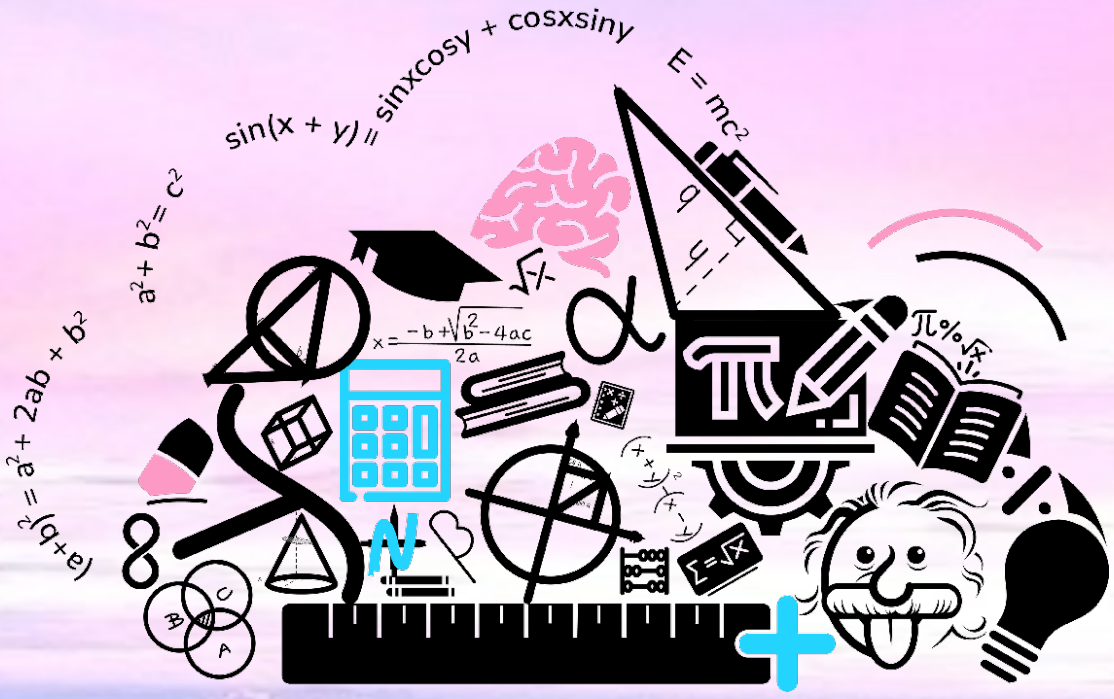
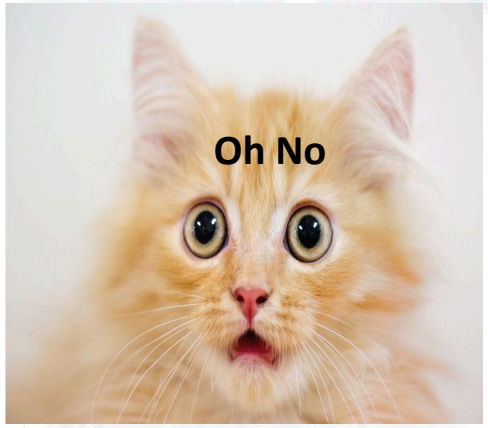


Common Mistakes

www.mymathscloud.com

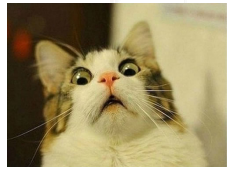
Every Time You Do This:



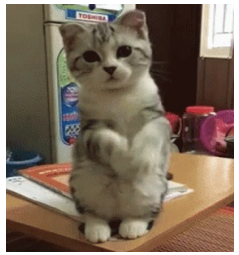
Simplify

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

A KITTEN DIES



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

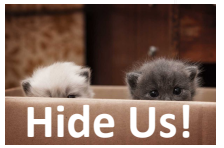


Every Time You Do This:

Simplify

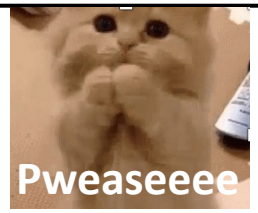
$$f(x) = \frac{x^2 - 16}{\cancel{x+2}} = x - 8$$

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

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

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)

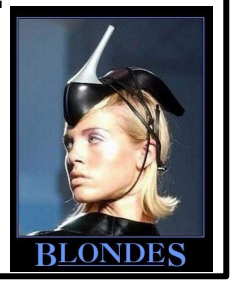
Remember to stay away from any other cancel culture

Solving equation by one Blonde:

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

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

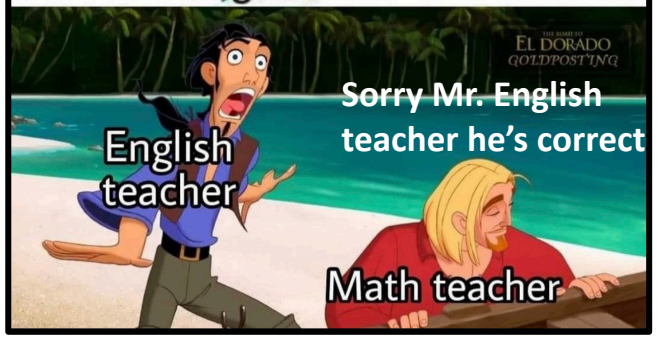
$$six = 6$$



Past tense	Past Participle
Grew	Grown
Flew	?

$$\frac{\text{grew}}{\text{grown}} = \frac{\text{flew}}{x}$$

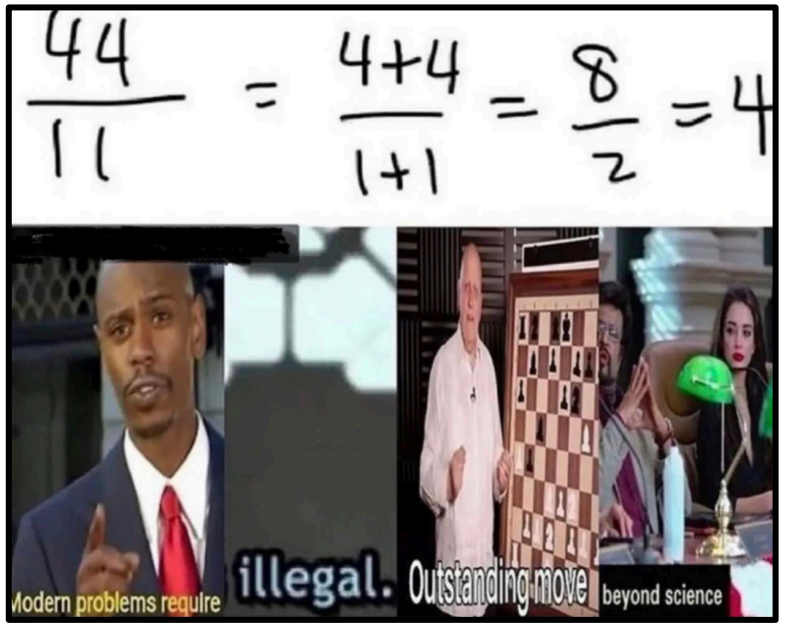
$$x = \frac{\text{flew.grown}}{\text{grew}} = \text{flown}$$

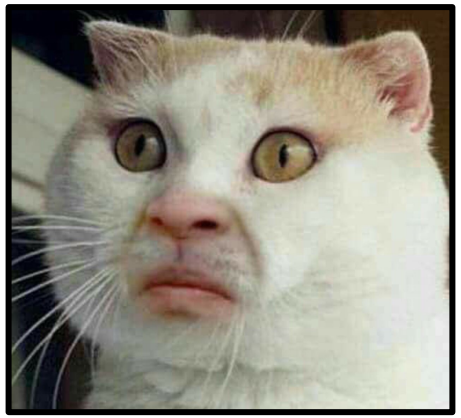


$$\frac{x^2 - 9}{x + 3} = x - 3$$

Respect the difference addition and multiplication

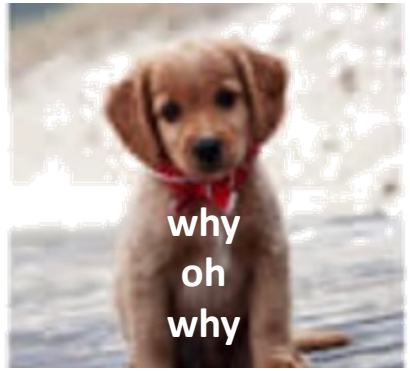
$$\frac{44}{11} = \frac{4+4}{1+1} = \frac{8}{2} = 4$$





