SAT MATH CHECKLIST:
Facts and Formulas
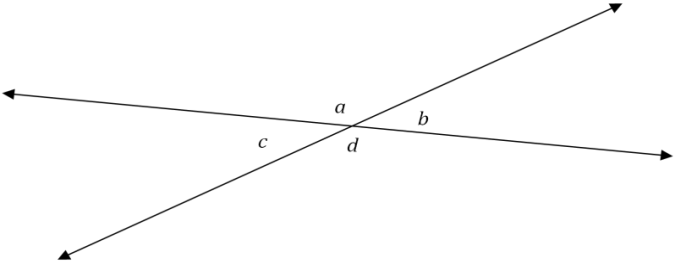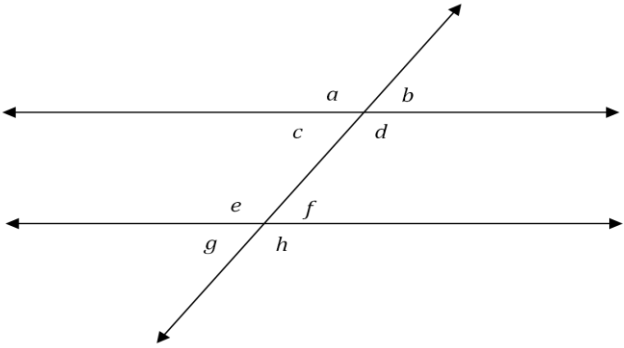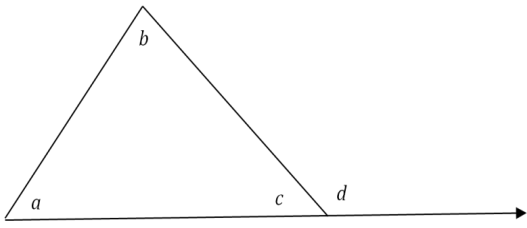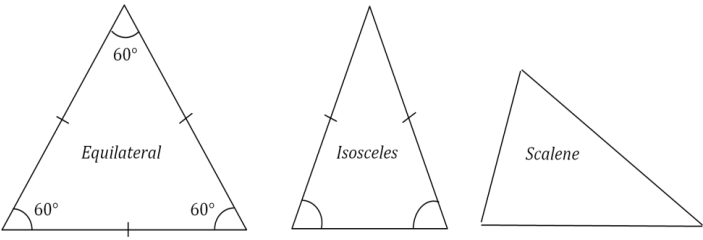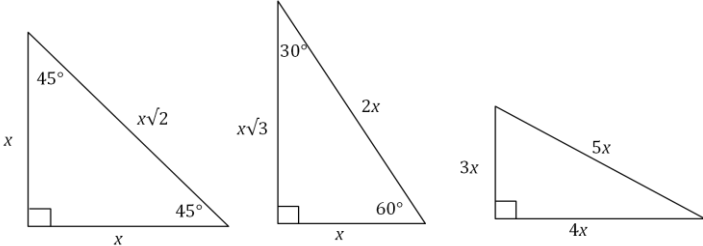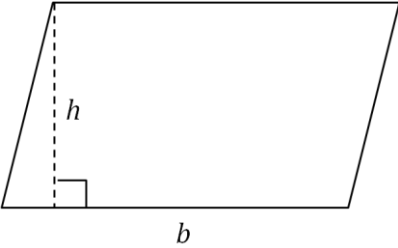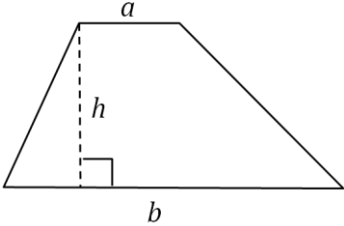

Numbers and Arithmetic

Sum of consecutive integers	$n + (n + 1) + (n + 2) \ldots$
Sum of the consecutive integers from 1 to an integer n	$(n + 1) \times {}^{n}/_{2}$

Adding or multiplying even or odd integers	even + even = even odd + odd = even odd + even = odd	even × even = even odd × odd = odd odd × even = even

Cross-multiplication	If $\dfrac{a}{b} = \dfrac{c}{d}$, then $ad = bc$.
Percent increase or percent decrease	$\dfrac{change\ in\ amount}{original\ amount} \times 100\%$

Exponent rules	$a^1 = a$ $a^0 = 1$ $a^{-m} = \dfrac{1}{a^m}$ $a^m a^n = a^{m+n}$ $\dfrac{a^m}{a^n} = a^{m-n}$	$(a^m)^n = a^{mn}$ $a^m b^m = (ab)^m$ $\dfrac{a^m}{b^m} = (\dfrac{a}{b})^m$ $a^{\frac{m}{n}} = \sqrt[n]{a^m}$

