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Opportunities For Using Interdisciplinary Relationships In Teaching Mathematics In Technical Higher Educational Institutions

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Abstract: This in the article technique supreme training in their homeland teachable supreme mathematics of the course interdisciplinary relevance in providing wide to opportunities has that enough theoretical and practical issues using illuminating given.

Keywords: Interdisciplinary relationship, function, function continuity, argument increment, function addition, derivative, integral, differential equation, velocity, acceleration.

INTRODUCTION:

Science and technique intense pictures with developed going today's on the day education in institutions, including technical supreme training in their homeland supreme mathematics science to teach time requirements based on further improvement education in the field current from issues to one became. In this regard last in years Our Republic President by one row decree and decisions acceptance These were example as Our Republic The President's July 9 , 2019 " Mathematics" sciences and education to develop state by support support, as well as Uzbekistan Republic Sciences Academy VI Romanovsky named after Mathematics Institute activity fundamentally improvement measures " On " decree to bring possible.

this Decree in sight caught tasks done increase from their paths one technique supreme training in their homeland teachable supreme mathematics of the course content student in the future possessive specialties for necessary will be specialty sciences from the requirements come out from choosing This is supreme mathematics teaching in the process interdisciplinary relevance systematic accordingly to provide demand does.

Our in our opinion technique in the direction of supreme training in their homeland High mathematics in teaching interdisciplinary relevance following in directions organization to do possible:

I. Higher mathematics of the course topics statement in doing other of sciences from issues use.

II. Higher mathematics of the course topics in strengthening other of sciences from issues use (practical) training in process)

III. Other sciences in teaching supreme mathematics theoretical and practical from issues use

This In the article we first two direction according to work how to perform possibility about our thoughts statement we will do.

Teaching in the process interdisciplinary relevance in

providing technique supreme training in their homeland teachable supreme mathematics of the course opportunities incomparable. Especially supreme mathematics "Function", "Derivative" in the course and his/her applications", "Integral and his/her "applications " (Unknown) and definite integral, two and three dimensional integral, curve linear and surface integrals), " Differential equations" and " Probabilities theory and mathematician statistics elements like " departments future engineers for important was physics, mechanics, materials resistance, heating engineering, hydraulics such as sciences with closely in contact, that is supreme mathematics above counting passed departments in learning physics and technique of sciences from issues regular is used. For example, correct line along movement doing of the body optional tThe problem of finding the speed at a given moment is a gender not been in sturgeon mass general without $m = f(l)$When distributed according to the law, its $l$linear density at an arbitrary point find matter , body 0^0If the amount of heat consumed when heated $w = f(\theta)$from to θ^0changes according to the law, its optional θThe problem of finding the heat capacity at a temperature, in chemistry of time optional $t$find the reaction rate at such as from issues derivative the concept when entering is used .

Another one row issues, for example known to accelerate mainly speed find, known to speed mainly of the point coordinates find such as issues to the concept of integral take comes. Another one row problems : in geometry curve linear trapezoid face to find , in mechanics variable of power completed work find , deform in the process Bruce length change find , plain of the line weight the center to find , the body inertia moment to find , the body coordinate to the arrows relative static moments find , flat form face weight of the center coordinates find such as issues to the concept of definite integral take is coming .

In geometry faces and volumes calculation, mechanics flat form of the face inertia moment and weight the center coordinates find such as issues curved, curved linear and surface to integrals take is coming.

In geometry given to properties has was the lines to find, in physics without resistance in the environment heavy of the body fall, radium decay about, population number increase about demographic issue, second space speed question about, mathematics pendulum about (free) and mandatory vibrations) matter, string vibration the issue of heat spread issue, wave equation such as issues differential to equations take is coming.

So so, this on the ground from the ones mentioned technique supreme training in their homeland supreme " Function ", " Derivative ", "Integral", " Differential" of mathematics equations " like departments according to theoretical information interdisciplinary relevance in providing wide to opportunities has that seeing We went out. Teaching in the process students above counting passed sections according to enough to knowledge has from those who were after they with occupied theoretical knowledge reinforcement for as follows issues study possible:

Problem 1. Body $S = t^2 - t + 3$It moves in a straight line according to the law. Motion 2 seconds from start next v speed be found.

Solution: $S = f(t)$It is known that the velocity $v = S'(t)$of a body moving according to the law $t$is mainly, $v = S'(t) = (t^2 - t + 3)' = 2t - 1, v(2) = S'(2) = 2 \cdot 2 - 1 = 3.$

So, $v = S'(2) = 3.$

Issue 2. Correct linear movement law $S = 4t^3 - t^2 + 1$(m) is given by the formula. Correct linear of the movement of time $t = 2$s and $t = 3$s were at the time acceleration be found.

Solution: Action $t$the speed $v(t) = S'(t) = (4t^3 - t^2 + 1)' = 12t^2 - 2t$ at the moment;

$t$and the acceleration at the moment $a(t) = v'(t) = S''(t) = (12t^2 - 2t)' = 24t - 2;$

$t = 2$acceleration at s $a(2) = S''(2) = 24 \cdot 2 - 2 = 46\ \frac{m}{s^2};$

$t = 3$The acceleration at s is: $a(3) = S''(3) = 24 \cdot 3 - 2 = 70 \frac{m}{s^2}.$

Problem 3. A body with a mass of 10 kg $S(t) = 3t^2 + t - 4$moves according to the law. Find the kinetic energy of the body after 4 s from the start of the movement.