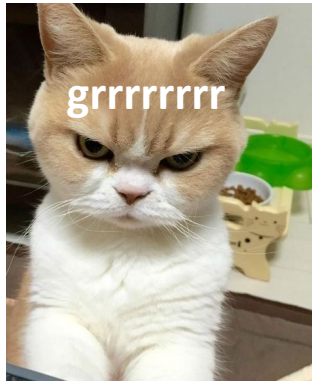
Ok, ok, I'm sorry for the mistakes

Every Time You Do This:

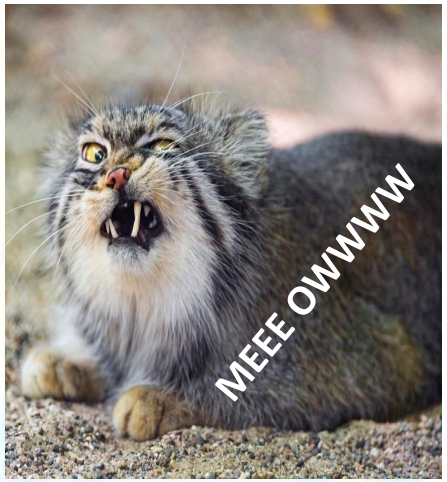


$$3(x+5) = 3x+8$$

You make this puppy SO DISAPPOINTED in you



Every Time You Do This:



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

A cat attacks YOU

Left Box Correction:

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

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

High five

Right Box Correction:

$$\underbrace{(x+3)^2}_{\text{Write out as 2 brackets and then expand}} = (x+3)(x+3) = x^2+3x+3x+9 = x^2+6x+9$$

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.

Example 1

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

Example 2

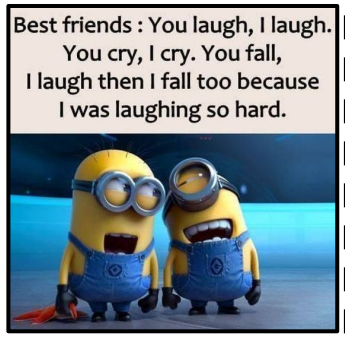
$$2a + 3b - 4a + 5b$$

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

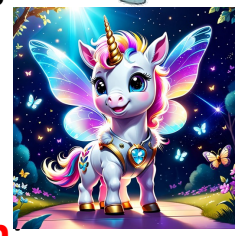
Correction:

$\sqrt{2} + \sqrt{8}$ cannot be added unless the numbers under the roots are the same. Adding and subtracting surds is the same as adding and subtracting algebra!

e.g. $2x + 3x = 5x$ and $2\sqrt{7} + 3\sqrt{7} = 5\sqrt{7}$

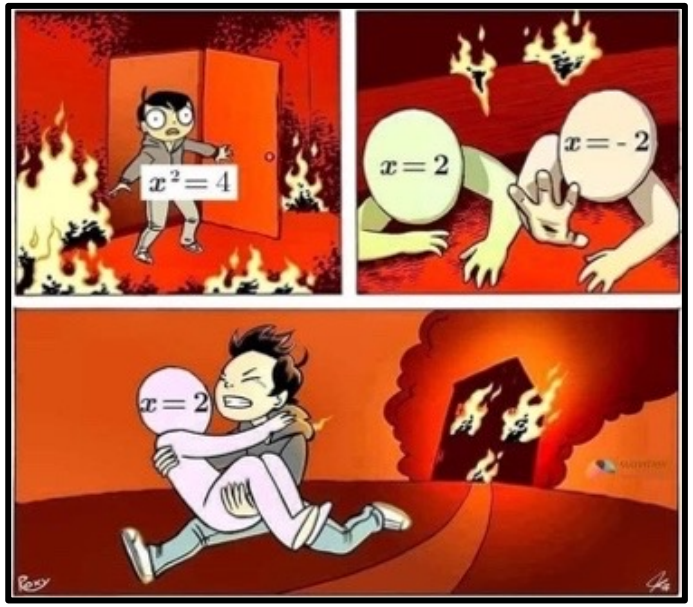
Sometimes we can make the roots the same using surds

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



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

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



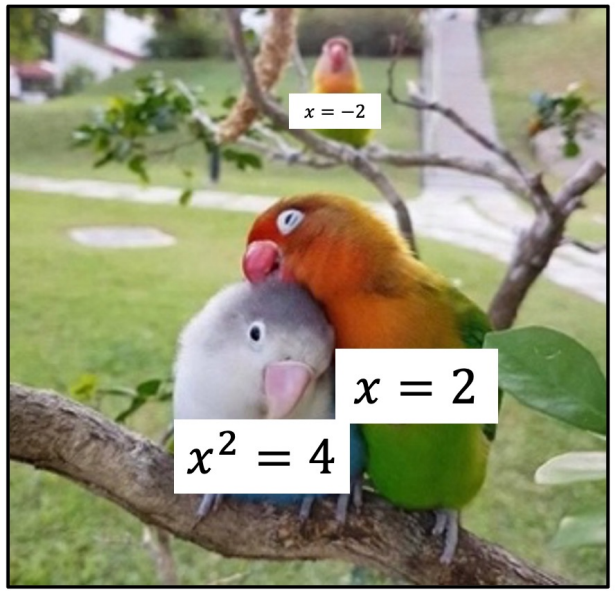
Every Time You Forget This:

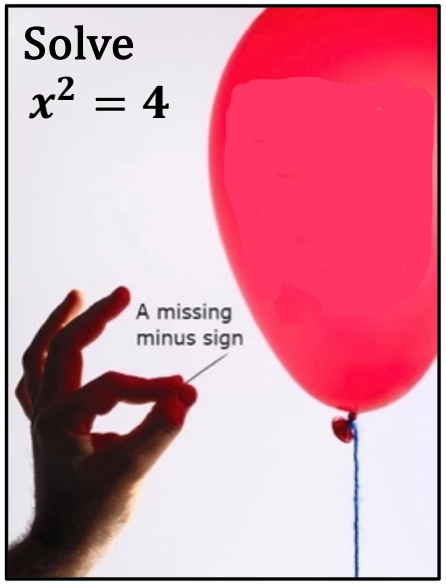
$$x^2 = 16$$

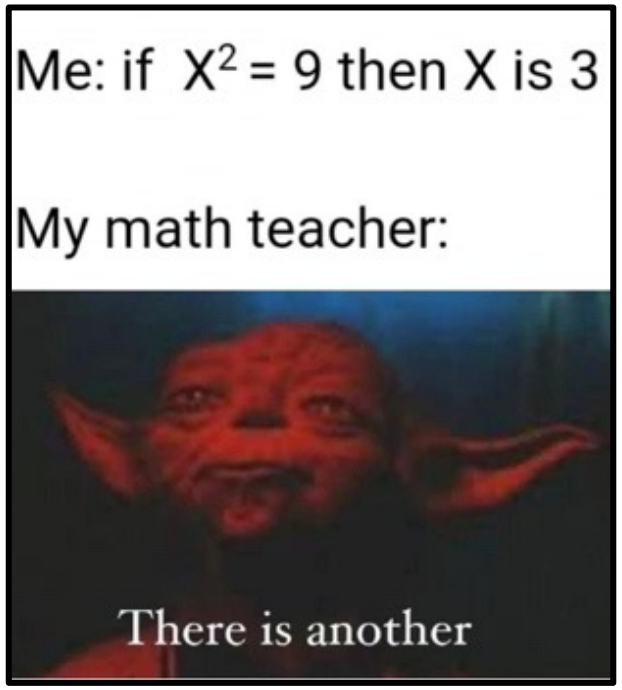
$x = 4$ $\quad x = -4$

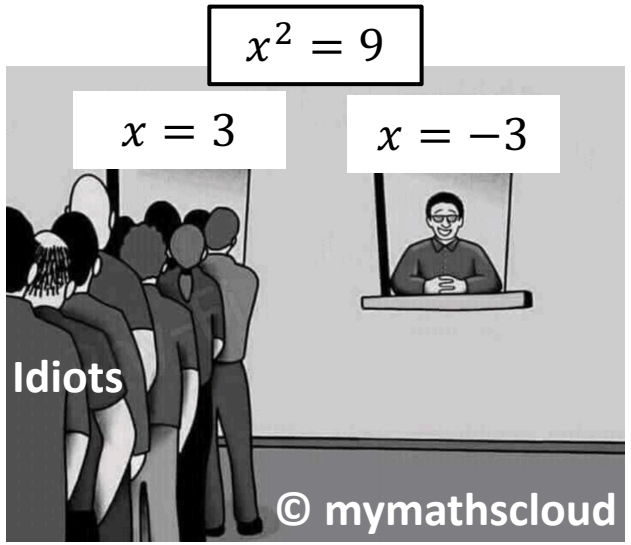
A BABY PANDA DIES

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





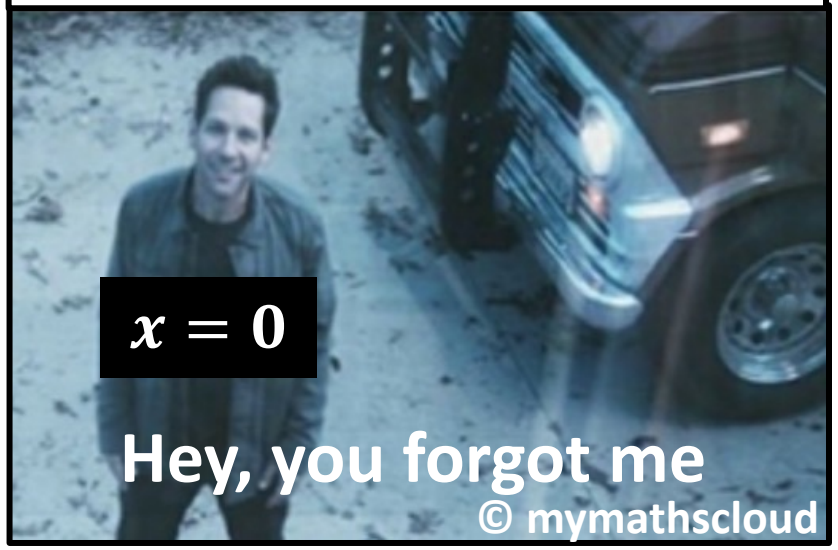




Me: solving $x^2 - 2x = 0$

$$x^2 = 2x$$

$$x = 2$$



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:

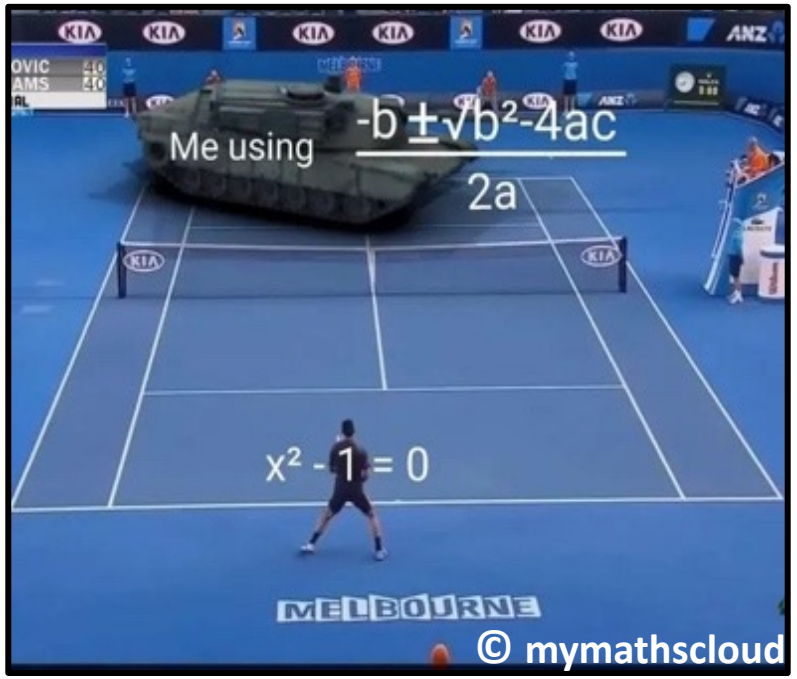
We are solving a quadratic, not a linear equation!!!

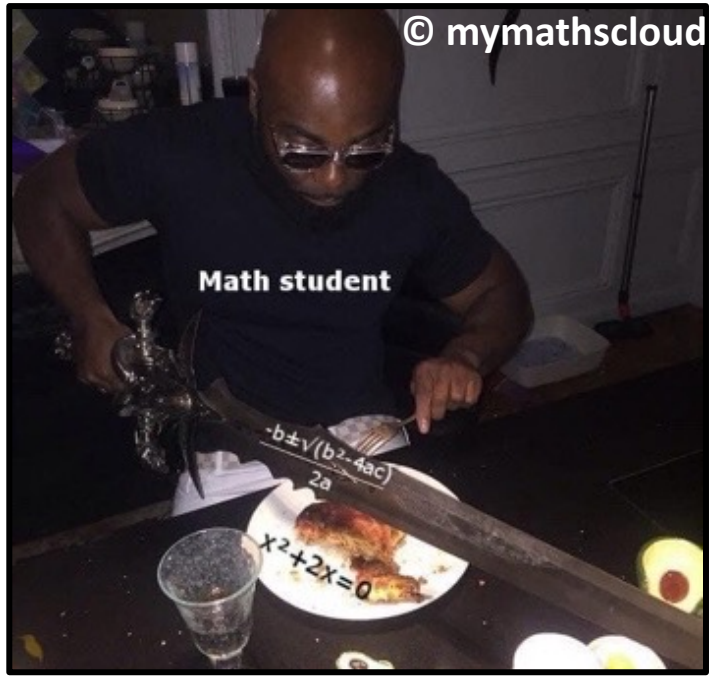
We want zero on one side first and then we Factorise OR use quadratic formula

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

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

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





Correction:
These are both not wrong above, 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
We don't need to use the quadratic formula

$$x^2 = 1$$
$$x = \pm 1$$

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

We can't get x on its own as easily
BUT this factorises so we don't need to use the quadratic formula

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

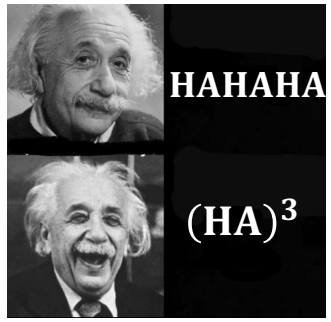
Every Time You Do Any Of This:

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

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:

$$(2x)^3 = 2^3x^3 = 8x^3$$

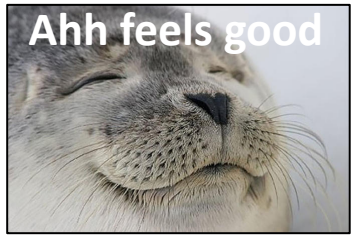
The 2 also gets affected by the power

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

The base doesn't change

$$2(3^2) = 2(9) = 18$$

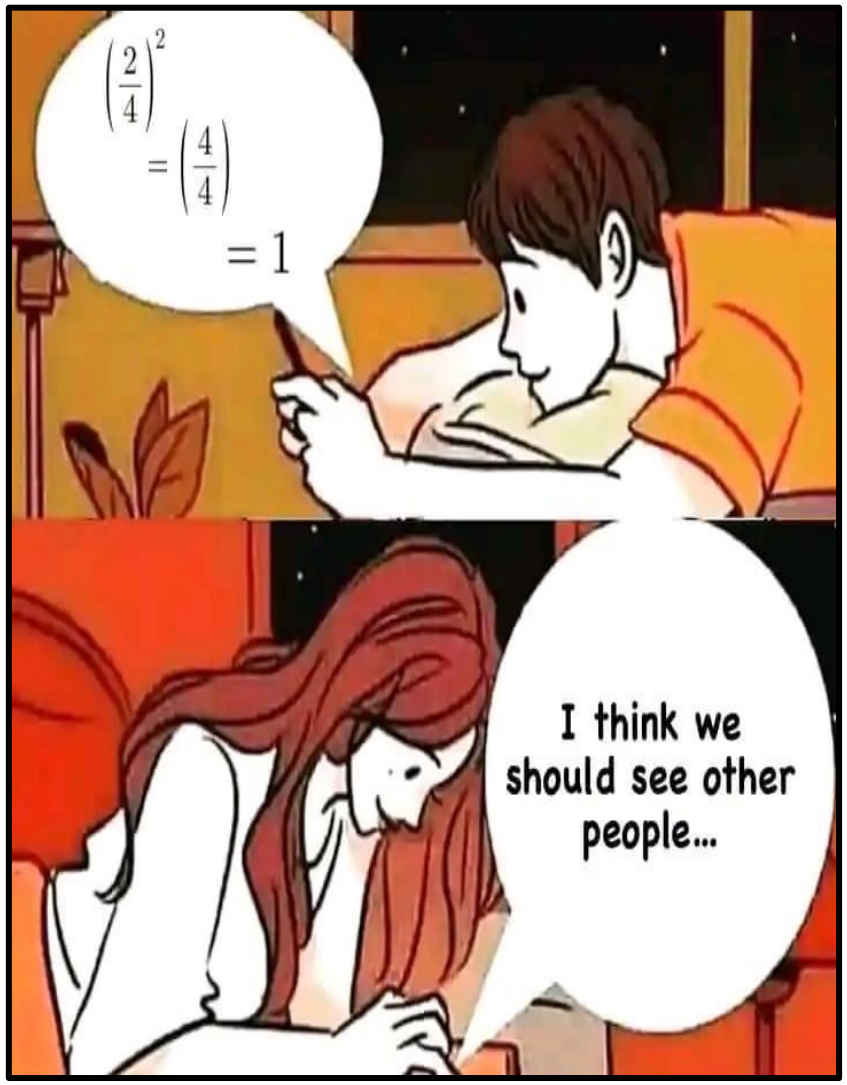
BIDMAS – we do the power (order) first



Correction:

The root also affects the 3

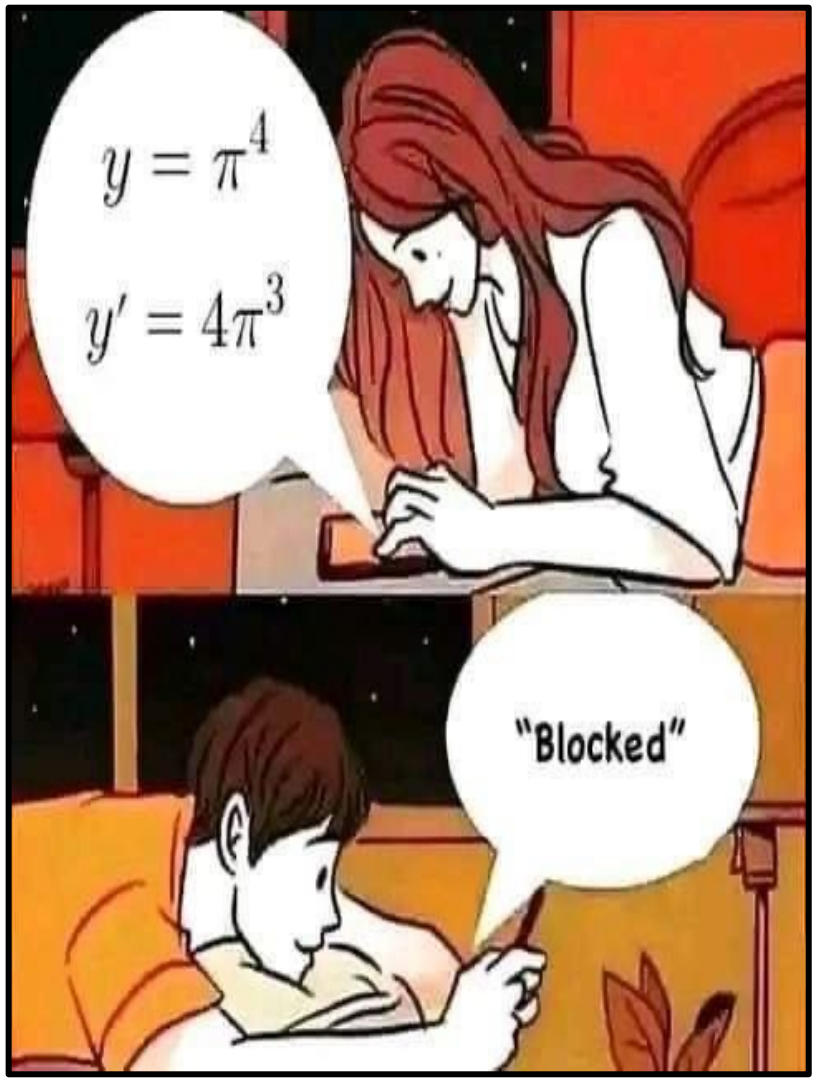
$$\sqrt{3x} = (3x)^{\frac{1}{2}} = 3^{\frac{1}{2}}x^{\frac{1}{2}}$$



Correction:

The power also affects both the numerator and the denominator

$$\left(\frac{2}{4}\right)^2 = \frac{4}{16}$$



Correction:

π is a constant, not a variable

$$y' = 0$$

Note: If instead we had $y = 4\pi x^3$

then we would get $y' = 12\pi x^2$

Every Time You Do Any Of This:

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

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

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

$$y = \sin x \implies x = \frac{y}{\sin x}$$

A BUNNY DIES

Correction:
Note of the first 3 errors can be simplified. Angles with trig are fixed UNLESS we use trig identities.

- $2 \sin 2x = 4 \sin x \cos x$ if using double angle formulae
- $\sin(x+2) = \sin x \cos 2 - \cos x \, sin \, 2$ if using
- addition formula
- $\sin x$ is a function. We have to use the inverse to separate trig from its angle x hence $x = \sin^{-1} y$

Every Time You Do This:

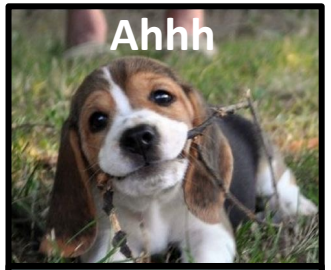
$$\frac{a}{b+c} = \frac{a}{b} + \frac{a}{c}$$

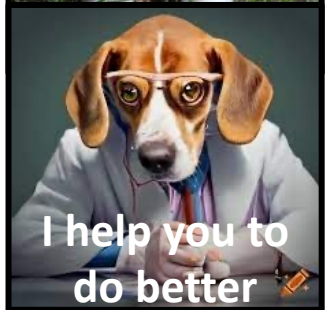
This beagle looks at you very very sternly

Correction:
We can split up fractions with **1 term** in denominator

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

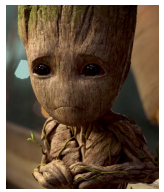
This is just the reverse direction of when we add or subtract fractions. If we look at this From right to left it makes sense, right?
Never split up fractions when there are 2 or more terms in the denominator!!!



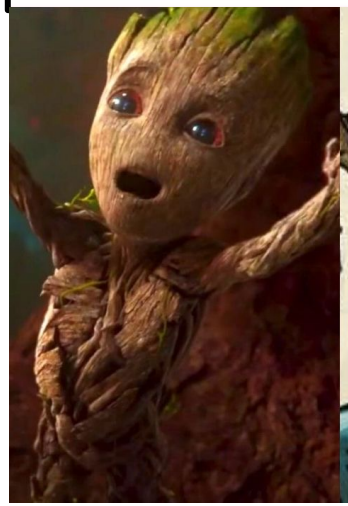


Every Time You "CROSS CANCEL"

$$\frac{\cancel{7}}{5} = \frac{x}{\cancel{7}}$$



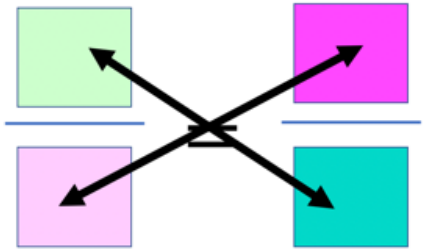
Groot REALLY hopes you're kidding



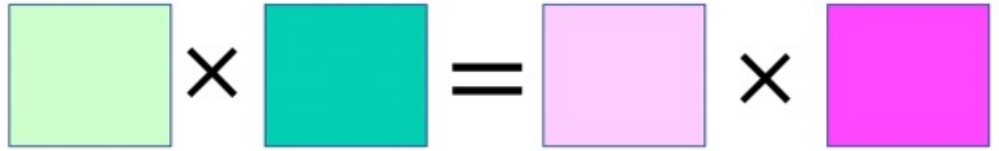
Correction:

You can only cross cancel when **multiplying fractions**, not when one fraction in on one side of an equals sign i.e. not when we have an equation.

