

On the Subject of Equations X

You have either tried to escape them, or you need to use them every single day...
Whatever the case they are here now!

This module has a display for a number pattern, symbols, and user input. It also has keypads for entering values into the input screen, and a clear button.

<#DISPLAY>		
<input type="radio"/>		
<SYMBOL>		
1	2	3
4	5	6
<INPUT>		
7	8	9
0	C	SUBMIT

To solve this module the defuser must enter in the correct number which is gotten through information from the symbol and number pattern display and used below in a step-by-step process.

If the defuser submits the wrong number into the module, a strike will be recorded but the module will NOT reset.

Step 1:

Find the corresponding symbol from the symbol display below and take note of the equation it relates to.

Symbols*	Equations**
Torque	$\mathbf{r} \times \mathbf{F}$
Kinetic Energy	$\frac{1}{2}mv^2$
Power	$\mathbf{F} \cdot \mathbf{v}$
Angular Velocity	v/r
Z of T	$\int(T + 3)dT, C=2$
Coefficient of Static Friction	F_F/F_N
H of T	$\int(T^2 + 4T)dT, C=-5$
Position	$x_{\max}\cos(\omega T + \phi)$
Angular Acceleration	$(\omega - \omega_0)/t$

* - A symbol to word key is provided at the end of the module page.

** - A equation help list is provided at the end of the module page.

Step 2:

Find the corresponding symbol from the symbol display below and go through the rules, which may make changes to your symbol's equation.

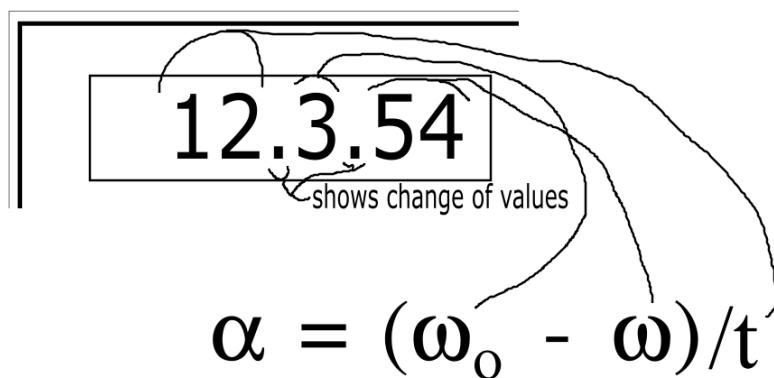
Symbols*	Rules
Angular Velocity	<ul style="list-style-type: none"> If there is an odd in the serial number, then subtract 5 from the equation. If the bomb has both an unlit indicator CAR and unlit indicator IND, then also do the rules for "Coefficient of Static Friction".
Coefficient of Static Friction	<ul style="list-style-type: none"> If there is exactly 2 batteries on the bomb, then divide the equation by $\frac{3}{7}$. If there is a lit indicator NSA, then ignore the next rule. If the bomb has a RJ-45 port, then add 1 to the equation.
Kinetic Energy	<ul style="list-style-type: none"> If the bomb has 3 or more indicators, remove the $\frac{1}{2}$ from the equation. If there is 1 "The Button" module, then multiply the entire equation by 3.
Torque	<ul style="list-style-type: none"> If the bomb has an empty port plate and more than 1 battery, add 10 to the equation. If you have solved at least 2 modules, then divide each term individually by 2. If the bomb has a lit indicator FRQ, then skip the rest of the rules. If there is a needy module, disregard all previous rules and use the original equation. If the bomb has an unlit indicator BOB, then add 3 to the equation.
Z of T	<ul style="list-style-type: none"> If you have more than 6 widgets, then take the derivative of the integral.
Power	<ul style="list-style-type: none"> If there is a vowel in the serial number, then multiply the equation by $\frac{2}{3}$. If you have at least 6 modules, then add 14 to the equation. If the bomb has a unlit indicator CLR, then turn any 3's in the number display to 4's.

Angular Acceleration	<ul style="list-style-type: none"> If the bomb has 2 strikes, then press submit with the input display cleared. If the bomb has a Stereo RCA port, then add 8 to the equation. If there is a needy module, then multiply the equation by $\frac{1}{4}$. If the 2 previous rules applied, then put "116" into the input display.
Position	<ul style="list-style-type: none"> If there is a 5 or 3 in the serial number, then add 21 to the equation. If there is 1 "Keypads" module, then turn any 5's in the number display to 8's. If you have ANY solved modules then change the cosine to a sine.
H of T	<ul style="list-style-type: none"> If you have more than 5 batteries, then take the derivative of the integral. Otherwise, if the bomb has a Parallel port, then change the "C" value to 8.
* – A symbol to word key is provided at the end of the module page.	

Step 3:

Take your new equation and substitute all values from the number display into the variables** of the equation from left to right (anything in a fraction goes denominator first then numerator) EXCLUDING what is before the equals sign. A diagram below shows how you identify the values from the display and an example of how to substitute them. Then calculate the answer to the equation and have the defuser input it into the module and press submit.

** – The equation helper list also contributes to letting you know what is a variable and what isn't.



Helpful Tables/Lists

*Hey remember those helpful things *'s promised? Well here they are!*

*Symbols to Words Table

Symbols	Words
H(T)	H of T
P	Power
X	Position
ω	Angular Velocity
Z(T)	Z of T
τ	Torque
μ	Coefficient of Static Friction
α	Angular Acceleration
K	Kinetic Energy

**Equations Help List

- Any dot (·), x (normal), or number/variable right next to another is multiplication
- sine (sin), cosine (cos), and tangent (tan) are all mathematical operators, not variables
 - These functions can either be calculated in terms of radians or degrees, the module does it with degrees
- Answers to the equations are assumed to be absolute values of themselves
- Decimal answers are rounded to the nearest whole number
- Anything with a subscript is a guaranteed variable
- Integrals (\int)
 - The \int symbol and dT can be ignored
 - What's left is called the integrand, and each term can be treated separately
 - Each term's variable gets raised to its current power + 1
 - Then each term's gets multiplied by coefficient already there / new power
 - If there is just a number term, then just add a T variable after it
 - Bring down each sign and add the "C" term listed with the integral to get your new equation
- Anything else that is not a number is probably a variable