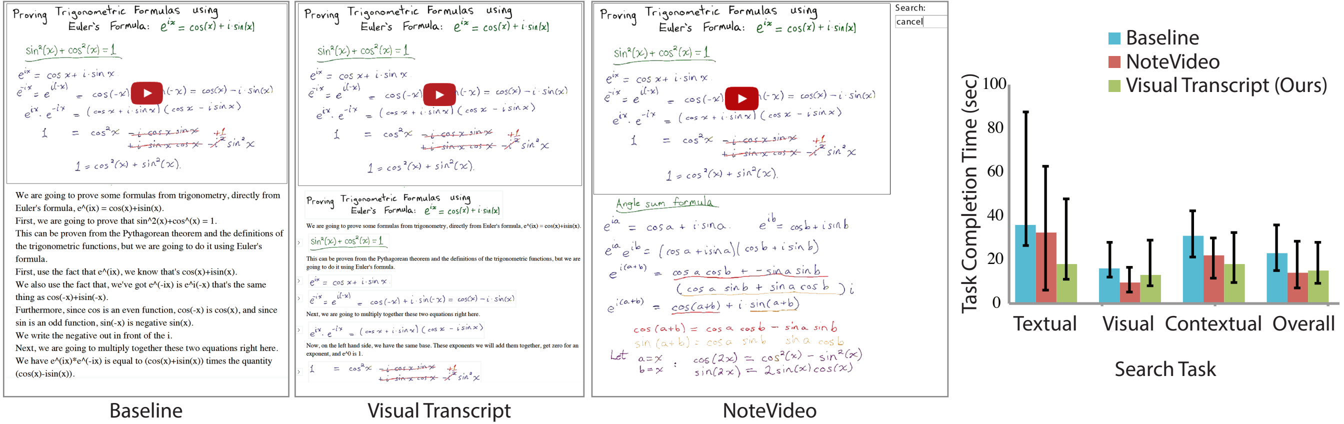
Proving Trigonometric Formulas using Euler's Formula: $e^{ix} = \cos(x) + i \cdot \sin(x)$
$\sin^2(x) + \cos^2(x) = 1$
We are going to prove some formulas from trigonometry, directly from Euler's formula, e^(ix) = cos(x)+isin(x).
First, we are going to prove that sin^2(x)+cos^(x) = 1.
This can be proven from the Pythagorean theorem and the definitions of the trigonometric functions, but we are going to do it using Euler's formula.
First, use the fact that e^(ix), we know that's cos(x)+isin(x).
We also use the fact that, we've got e^(-ix) is e^i(-x) that's the same thing as cos(-x)+isin(-x).
Furthermore, since cos is an even function, cos(-x) is cos(x), and since sin is an odd function, sin(-x) is negative sin(x).
We write the negative out in front of the i.
Next, we are going to multiply together these two equations right here.
We have e^(ix)*e^(-ix) is equal to (cos(x)+isin(x)) times the quantity (cos(x)-isin(x)).
We are going to prove some formulas from trigonometry, directly from Euler's formula, e^(ix) = cos(x)+isin(x).
This can be proven from the Pythagorean theorem and the definitions of the trigonometric functions, but we are going to do it using Euler's formula.
Next, we are going to multiply together these two equations right here.
Now, on the left hand side, we have the same base. These exponents we will add them together, get zero for an exponent, and e^0 is 1.
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