Instead, we can cross multiply



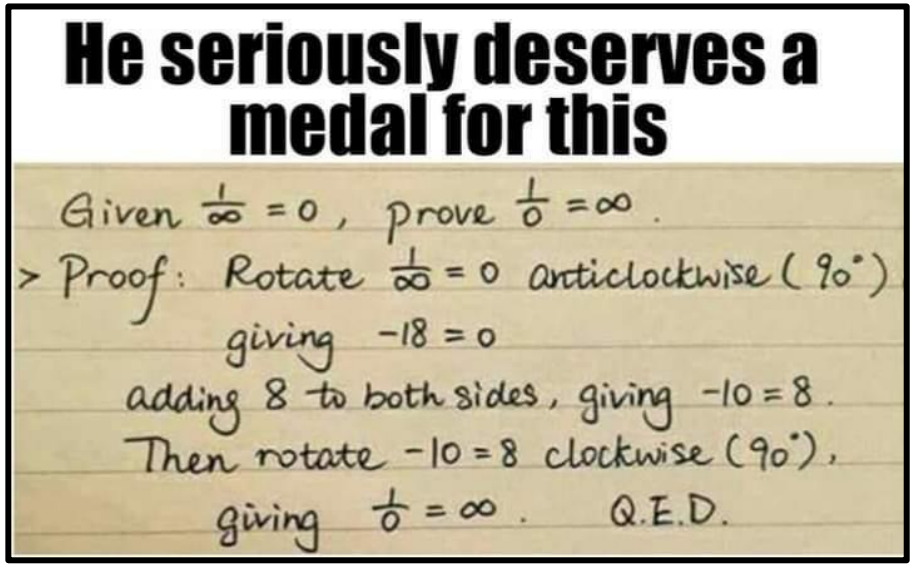
This gives

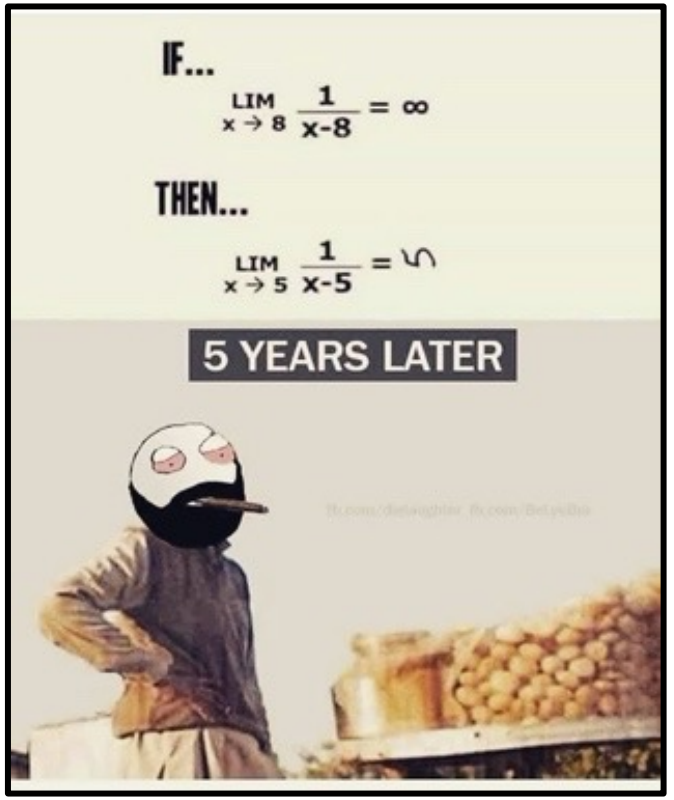


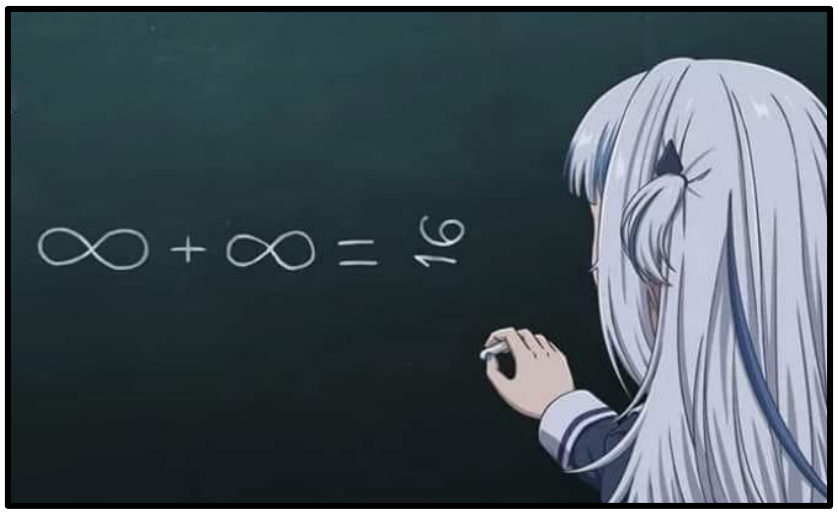
$$3^3+4^4+3^3+5^5=$$

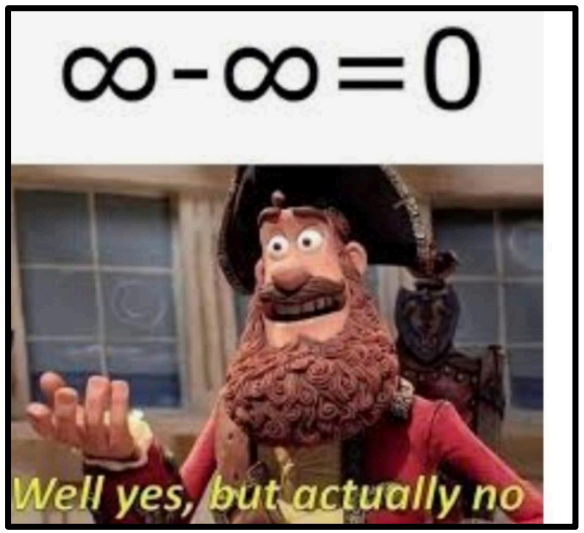
$$3435$$

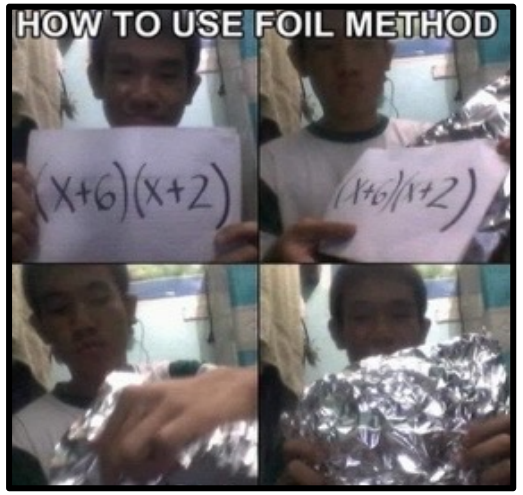
Actually, this dude is correct

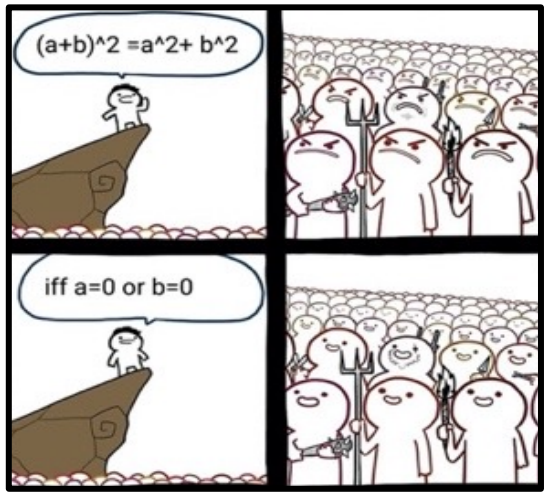


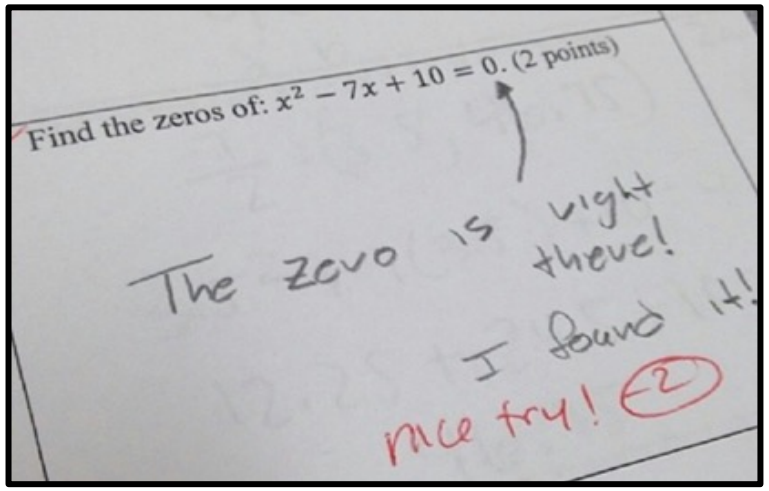


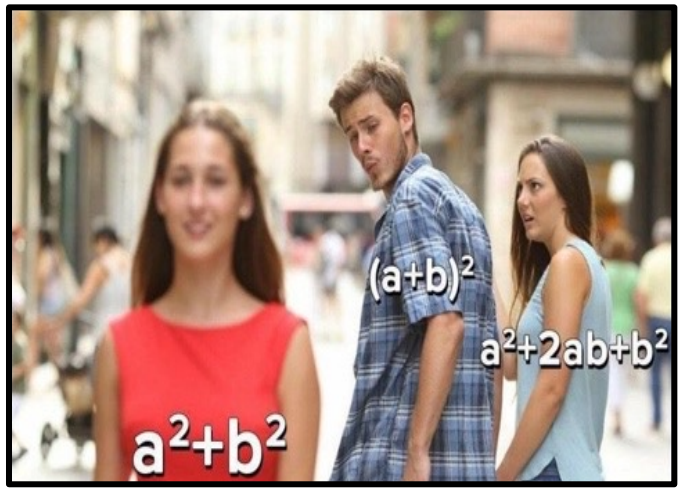


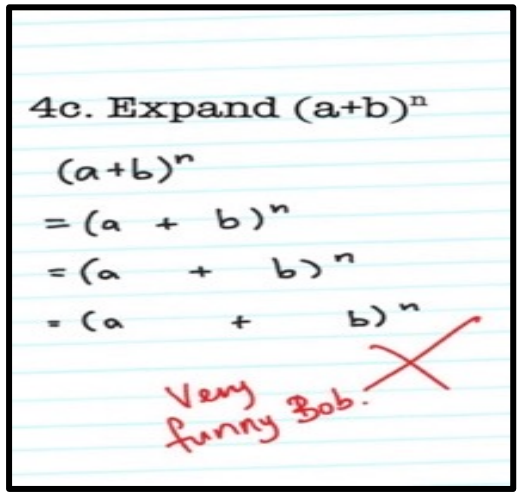