Solution: The velocity of the object at time t $v(t) =$

$S'(t) = (3t^2 + t - 4)' = 6t + 1$is $t = 4$the velocity at time (s) $v(4) = 6 \cdot 4 + 1 = 25$. The object's $t = 4$(s) at the end kinetic energy $E = \frac{mv^2}{2} = \frac{10 \cdot 25^2}{2} = 3125$will be equal to.

Here seeing passed every three questions of the product physicist issues to solve implementation and they solution in the process students High mathematics science with physics science relatedness obvious imagination they do.

Issue 4. Sturgeon's linear density $\rho = \rho(x)$changes according to the law (where x is the distance from the point of view) sturgeon from the ends up to one was distance). If the rod length $l$is equal to, then its mass be found.

Solution. Let's say $m(x)$Let the mass of the part of the rod whose length is x be. Then whole sturgeon mass $m = m(l) - m(0)$is equal to. Sturgeon's linear density $\rho(x) = m'(x)$It is known that. Therefore for Newton-Leibniz to the formula mainly to the following has we will be:

$$m = m(l) - m(0) = \int_0^l \rho(x)dx$$

Problem 5. 1 kg force spring 3 cm How much does it stretch ? work completed will it be ?

Solution. Physics from the chair known was Hook to the law mainly power spring to stretch or to squeeze proportional, that is $F = kx$, this on the ground x- the amount of extension or compression of the spring, $k$and is the coefficient of proportionality.

The matter on condition mainly $l = k: 0,03$is, from now on $k = \frac{1}{0,03}$will be.

So, the spring stretcher power as follows will be :

$$F = \frac{1}{0,03}x.$$

Power quiet in case standing to the spring impact shown for done the work find formula

$$P = \int_a^b f(x)dx$$

in of the integral lower border to zero equal, high border and $b = 0,03$will be. So, the sought work to the following equal will be:

$$P = \int_0^{0,03} \frac{1}{0,03}xdx = \frac{1}{0,03} \cdot \frac{x^2}{2} \Big|_0^{0,03} = \frac{1}{0,03} \cdot \frac{0,03^2}{2}$$
$$= \frac{0,03}{2} = 0,015$$

These two issues are clear. of the integral physicist to their implementation It is a matter of in solution from students one row physicist the laws to know demand does.

Issue 6. Arrow shooting from the gun shot arrow $v_0 = 400\frac{m}{s}$speed with moving , $h = 20$cm thick the wall pierce it , from it $v_1 = 100\frac{m}{s}$ speed with flying The wall resistance power of the arrow movement speed squared taking it as proportional , the axis wall inside movement Find the time t .

Solution: Newton's second to the law mainly arrow movement differential equation

$$m \cdot \frac{dv}{dt} = -kv^2$$

in appearance will be (negative hint of the wall resistance power of the arrow to the speed opposite directed happened for taken).

This is an equation with separate variables. Let's solve it:

$$m \cdot \frac{dv}{dt} = -kv^2, \frac{dv}{v^2} = -\frac{k}{m}dt, \quad \frac{dv}{v^2} = -k_1 dt(-\frac{k}{m} = k_1 \text{we said}),$$
$$\int \frac{dv}{v^2} = -k_1, \int dt - C, -\frac{1}{v} = -k_1 t - C, \frac{1}{v} = k_1 t + C$$

$t = 0$because it is $C = \frac{1}{v_0}$in $v = v_0$. If we take this into account, $\frac{1}{v} = k_1 t + \frac{1}{v_0}$it happens.

If $v = v_1$we assume that in this relation, $t = T$then we have:

$$\frac{1}{v_1} = k_1 T + \frac{1}{v_0}, T = \frac{1}{k_1}(\frac{1}{v_1} - \frac{1}{v_0})$$

In this expression unknown k $_1$ size participation He is doing it . determination for above found general the solution as follows we write :

$$\frac{dx}{dt} = \frac{v_0}{1 + k_1 v_0 t},$$

where v is the velocity, $\frac{dx}{dt}$and v is the velocity. Solving this equation with respect to x, we get: $x = \frac{1}{k_1}\ln(1 + k_1 v_0 t) + C_1$. $t = 0$and $x = 0$therefore $C_1 = 0, t = T$and $x = h, h = \frac{1}{k_1}\ln(1 + k_1 v_0 t)$.

TFrom the expression found above, we write the following:

$$v_1 = \frac{v_0}{1+k_1 v_0 T},$$

where $1 + k_1 v_0 T = \frac{v_0}{v_1}$. Therefore, the expression for h is as follows:

$$h = \frac{1}{k_1} ln \frac{v_0}{v_1} \quad \text{or} \quad \frac{1}{k_1} = \frac{h}{ln \frac{v_0}{v_1}}$$

$\frac{1}{k_1}$ By putting the expression found $T$for into the expression found for, the search is done. $T$to find time for following the formula harvest we do:

$$T = \frac{h}{ln \frac{v_0}{v_1}} (\frac{1}{v_1} - \frac{1}{v_0})$$

$v_0 = 400 \frac{m}{s}$, $v_1 = 100 \frac{m}{s}$, $h = 20$cm attention take calculations to perform as a rule $T = 0{,}00108$s we will find.

Last seen of issues the first one clear of the integral physicist to the implementation the next issue and differential of the equation mechanic to issues from the implementation consists of.

So so we can do this in the article Technique High Training in their homeland High Mathematics teaching in the process interdisciplinary relevance how done increase possibility about our thoughts statement we did.

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