

Why Study Mathematics?

“Why study mathematics?” This is a question that every student of mathematics should have asked, either out loud or only in thought, at least once. If you are a math student and have never asked it, then you are either (a) not interested in math at all or (b) already beaten down by the system into doing whatever you are told without asking why.

There is nothing much that can be done if you are in category (a). No one can find everything interesting and it is perfectly alright if mathematics for you is a task to be gotten through on the way to something more important. Nevertheless, read on to see one way that the question could be answered if you had asked it. Nor is there much that can be done if you are in category (b). Systems are designed to beat people down. However, it is too bad if you have been defeated so quickly: many people hold out for years, and some never give in.

The question can be answered at several levels. There is no need to spend time on the superficial answers. “I’m taking mathematics because it’s a requirement.” “I had precalculus in high school, so I figured this would be an easy course.” “I’ve always gotten pretty good grades in my math classes, so I’m taking some more.” “I’ve got to take something – I need 120 hours of credit to get out of here – and math is as good as anything else.” Complete and satisfactory answers, giving perfectly valid reasons for being enrolled in a mathematics class (it is not true that you must have noble and commendable reasons for all of your actions, or even for your noble and commendable actions), but there is nothing much that can be said about them. They do not get at the deeper questions about why mathematics classes exist to be taken, or why schools exist that teach mathematics.

A more fundamental question is, why study anything? Until a satisfactory answer can be given, there is no sense in worrying about studying something as specialized as functions. Yes indeed, why study anything? Studying is not necessary. Animals don’t study anything, and they do alright. Take squirrels, for example. Why not be a squirrel? Squirrels seem to have good lives: they do what they want to, when they want to. Their lives have freedom and variety. (Squirrels are never bored.) They have nuts to eat, trees to climb, and squirrels of the opposite sex to chase or be chased by. Squirrels don’t have worries about the future. Squirrels don’t have to work. Squirrels don’t have to learn mathematics. Squirrels have great lives! Why not be a squirrel?

I’ll tell you why not. Observe squirrels. Squirrels are constantly twitching. They are always looking over their shoulders. Squirrels are in a continual state of panic. Everything surprises a squirrel. Squirrels spend a lot of their time running away from things. Squirrels are constantly threatened. A squirrel’s life is one of random potential disasters, repeated and repeated and repeated without end. I wouldn’t want to be a squirrel.

Well, you might say, if you don’t want to be a squirrel because you can’t take the stress, how about being a sheep? Sheep have calm and contented lives with plenty of grass to eat, all their needs taken care of, and unlimited time to think sheep thoughts. You would have nothing to worry about, no anxieties about the future, no family problems, never a care about money, no need to fret over the progress of your career or be apprehensive about who will take care of you when you get old. A life of tranquility, a good life! Why not be a sheep?

Life as a sheep is not for me. Have you ever looked deeply into the eyes of a sheep? What you see there is a look of bafflement, of incomprehension, of confusion and unknowing. Sheep do not know what is happening to them or why it is happening, and they are puzzled. Sheep are aware, though very dimly, that they do not have the answers to anything and they yearn, with a sheeplike yearning that can never be satisfied, for someone to tell them in terms that they can understand what the world is about and what it is doing to them. I wouldn't want to be a sheep.

In any event, we are stuck with our humanity which carries with it the gifts of self-consciousness and rationality, not given in the same measure to squirrels and sheep. Or are they instead burdens and afflictions? If we do not surrender to delusions, either imposed from the outside or generated from within, we can use them to look around and see the world whole and clear. What we see does not always lead to joy. Consider the following excerpt.

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Vanity of vanities, says Qoheleth, vanity of vanities! All things are vanity! What profit has man from all the labor which he toils at under the sun? One generation passes and another comes, but the world forever stays.

What has been, that will be; what has been done, that will be done. Nothing is new under the sun. Even the thing of which we say, "See, this is new!" has already existed in the ages that preceded us. There is no remembrance of the men of old; nor of those to come will there be any remembrance among those who come after them.

For what profit comes to a man from all the toil and anxiety of heart with which he has labored under the sun? All his days sorrow and grief are his occupation; even at night his mind is not at rest. This also is vanity.