Theorem:

$$(a+b)^2 = a^2 + b^2$$

Proof:

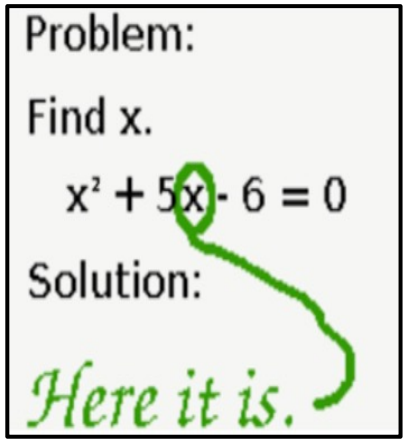
Let $c = a + b$

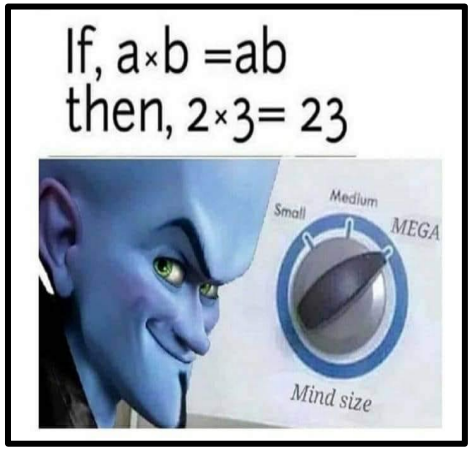
By Pythagoras's Theorem we know that

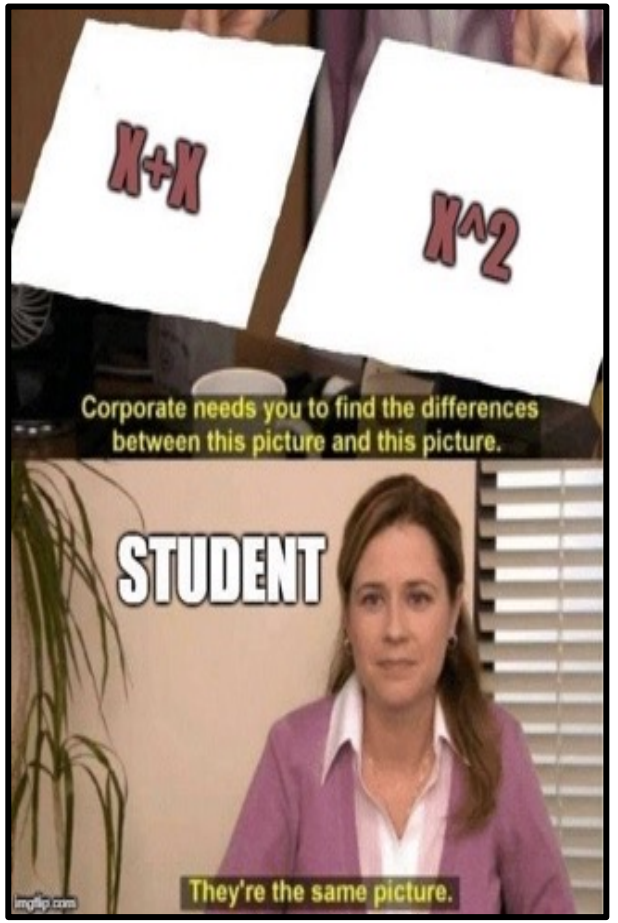
$$c^2 = a^2 + b^2$$

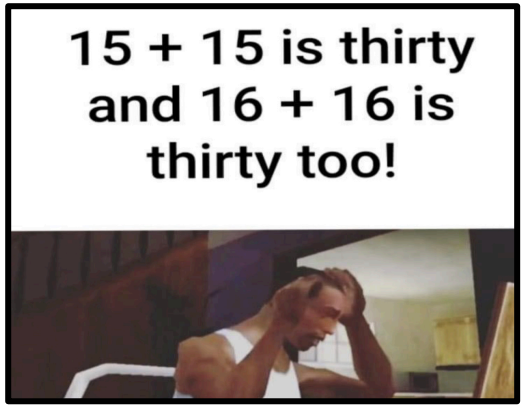
Therefore

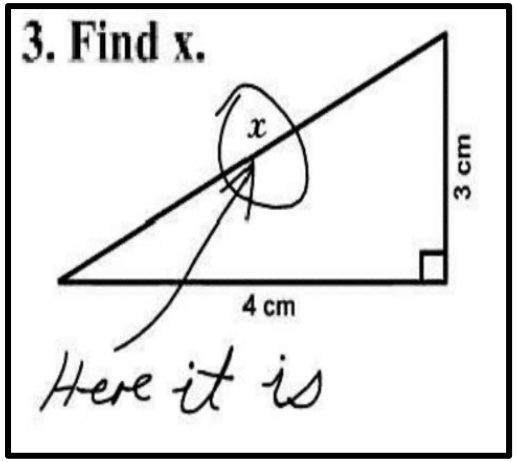
$$(a+b)^2 = a^2 + b^2$$

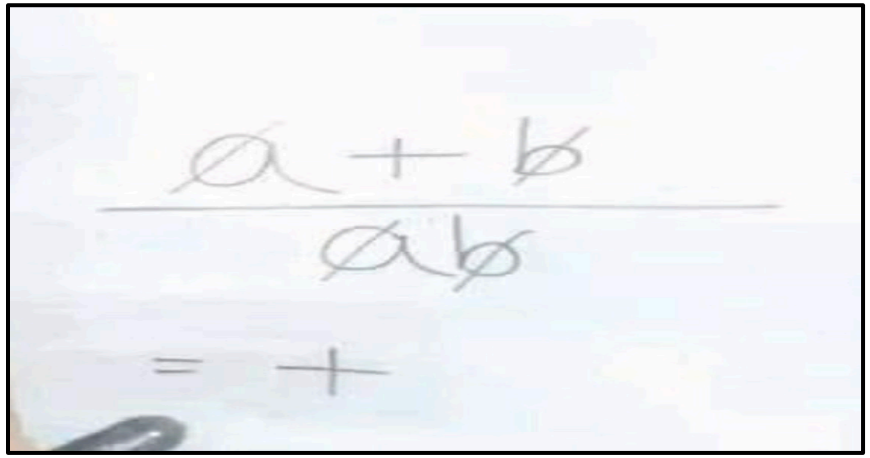












log(1+2+3)
=
log(1) + log(2) + log(3)