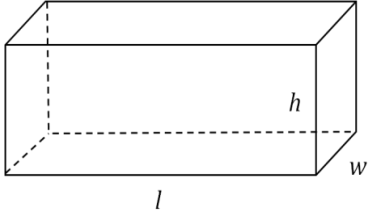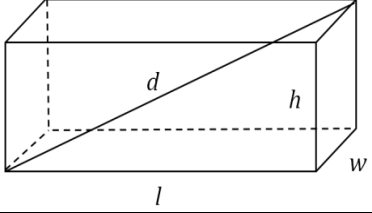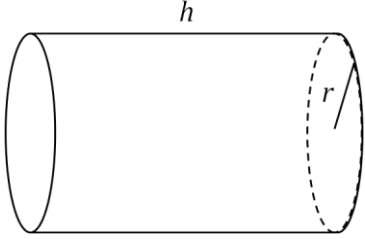|	
Absolute value	If $\lvert x \rvert = 4$, then $x = 4\ or\ x = -4$ If $\lvert x \rvert < 4$, then $-4 < x < 4$ If $\lvert x \rvert > 4$, then $x < -4\ or\ x > 4$
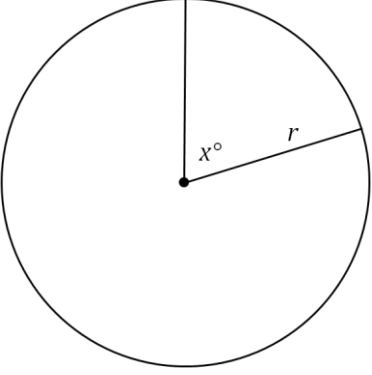
Algebra and Functions

Difference of squares	$$a^2 - b^2 = (a + b)(a - b)$$
Properties of inequalities	The inequality is reversed by - taking the negative of both sides - taking the reciprocal of both sides - multiplying or dividing both sides by a negative number
Rates	$$distance = rate \times time$$
Domain of a function	The set of all the "input" numbers for which the function still works
Range of a function	The set of all the "output" numbers
Formula for slope	$$m = \frac{\text{rise}}{\text{run}} = \frac{y_2 - y_1}{x_2 - x_1}$$
Facts about slope	- Horizontal lines have slopes of zero. - Vertical lines have undefined slopes. - Non-vertical parallel lines have equal slopes. - Non-vertical perpendicular lines have slopes whose product is -1.
Linear functions	$$y = mx + b$$
Quadratic functions	$$y = ax^2 + bx + c$$
Translation of $y = f(x)$, a units vertically and b units horizontally	$$y - a = f(x - b)$$

Geometry

Angle sums	- The sum of any number of angles that form a straight line is 180°. - The sum of any number of angles around a point is 360°. - Two angles that add to 90° are called complementary angles. - Two angles that add to 180° are called supplementary angles.
Sum of the interior angles of a polygon with n sides	$180°(n-2)$
Vertical angles	 $a = d$ and $b = c$
Transversals	 $a = d = e = h$ $b = c = f = g$ $c + e = 180°$ and $d + f = 180°$
Exterior angle of a triangle	 $d = a + b$

Classification of triangles	
Pythagorean Theorem	$$a^2 + b^2 = c^2$$
Special right triangles	
Triangle inequality	The sum of the lengths of two sides of a triangle is always greater than the length of the third side
Area of a triangle	$$A = \frac{1}{2}bh$$
Area of a parallelogram or rectangle	$A = bh$
Area of a trapezoid	$A = \frac{1}{2}h(a + b)$
Area and circumference of a circle	$$A = \pi r^2$$ $$C = \pi d = 2\pi r$$

Arc length (L) and area (A)	$$\frac{L}{2\pi r} = \frac{x°}{360°}$$ $$\frac{A}{\pi r^2} = \frac{x°}{360°}$$
Volume and surface area of a rectangular solid	$$V = lwh$$ $$SA = 2lw + 2wh + 2lh$$
Diagonal of a rectangular solid	$$d^2 = l^2 + w^2 + h^2$$
Volume and surface area of a right cylinder	$$V = \pi r^2 h$$ $$SA = 2\pi r^2 + 2\pi rh$$
Distance formula	$$d = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$$
Midpoint formula	$$(\frac{x_1 + x_2}{2}, \frac{y_1 + y_2}{2})$$

Data Analysis and Statistics

Counting principle	If there are m ways to complete the first and n ways to complete the second, then there are $m \times n$ ways to complete the two of them
Probability	$$\frac{number\ of\ favorable\ outcomes}{number\ of\ possible\ outcomes}$$
Average	$$average = \frac{sum}{n}$$