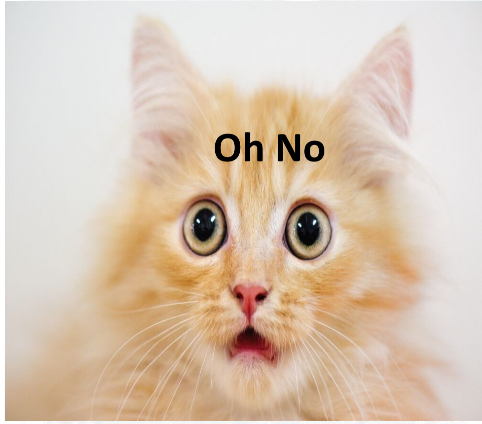
Every Time You Do This:

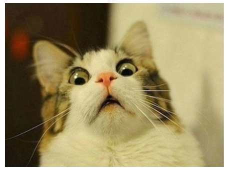


Simplify

$$f(x) = \frac{\cancel{x^2} + 2x + 1}{\cancel{x^2} + 3}$$

$$= \frac{2x + 1}{3}$$

A KITTEN DIES



Thinking is hard, maybe that's why hoooomans don't do it always

Every Time You Do This:

Simplify

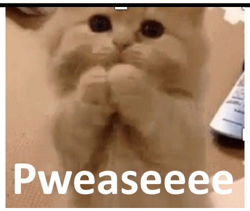
$$f(x) = \frac{x^{\cancel{2}} - 16}{\cancel{x} + \cancel{2}}$$

$$= x - 8$$

2 KITTENS DIE

Correction: Consider an example where we can simplify straight away

We can simplify (cancel) when terms are multiplied (X)



$$\frac{12x^2y^2}{18xy^3}$$ which is just $$\frac{12 \times x^2 \times y^2}{18 \times x \times y^3}$$

becomes

$$\frac{{}^{2}\cancel{12}\,x^{\cancel{2}}\,\cancel{y^2}}{{}^{3}\cancel{18}\,\cancel{x}\,y^{\cancel{3}\,1}} = \frac{2x}{3y}$$

We **cancel common** factors (colour pairs)

Correction: Consider an example where we must factorise first

We CANNOT simplify when terms are NOT multiplied

$$\frac{x^2 + x - 2}{2x^2 + 7x + 6}$$

We **factorise** first instead

$$= \frac{(x+2)(x-1)}{(2x+3)(x+2)}$$ which is just $$\frac{(x+2) \times (x-1)}{(2x+3) \times (x+2)}$$

Now we can cancel since we have multiplication

$$= \frac{\cancel{(x+2)}(x-1)}{(2x+3)\cancel{(x+2)}} = \frac{x-1}{2x+3}$$

We **cancel common** factors (colour pairs)

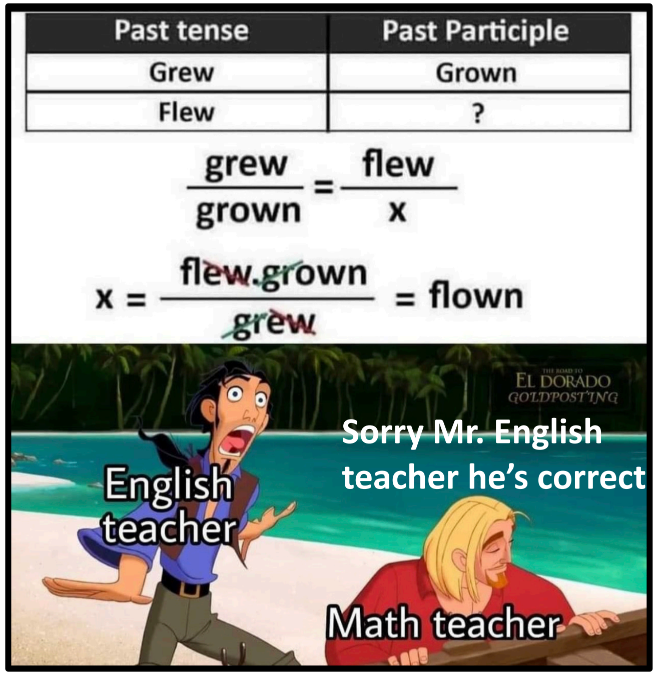
Remember to stay away from any other cancel culture

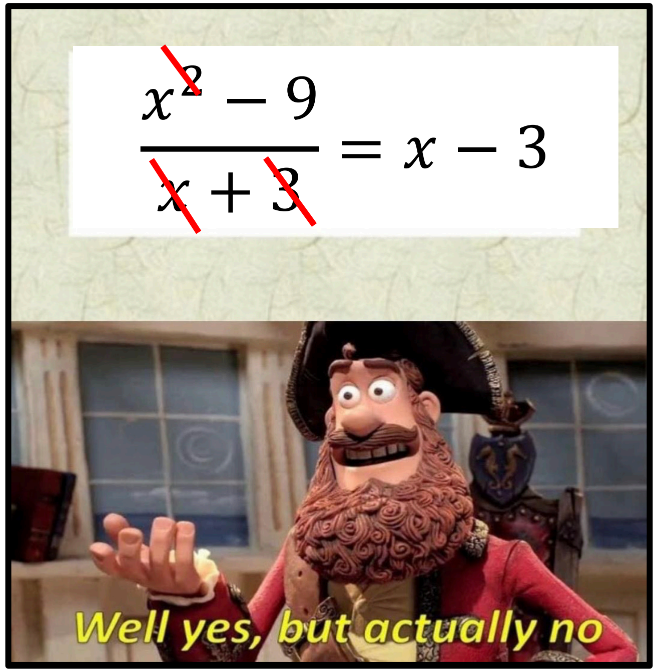
Solving equation by one Blonde:

$$\frac{1}{n}\sin x = ?$$

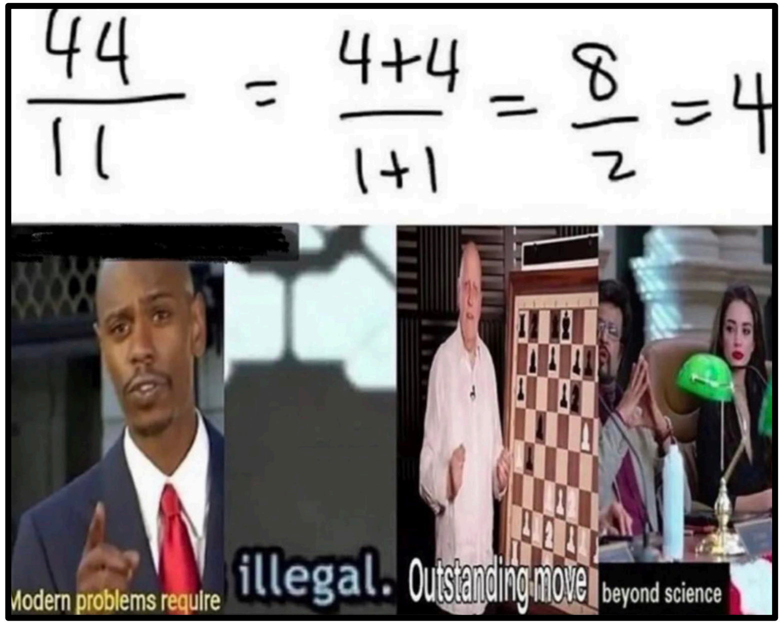
$$\frac{1}{\cancel{n}}\,\text{si}\cancel{\text{n}}\,x = ?$$

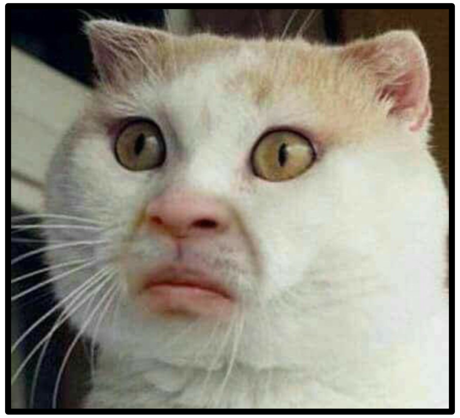
$$six = 6$$





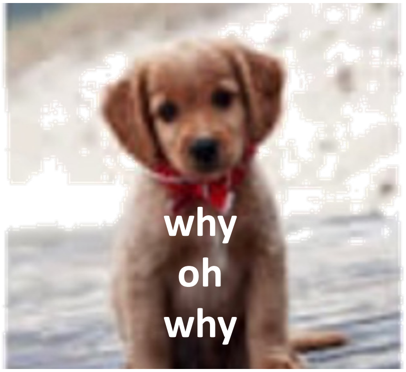
And respect the difference addition and multiplication





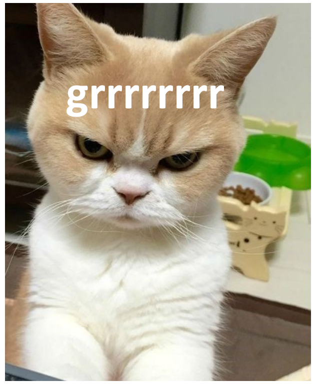
Ok, ok, I'm sorry for the mistakes

Every Time You Do This:

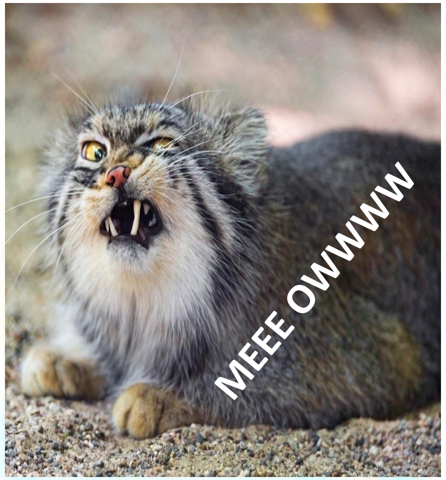


$$3(x+5)$$
$$= 3x + 8$$

You make this puppy SO DISAPPOINTED in you



Every Time You Do This:



$$(x+3)^2$$
$$=$$
$$x^2 + 9$$

A cat attacks YOU

Correction of both :

$3(x+5) = 3x + 15$

The brackets mean multiply, so the 3 and 5 are multiplied

High five

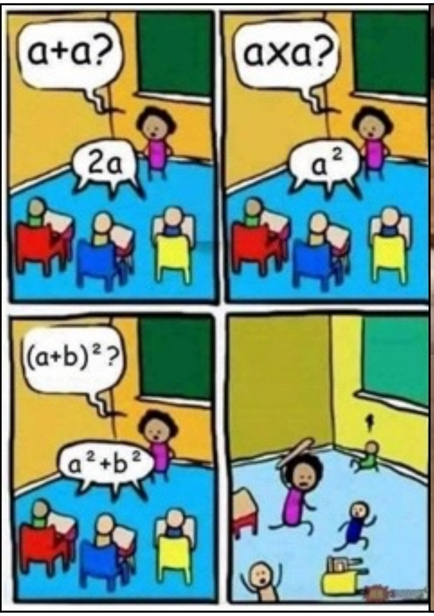
$\underbrace{(x+3)^2}_{\text{Write out as 2 brackets and then expand}} = (x+3)(x+3) = x^2 + 3x + 3x + 9$

$= x^2 + 6x + 9$

Remember: $(3x)^2$ is not the same as $(3+x)^2$

$(3x)^2 = 3x \times 3x = 9x^2$

$(3+x)^2 = (3+x)(3+x) = x^2 + 6x + 9$



Every Time You Do This:

$$a + a + a = a^3$$

Someone unfriends you

Correction:
The object that we add or subtract doesn't change. Only the number in front does.

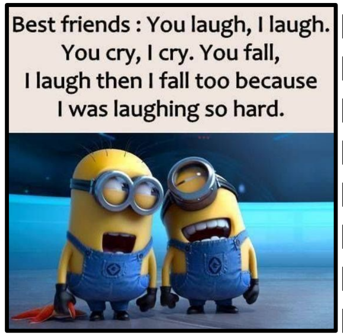
$$a + a + a = 3a$$

$$2a + 3b - 4a + 5b$$

If I had 2 apples and took away 4 apples then I would have negative two apples
If I had 3 bananas and got 5 more bananas then I would have 8 bananas

$$-2a + 8b$$

However, it is good to keep friends ...