$$\ln(1+2+3) = \ln 1 + \ln 2 + \ln 3$$

$$y = \ln x$$

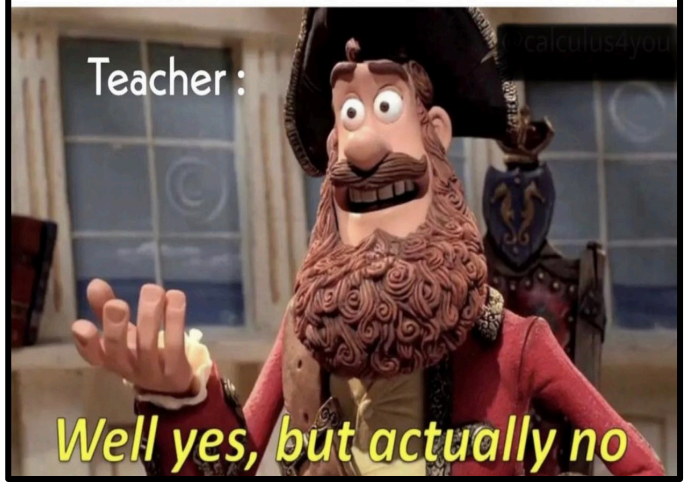
Express x in terms of y

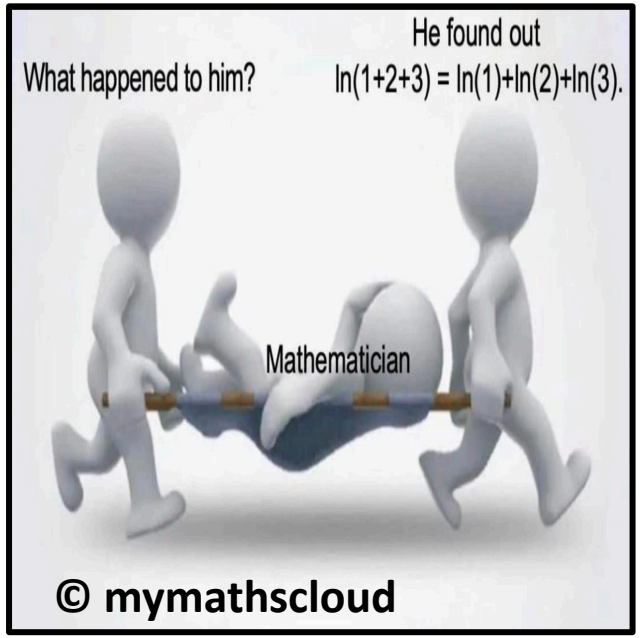
Student:

$$x = \frac{y}{\ln x}$$

Math Teacher:

Student : So if f"(x) = 0 at x = a then x = a is an inflection point right ?





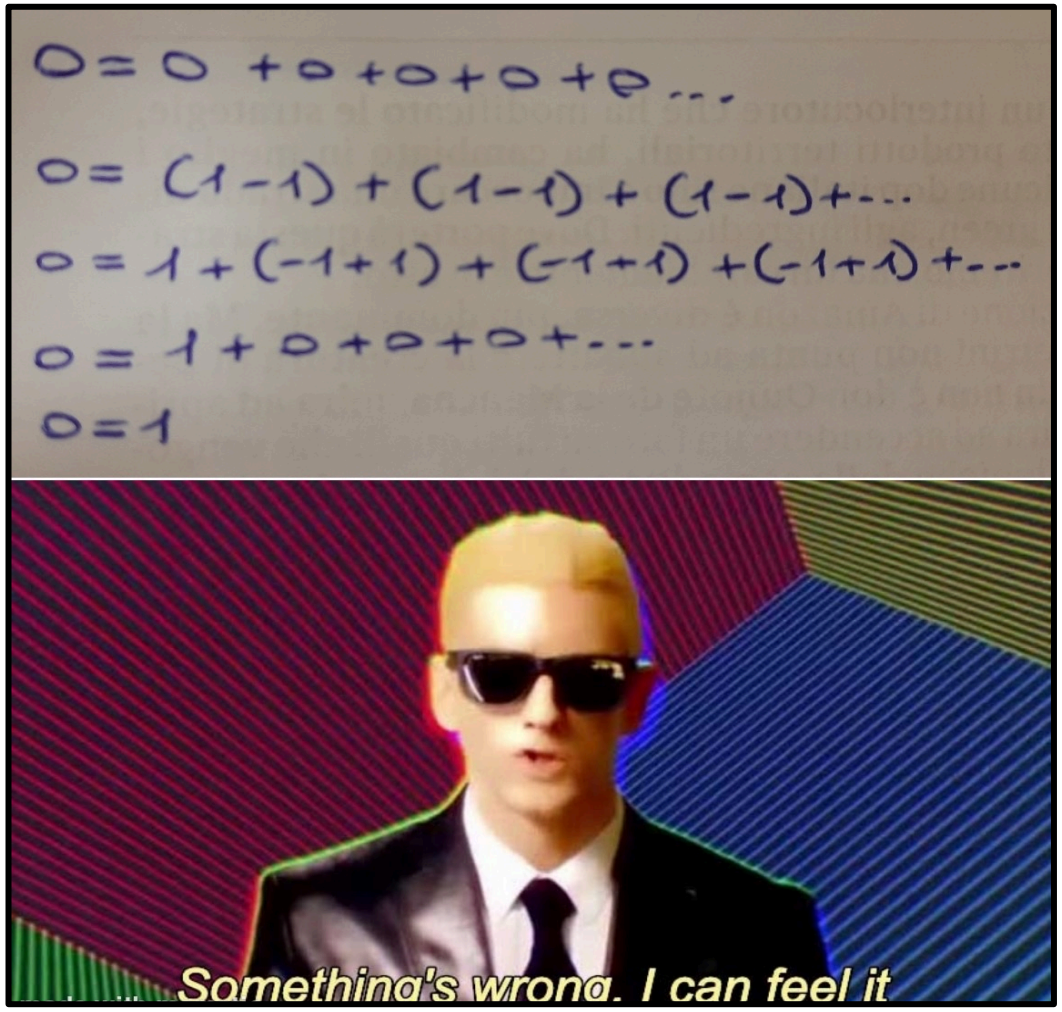
You have to respect other people's opinions

Their opinion:

$$(a+b)^2 = a^2 + b^2$$

$$\frac{d}{dx}\left(e^x\right) = x \cdot e^{x-1}$$

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



proof?

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.

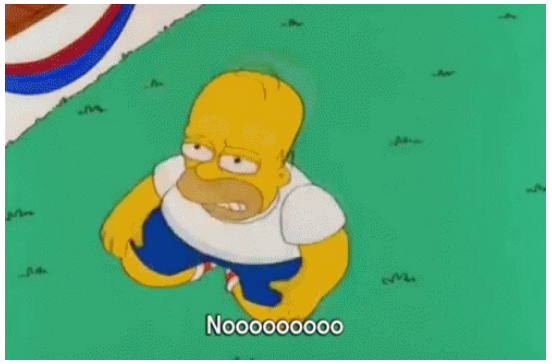
Remove b^2. OK? — $a^2 - b^2 = ab - b^2$

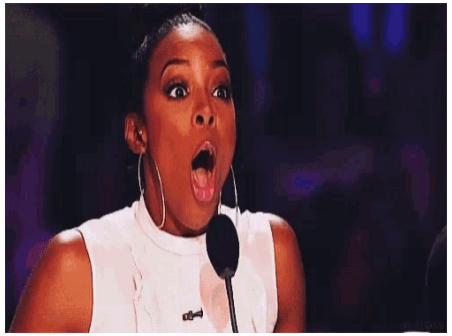
Both sides we will factorize. See?
Now each side contains a − b. — $(a + b)(a - b) = b(a - b)$
We'll divide through by a
Minus b and olé — Error: Divided by 0. $a - b = 0$ since $a = b$

