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: πr^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: $\pi r^2 h$; $2\pi rh$
- 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

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