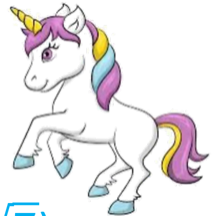


Every Time You Do This:

$$\sqrt{2} + \sqrt{8} = \sqrt{10}$$

$$\sqrt{x^2 + 9} = x + 3$$

Math Unicorn Can't Understand Why You Would Hurt Its Feelings So Badly

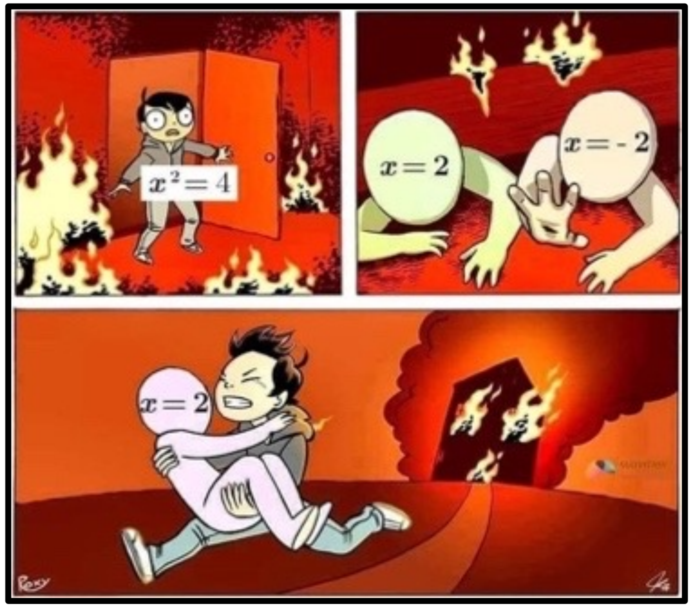


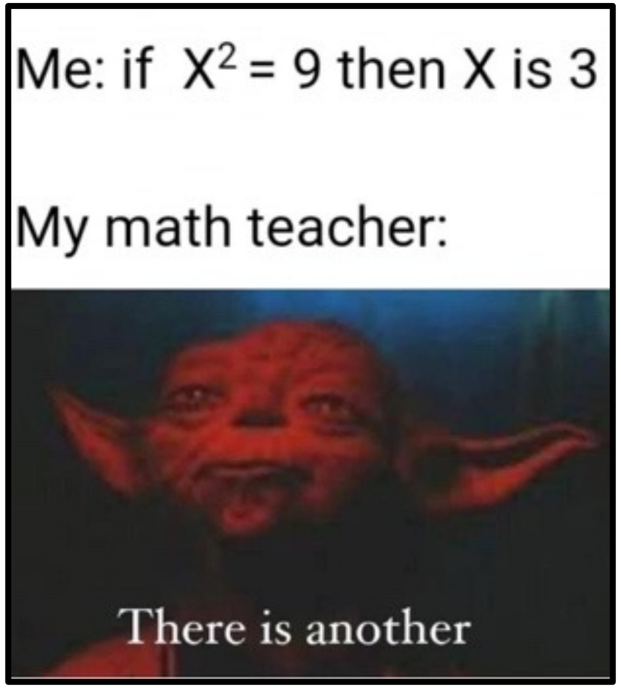
Correction:
$\sqrt{2} + \sqrt{8}$ cannot be added unless the roots are the same (adding and subtracting surds is the same as adding and subtracting algebra e.g. $2x + 3x = 5$ and $2\sqrt{7} + 3\sqrt{7} = 5\sqrt{7}$)
Sometimes using surd knowledge we can make the roots the same

$$\sqrt{2} + \sqrt{8} = \sqrt{2} + 2\sqrt{2} = 3\sqrt{2}$$

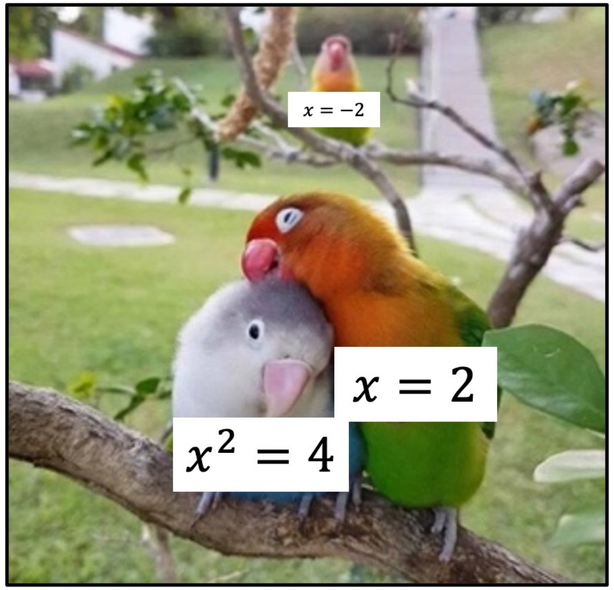
$\sqrt{x^2 + 9}$ cannot be simplified. We could only simplify & take the roots of each number IF we have **multiplication**

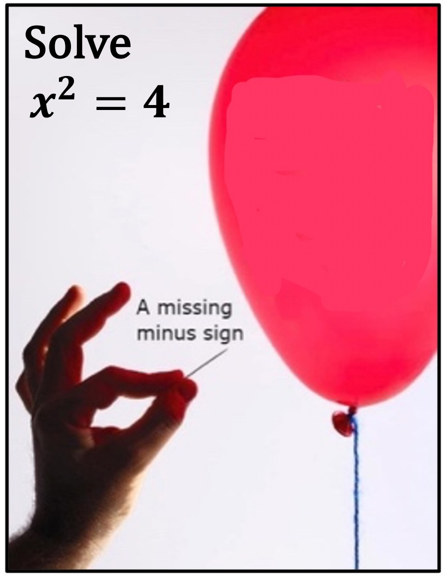
$$\sqrt{x^2} \times \sqrt{9} = x \times 3 = 3x$$

