THEOREM
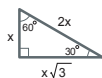
c = hypotenuse *(longest side of a right triangle)*
a & b are called "legs"

Pythagorean Theorem:
$$a^2 + b^2 = c^2$$

3 - 4 - 5 Rule

5 - 12 - 13 Rule

OTHER RIGHT TRIANGLE RULES

30 - 60 - 90 Rule
2x, 60°, 30°, $x\sqrt{3}$, x

Other Pythagorean Triples
7-24-25
8-15-17

45 - 45 - 90 Rule
$x\sqrt{2}$, 45°, 45°, x

SLOPES, POINTS, & LINES
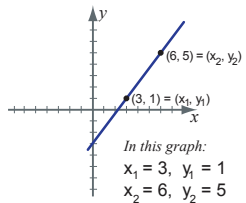
MIDPOINT FORMULA

$$x_{midpoint} = \frac{(x_1 + x_2)}{2}$$

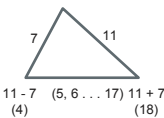$$y_{midpoint} = \frac{(y_1 + y_2)}{2}$$

Example:
Given points (3,1) & (6,5)

$$x_{midpoint} = \frac{(3+6)}{2} = 4.5$$

$$y_{midpoint} = \frac{(1+5)}{2} = 3$$

(6, 5) = (x_2, y_2)
(3, 1) = (x_1, y_1)

In this graph:
$x_1 = 3$, $y_1 = 1$
$x_2 = 6$, $y_2 = 5$

Length of 3rd side of a Triangle
7, 11
11 - 7   (5, 6 . . . 17)   11 + 7
(4)   (18)

SLOPE FORMULA

slope of a line: $m = \frac{(y_2 - y_1)}{(x_2 - x_1)} = \frac{\Delta y}{\Delta x} = \frac{y}{x} = \frac{Rise}{Run}$

Example:
Given points (3,1) and (6,5)

$$m = \frac{(5-1)}{(6-3)} = \frac{4}{3}$$

EQUATION OF A LINE FORMULA

$y = m(x) + b$
m = slope of the line
b = the y intercept of the line

POLYGONS

Sum of interior angles of a Polygon:
(n-2) x 180° *(n = the number of sides)*

Example: For a heptagon, n = 7
(7-2) x 180° = **900°**

STATISTICS & PROBABILITY

ARITHMETIC MEAN (AVERAGE)

$$Average = \frac{Sum}{Number}$$

MEDIAN

The middle value in increasing or decreasing order.
Example:
2, 3, 4, 5, 7   median = 4
2, 3, 4, 5   median = $\frac{3+4}{2}$ = 3.5

MODE

The most frequently occuring value.
Example:
1, 3, 3, 4, 5, 3, 7
mode = 3

FRACTIONS & PROBABILITY

$$Fraction = Probability = \frac{Focus}{Total}$$

Example:
{2, 3, 5, 7, 10, 13}
Fraction / Probability of selecting an odd number from the set above is:
$\frac{4}{6}$ *(# of odd values)* *(Total # of values)*

PERCENTAGE

$$What\ \%\ of = \frac{Focus}{Total} \times 100$$

$$Percentage\ Increase = \frac{Increase}{Original} \times 100$$

$$Percentage\ Decrease = \frac{Decrease}{Original} \times 100$$

SPEED–DISTANCE–TIME

D
S   T
speed   time

COMBINATION

n = total
c = combination
r = focus

$$^nC_r = \frac{n!}{(n-r)!\ r!}$$

QUANTITATIVE COMPARISON

	Quantity A	Quantity B	Correct Answer
Example 1:	(2)(6)	2 + 6	Ⓐ Ⓑ Ⓒ Ⓓ

Example 2:

In the figure, squares PQRV and VRST have sides of length 6.

Q   R   S
P   V   T

	Quantity A	Quantity B	Correct Answer
	The area of the shaded region	36	Ⓐ Ⓑ Ⓒ Ⓓ

Example 3:   x + y = -1

	Quantity A	Quantity B	Correct Answer
	x	y	Ⓐ Ⓑ Ⓒ Ⓓ

Selecting ANSWERS

[A] Square box - Pick **ALL** answers that apply. No credit is given unless you select all of the correct choices and no others.

Ⓐ Oval - Pick only **ONE** correct answer

GRE MATH