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. — $2 = 1$



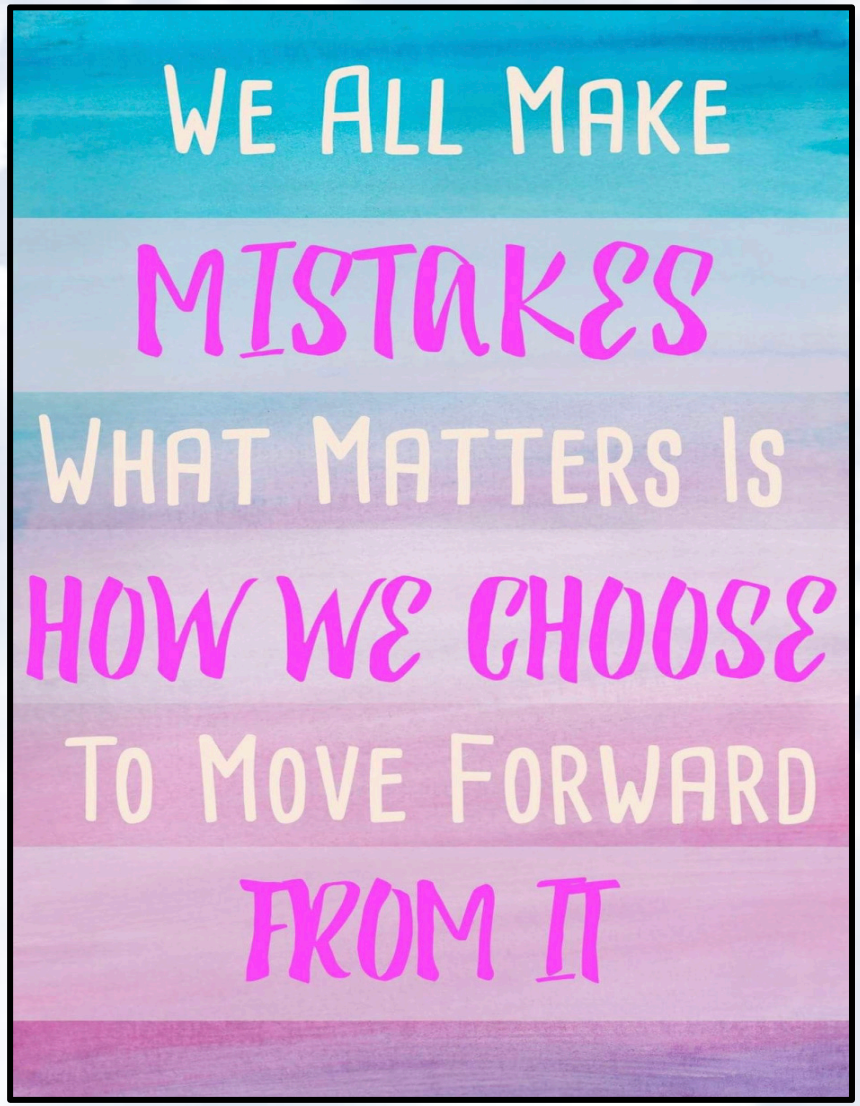


Dividing By Zero!

$\frac{5}{0}$ = undefined

$\frac{0}{5} = 0$

Making Mistakes Is Not Always A Bad Thing



MISTAKES
ALLOW
THINKING TO
HAPPEN

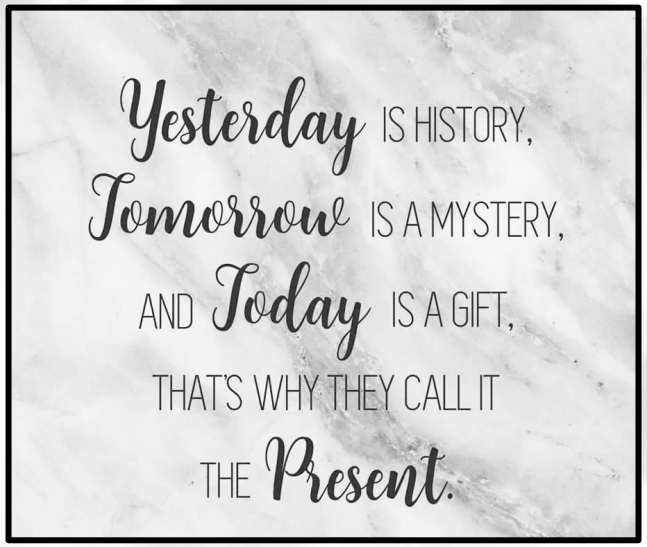
MISTAKES HAVE THE POWER TO TURN YOU INTO SOMETHING BETTER THAN YOU WERE BEFORE.

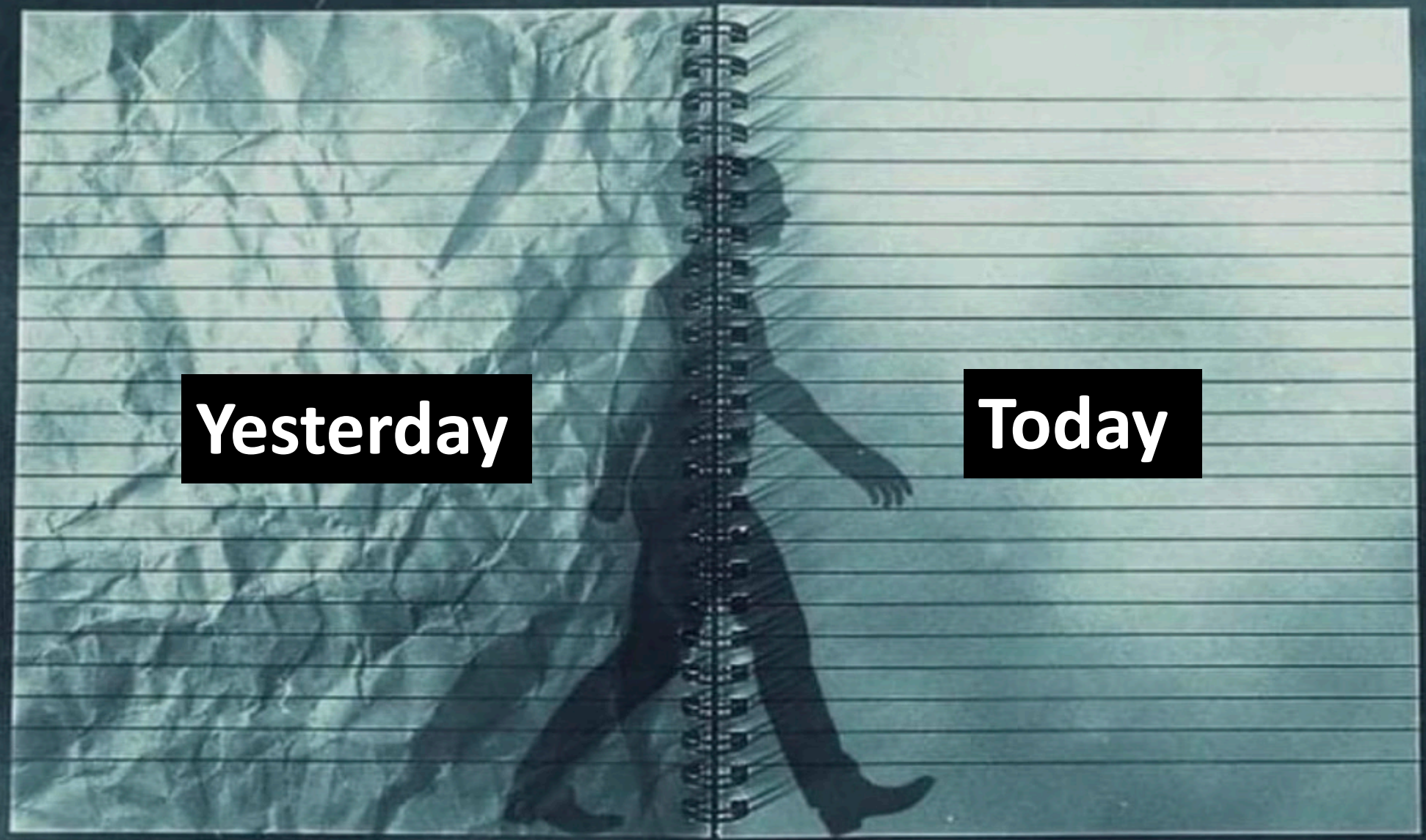
Don't Focus On The Past

Forget about the past. You cannot change it, so why worry about it?

Stay in the present. Today is the first day of the rest of your life.

You cannot start the next chapter of your life if you keep re-reading the last one.




Yesterday
Today

That's All For Now