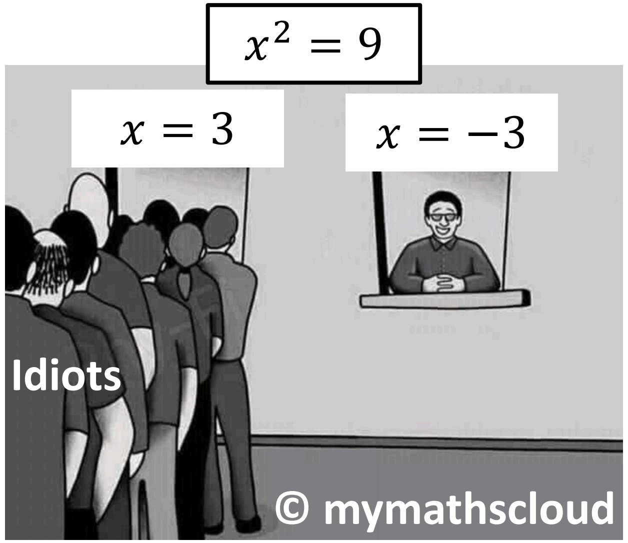




Correction:
There are 2 solutions, not 1
We always get 2 solutions when we take the **even** root



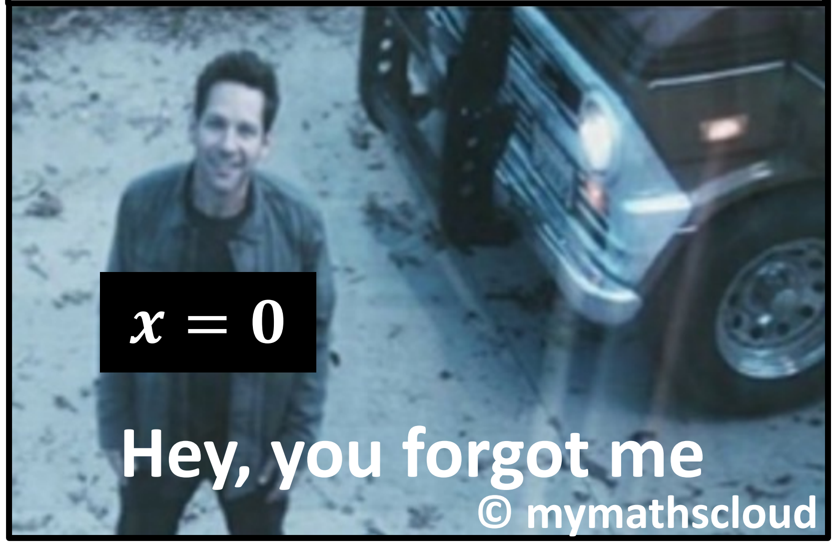




Me: solving $x^2 - 2x = 0$

$$x^2 = 2x$$

$$x = 2$$



Correction:
Dividing by x loses a solution.
Factorise instead to solve.
We want zero on one side first which we already had at the beginning. Factorising gives

$$x(x-2) = 0$$

$$x = 0, x = 2$$

Looking for the lost solution

Me: solving $x^2 - 2x - 3 = 0$

$$x^2 - 2x = 3$$

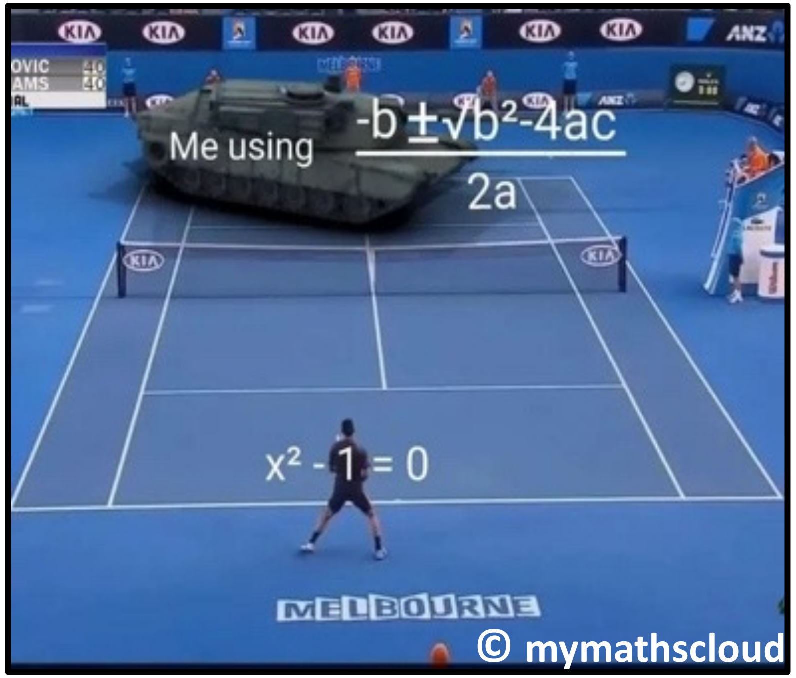
$$x(x-2) = 3$$

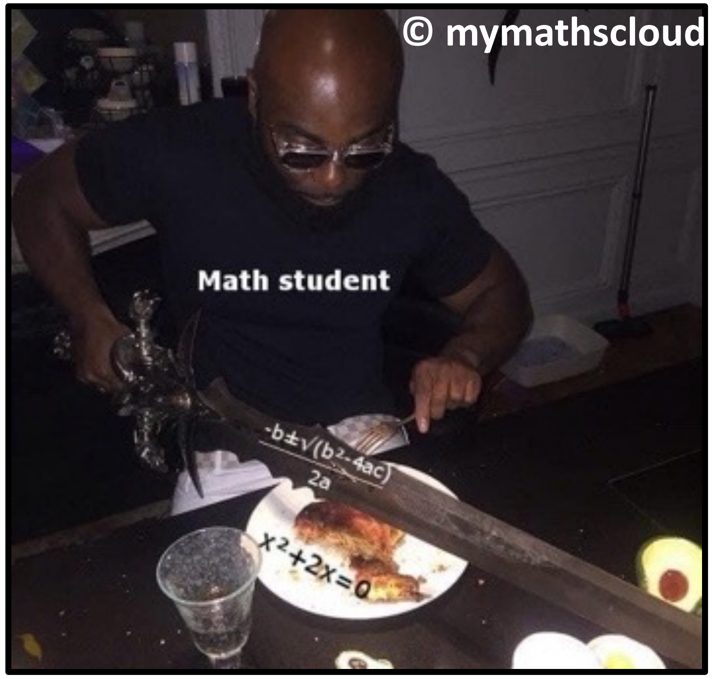
Correction:
We are solving a quadratic, not a linear equation!!!
We want zero on one side first and then we
Factorise OR use quadratic formula

$$x^2 - 2x - 3 = 0$$

$$(x-3)(x+1) = 0$$

$$x = 3, x = -1$$





Correction:
These are both not wrong, but both equations are easy to solve and do not need the quadratic formula, which is overkill here.

