GMAT Quant Notes

Fraction	Decimal	Percent
$\frac{1}{6}$	0.167	16.7%
$\frac{5}{6}$	0.833	83.3%
$\frac{1}{9}$	0.111	11.1%

Root	Approximation
$\sqrt{2}$	1.4
$\sqrt{3}$	1.7
$\sqrt{5}$	2.25

Fractions, etc.

To compare fractions, cross-multiply:

Compare $\frac{7}{9}$ and $\frac{4}{5}$

$7 \times 5 = 35 < 36 = 9 \times 4 \longrightarrow \frac{7}{9} < \frac{4}{5}$

Using conjugates to rationalize denominators

Simplifiy $\frac{4}{\sqrt{2}}$

$\frac{4}{\sqrt{2}} \times \frac{\sqrt{2}}{\sqrt{2}} = \frac{4\sqrt{2}}{\sqrt{4}} = 2\sqrt{2}$

Exponents

Exponents and Roots

To raise a decimal to a high power, rewrite decimal as product of integer and power of 10 and then apply exponent.

Example: $(0.5)^4 = (5 \times 10^{-1})^4 = 5^4 \times 10^{-4} = 625 \times 10^{-4} = 0.0625$

A Compound Base

$10^3 = (5 \times 2)^3 = 5^3 \times 2^3 = 125 \times 8 = 1000$

Combining Terms with Common Bases

$z^2 \times z^5 = z^7$

Factoring Out a Common Term

$11^3 + 11^4 = 11^3(1 + 11) = 12(11)^4$

Absolute Value

Absolute Value Equations

Solve for w, given $12 + |w - 4| = 30$

$|w - 4| = 18$

Then, $w - 4 = 18$ and $w - 4 = -18 \longrightarrow w = \{22, -14\}$

Complex Absolute Value Equations

If $|x - 2| = |2x - 3|$, what are the possible values for x?

1. $x - 2 = 2x - 3$

2. $x - 2 = -(2x - 3)$

3. $-(x - 2) = 2x - 3$

4. $-(x - 2) = -(2x - 3)$

Note that **1** and **4** are equivalent, as are **2** and **3**.

Graph of $|x - 4| < 3$

Quadratics

Memorize:

$x^2 - y^2 = (x + y)(x - y)$

$x^2 + 2xy + y^2 = (x + y)(x + y) = (x + y)^2$

$x^2 - 2xy + y^2 = (x - y)(x - y) = (x - y)^2$

Quadratic Formula

$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$ where the discriminant is $b^2 - 4ac$

If $d > 0$, 2 solutions; if $d = 0$, then 1 solution; if $d < 0$, then 0 solutions.

Rate Problems

$Rate \times Time = Distance$

$Rate \times Time = Work$

Invert 'time for unit' for rate

Suppose it takes an elevator 4 seconds to climb 1 floor, then $Rate = \frac{1}{4}\, floor/sec$

Relative Rates

1. If bodies move toward each other, distance between bodies is decreasing by sum of velocities of A and B.

2. If bodies move away from each other, distance between bodies is increasing by sum of velocities of A and B.

3. If bodies move in the same direction, distance is clsoing by difference of A and B.

Mixtures

$k = 0.1$ and $b = 0.02$; want mixture that is 0.04. What is ratio?

$0.1k + 0.02b = 0.04(k + b) = 0.04k + 0.04b \longrightarrow 0.06k = 0.02b \longrightarrow 3 : 1\, ratio$

Geometry

Sum of Interior Angles for Polygons

$(n - 2) \times 180$

Area of Trapezoid

$a = \frac{(b_1 + b_2)h}{2}$

Common Right Triangles

$3 - 4 - 5$

$5 - 12 - 13$

$8 - 15 - 17$

45-45-90 and 30-60-90 Ratios

$1 : 1 : 1\sqrt{2}$

$1 : 1\sqrt{3} : 2$

Inscribed v. Central Angles

An inscribed angle is equal to half of the arc it intercepts.

A central angle is equal to the arc it intercepts.

Diagonals of Other Polgyons

Diagonal of a Square: $d = s\sqrt{2}$

Diagonal of a Cube: $d = s\sqrt{3}$