

SAT Math and SAT Math IIC Formula Sheet

**Algebra**

Given  $f(x) = ax^2 + bx + c$

Sum of roots:  $-\frac{b}{a}$

Product of roots:  $\frac{c}{a}$

Quadratic formula:  $\frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$

Even functions:  $f(x) = f(-x)$ . The right side of the graph has the same y-values as the left side

Odd functions:  $f(x) = -f(-x)$ . The right and left sides of the graph have opposite y-values, like 5 and -5

Solving a system of linear equations with a TI-83 or higher:

Line up your variables. Example

Equation 1:  $5x + 2y = 13$

Equation 2:  $7y - 4x = 27$

Should be

$5x + 2y = 13$

$-4x + 7y = 27$

Create a matrix and type in the coefficients. Create a second matrix and type in the solutions – in this case, 13 and then 27. Invert (hit the  $^{-1}$  button on your calculator) the first matrix and multiply it by the second matrix. This method can work with more than two variables.

**Geometry**

Regular polygon: a polygon where the sides all have the same length

Distance between two points  $(x_1, y_1)$  and

$(x_2, y_2)$ :  $\sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$

\*Distance from a point  $(x_1, y_1)$  to a line

$ax + by + c = 0$ :  $\frac{|ax_1 + by_1 + c|}{\sqrt{a^2 + b^2}}$

Sum of interior angles in an n-sided regular polygon:  $180(n - 2)$

Areas:

- Square:  $s^2$
- Circle:  $\pi r^2$
- Triangle:  $\frac{bh}{2}$  or  $\frac{ab \sin C}{2}$
- Rhombus:  $\frac{d_1 d_2}{2}$
- Trapezoid:  $\frac{(b_1 + b_2)h}{2}$
- Regular Hexagon:  $\frac{3s^2 \sqrt{3}}{2}$

Special area formulas:

- Regular triangle:  $\frac{s^2 \sqrt{3}}{4}$
- Heron's formula for scalene triangles:  $\sqrt{s(s-a)(s-b)(s-c)}$ , where s is one-half of the perimeter

Volumes; Lateral Surface Areas:

- Sphere:  $\frac{4\pi r^3}{3}$ ;  $4\pi r^2$
- Cylinder:  $\pi r^2 h$ ;  $2\pi r h$
- Cube:  $s^3$ ;  $6s^2$
- Rectangular Prism:  $lwh$ ;  $2(lw) + 2(wh) + 2(lh)$
- Right Cone:  $\frac{\pi r^2 h}{3}$ ;  $\pi r \sqrt{r^2 + h^2}$

\*Angle between two lines:  $\tan \theta = \frac{m_2 - m_1}{1 + m_1 m_2}$ ,

where  $m_2$  is the slope of one of the lines and  $m_1$  is the slope of the other line

\*Law of sines:  $\frac{\sin A}{a} = \frac{\sin B}{b} = \frac{\sin C}{c}$

\*Law of cosines:  $c^2 = a^2 + b^2 - 2ab \cos C$

Number of diagonals in an n-sided polygon:  $d = n(n - 3) / 2$

Common Pythagorean triples: (3,4,5), (5,12,13), (7,24,25), (8,15,17)

Items marked with a \* are for the Math IIC Test and are unlikely to show up on the SAT I

Written by Jeffrey Wong  
July 2006