$$x^2 - 1 = 0$$

We can easily get x on its own easily

$$x^2 = 1$$

$$x = \pm 1$$

$$x^2 + 2x = 0$$

We can't get x on its own as easily
BUT this factorises

$$x(x+2) = 0$$

$$x = 0, x = 2$$

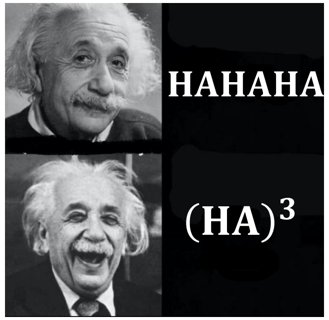
Every Time You Do Any Of This:

$$2^5 = 10$$
$$(-2)^3 = 8$$
$$-2^2 = 4$$
$$(-2)^2 = -4$$
$$37^0 = 0$$
$$2^{-3} = -8$$

A KOI GASPS IN SHOCK. "HOW COULD YOU?"

Correction:

$$2^5 = 2\times2\times2\times2\times2 = 32$$
$$(-2)^3 = -2\times-2\times-2 = -8$$
$$-2^2 = -2\times2 = -4$$
$$(-2)^2 = -2\times-2 = 4$$



$37^0 = 1$ (ANYTHING raised to the power 0 is 1)

$$2^{-3} = \frac{1}{2^3} = \frac{1}{8}$$

Negative powers have nothing to do with negative numbers

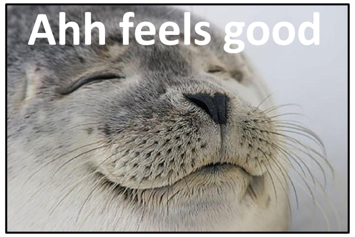
Every Time You Do Any Of This:

$$(2x)^3 = 2x^3$$
$$(2x)^3 = 6x^3$$
$$(2^x)^3 = 8^{3x}$$
$$2(3^2) = 6^2$$

Another baby otter picture is deleted from the internet

Correction:

$$(2x)^3 = 8x^3$$
$$(2^x)^3 = 2^{3x}$$
$$2(3^2) = 2(9) = 18$$



Every Time You Any Of This:

$$x^2 \sin x = \sin x^3$$

$$2 \sin 2x = \sin 4x$$

$$\sin(x+2)$$
$$= sinx + sin2$$

A BUNNY DIES

Correction:
Note of these can be simplified. Angles with trig are fixed unless we use identities

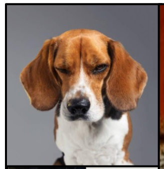
$2 \sin 2x = 4 \sin x \cos x$ is using double angle Formulae

$\sin(x+2) = \sin x \cos 2 - \cos x \, sin \, 2$ if using addition formula

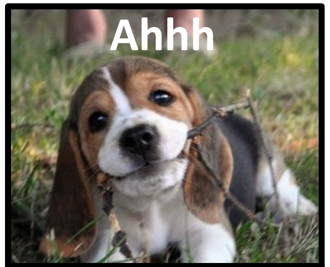
Every Time You Do This:

$$\frac{a}{b+c} = \frac{a}{b} + \frac{a}{c}$$

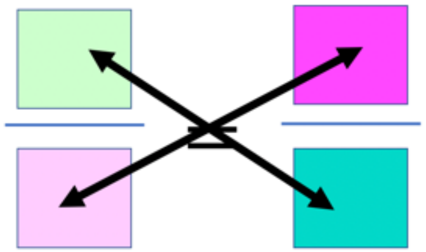
This beagle looks at you very very sternly



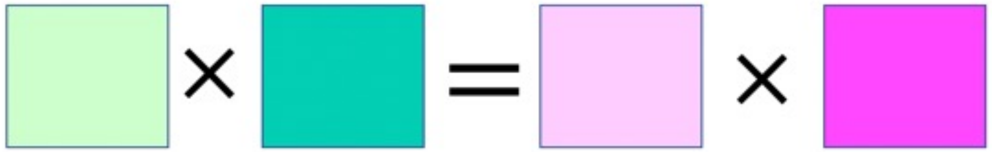
Correction:
We can split up fractions with **1 term** in denominator $\frac{a+b}{c} = \frac{a}{c} + \frac{b}{c}$
This is just the reverse direction of when we add or subtract fractions. If we look at this From right to left it makes sense, right?
Never split up fractions when there are 2 or more terms in the denominator

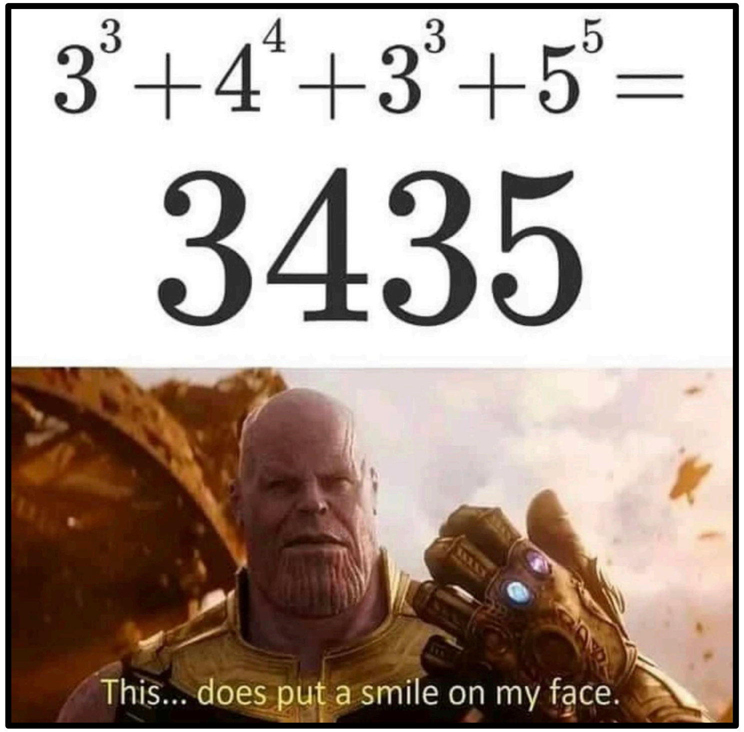


Correction:
You can only do this when multiplying fractions, not when one fraction in on one side of an equals sign.
Instead, we can cross multiply