For the lot of man and of beast is one lot; the one dies as well as the other. Both have the same life-breath, and man has no advantage over the beast; but all is vanity. Both go to the same place; both were made from the dust, and to the dust they both return.

Again I considered all the oppressions that take place under the sun; the tears of the victims with none to comfort them! From the hand of their oppressors comes violence, and there is none to comfort them! And those now dead, I declared more fortunate in death than are the living to be still alive. And better off than both is the yet unborn, who has not seen the wicked work that is done under the sun. Then I saw that all toil and skillful work is the rivalry of one man for another. This also is vanity and a chase after wind.

What the eyes see is better than what the desires wander after. This also is vanity and a chase after wind. Whatever is, was long ago given its name, and the nature of man is known, and that he cannot contend in judgment with one who is stronger than he. For though there are many sayings that multiply vanity, what profit is there for a man? For who knows what is good for a man in life, the limited days of his vain life?

Again I saw under the sun that the race is not won by the swift, nor the battle by the valiant, nor a livelihood by the wise, nor riches by the shrewd, nor favor by the experts; for a time of calamity comes to all alike.

Light is sweet! And it is pleasant for the eyes to see the sun. However many years a man may live, let him, as he enjoys them all, remember that the days of darkness will be many. All that is to come is vanity.

The evil days come and the years approach of which you will say, I have no pleasure in them. Before the sun is darkened, and the light, and the moon, and the stars, while the clouds return after the rain; when the guardians of the house tremble, and the strong men are bent, and the grinders are idle because they are few, and they who look through the windows grow blind; when the doors to the street are shut, and the sound of the mill is low; when one waits for the chirp of a bird, but all the daughters of song are suppressed; and one fears heights, and perils in the street; when the almond tree blossoms, and the locust grows sluggish and the caper berry is without effect, because man goes to his lasting home, and mourners go about the streets; before the silver cord is snapped and the golden bowl

is broken, and the pitcher is shattered at the spring, and the broken pulley falls into the well, and the dust returns to the earth as it once was... Vanity of vanities, says Qoheleth, all things are vanity!

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Any comment must be pale in comparison to that passage, whose power is immense. Surely life cannot be that grim and bleak. Surely not all is empty. Surely the Speaker must have missed something, surely the Speaker's vision must be somehow limited or flawed.

Yes, it is limited and yes, the Speaker did miss something. What the Speaker missed, what would have made all the difference, was a course in mathematics.

Let me explain. The Speaker looked about and saw that nothing changes. People come and people go, but they forever do the same things. They want to be rich, they want to be powerful, they want, want, want, but what is the point of all their wanting? They all die, and what of their riches and power then? Those that replace them will die also. Emptiness, all is emptiness. That was an accurate reflection of the time and place in which the Speaker lived, the Near East something over two thousand years ago. What was lacking there and then was science and mathematics. The Greeks had invented mathematics as a deductive system a very few centuries before and science and the scientific method lay many centuries in the future. Mathematics and science are antidotes to the despair that comes from thinking that in spite of mighty efforts nothing changes or will ever change. It is true that in government, in economics, in morals, the wheel of existence goes around and around, endlessly turning, and there is nothing new under the sun. We overthrow kings and replace them with democracies that change into dictatorships; we have free markets until we see that a little regulation would make conditions better and we then regulate more and more until we see that no regulation would be better still; we forbid divorce to minimize the damage to families and society and then we make divorce easy for exactly the same reason; around and around the wheel of existence goes. However, it is not the case that nothing ever changes and there is nothing new under the sun. In science and mathematics, progress is made. In science and mathematics, the arrow points forward only and does not bend into a circle. The advances made in this century in physics and medicine are astonishing, and a person would have to be devoid of curiosity – and hence not completely human – not to wonder what was going to happen next. Whatever happens next will be new. It will not be emptiness.

It is better to be human than to be a squirrel or a sheep, and one of the higher callings of humanity is to find out why the world is as it is. That is a purpose that is not chasing the wind. That is a reason for studying mathematics.¹

¹ Adapted from [?] pp.103–105. Passage taken from Ecclesiastes 1:2-4, 9-11, 2:22-23, 3:19-20, 4:1-4, 6:9-12, 10:11, 11:7-8, 12:1-8 (NAB).