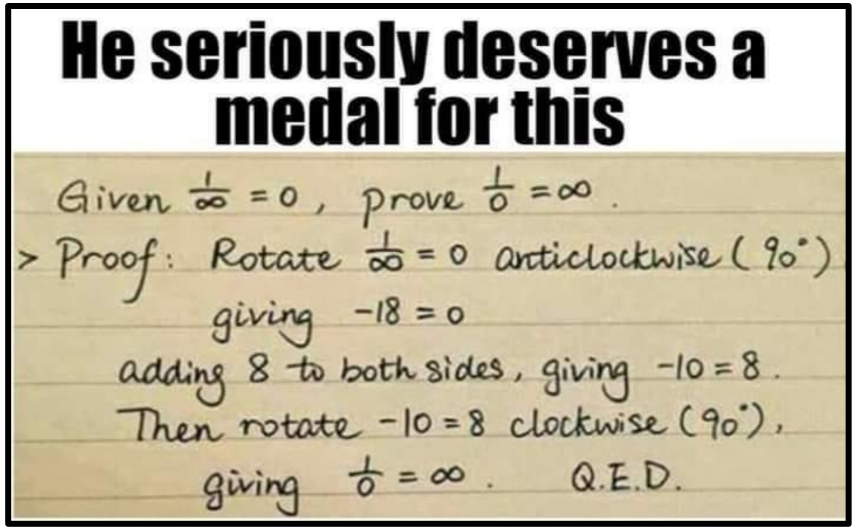


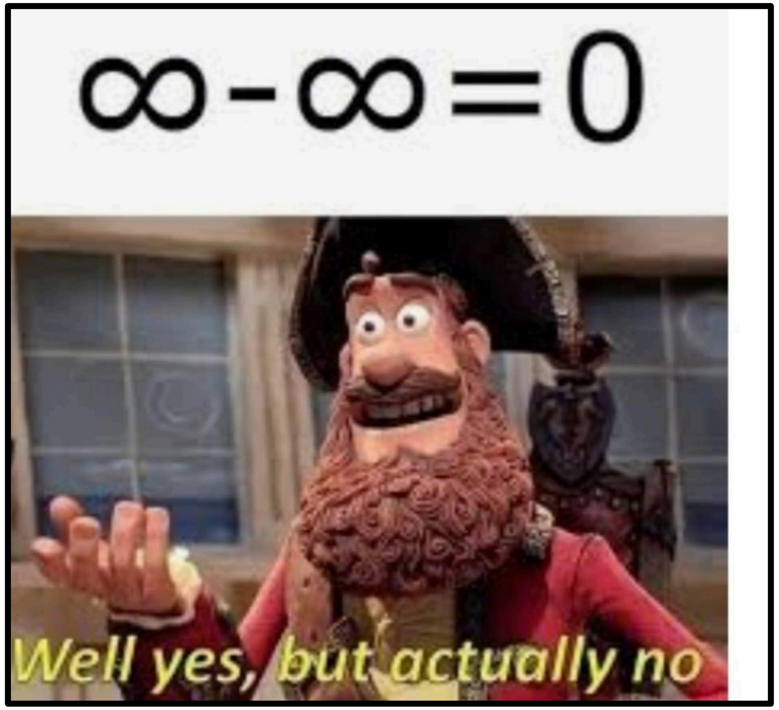
This gives

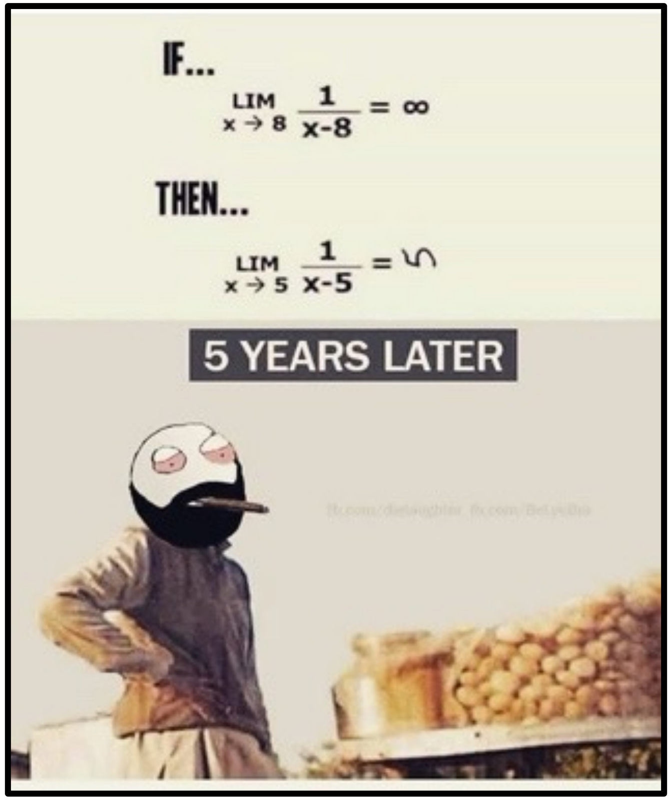


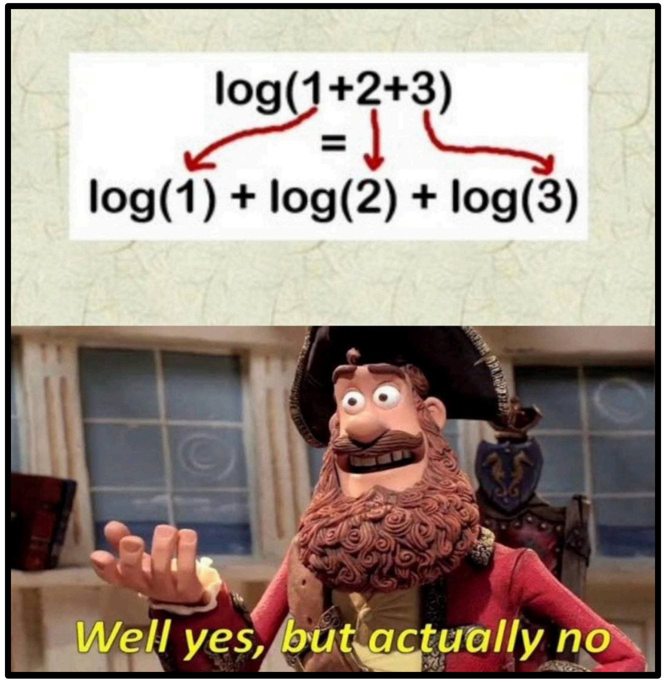


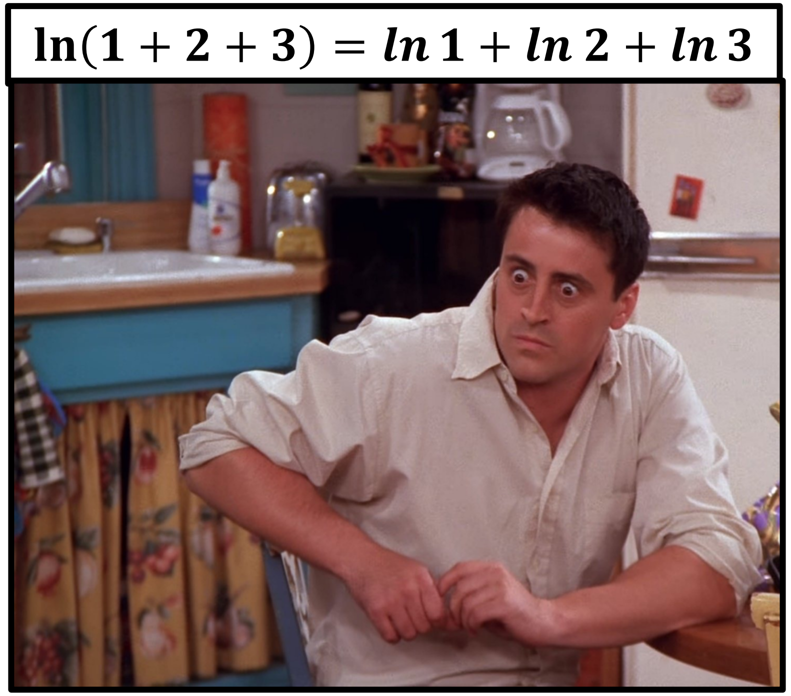
Actually, this dude is correct

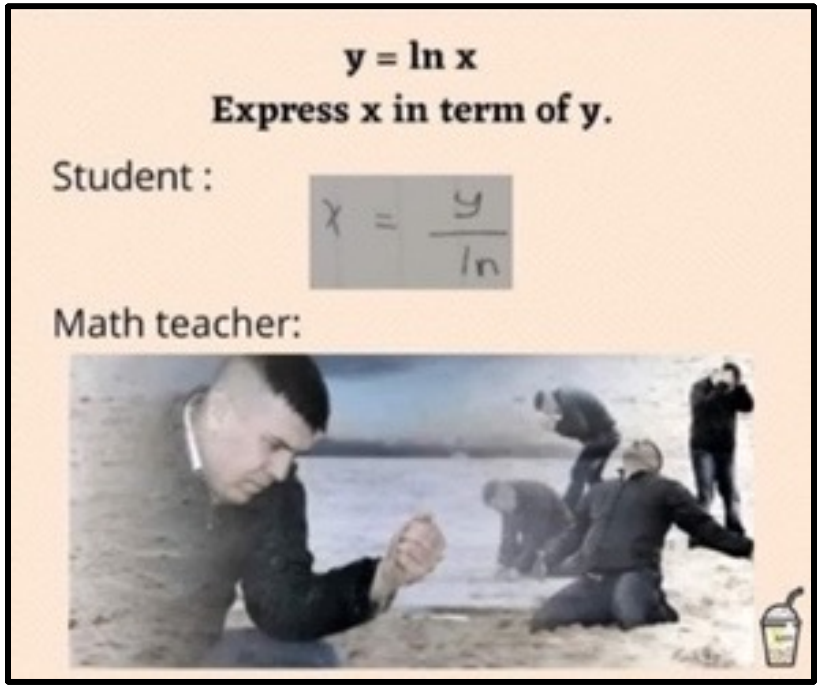


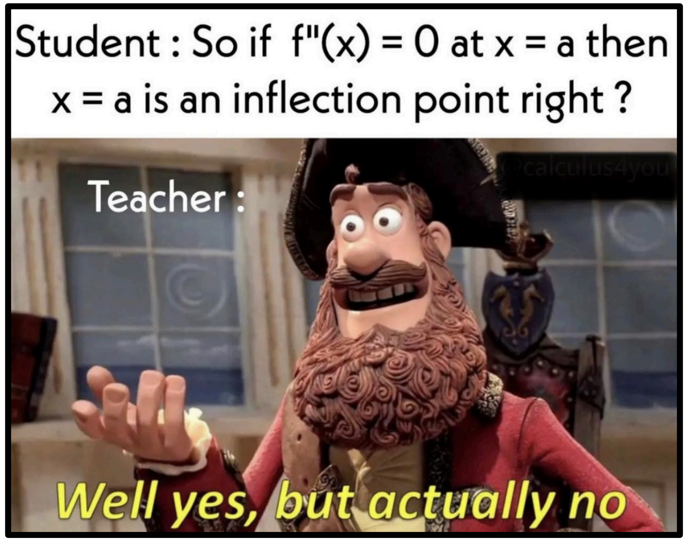


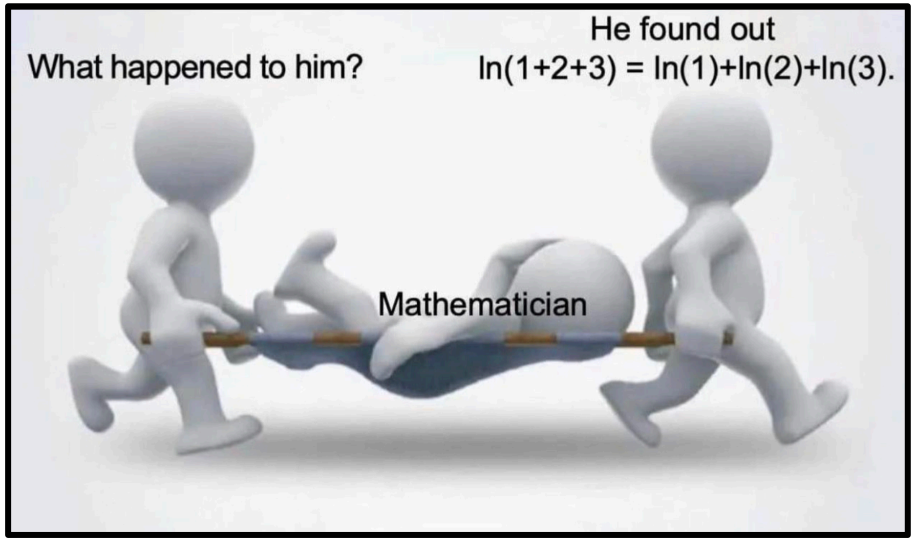


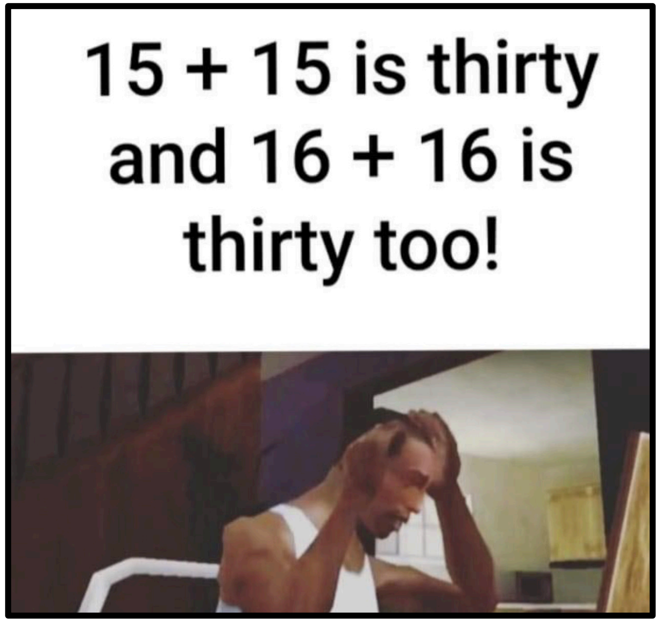

log(1+2+3)
=
log(1) + log(2) + log(3)
Well yes, but actually no

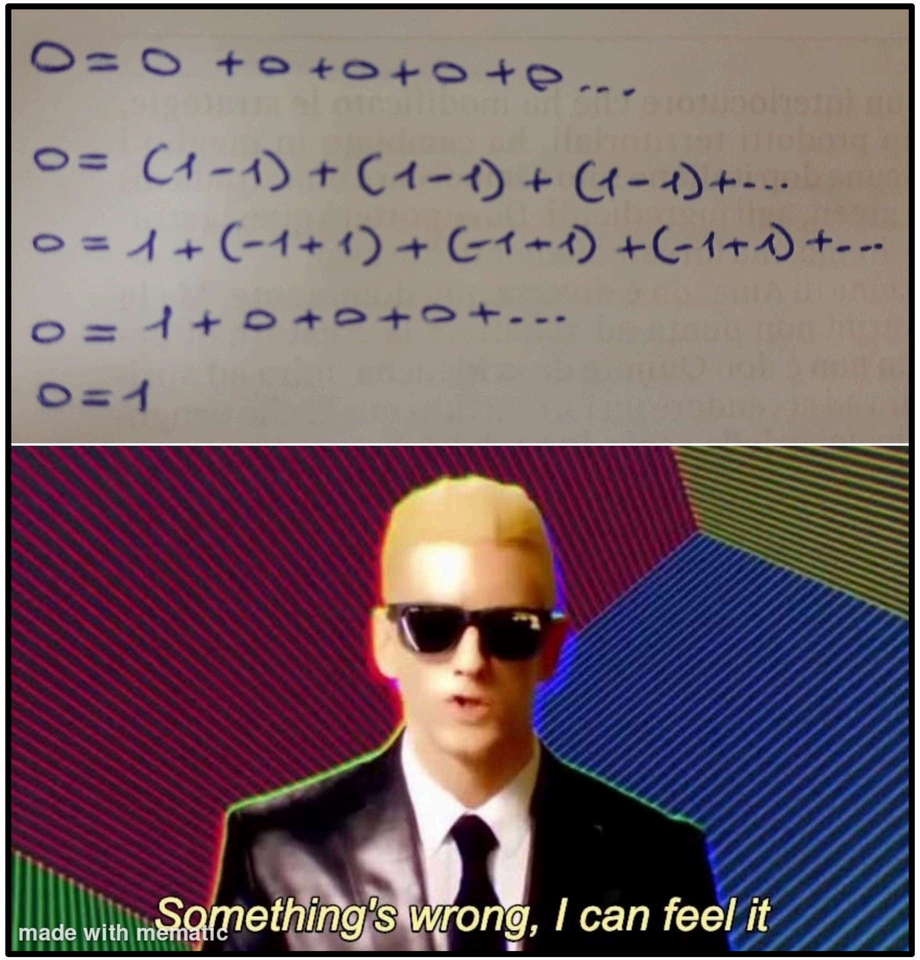

$\ln(1+2+3) = \boldsymbol{ln}\,1 + \boldsymbol{ln}\,2 + \boldsymbol{ln}\,3$


y = ln x
Express x in term of y.
Student :
$x = \frac{y}{ln}$
Math teacher:


Student : So if f"(x) = 0 at x = a then x = a is an inflection point right ?
Teacher :
Well yes, but actually no


What happened to him?
He found out ln(1+2+3) = ln(1)+ln(2)+ln(3).
Mathematician


15 + 15 is thirty and 16 + 16 is thirty too!



Proof that 2 = 1

If a = b (so I say) — $a = b$

And we multiply both sides by a
Then we'll see that a^2 — $a^2 = ab$
When with ab compared
Are the same.

Remove b^2. OK? — $a^2 - b^2 = ab - b^2$

Both sides we will factorize. See?
Now each side contains a – b. — $(a + b)(a - b) = b(a - b)$
We'll divide through by a
Minus b and olé

Error: Divided by 0.
$a - b = 0$ since $a = b$

a + b = b. Oh whoopee! — $a + b = b$

But since I said a = b
b + b = b you'll agree? — $b + b = b$

So if b = 1
Then this sum I have done — $1 + 1 = 1$
Proves that 2 = 1. — $2 = 1$