Table of Contents:

Continuity

You know that it shouldn't be strenuous
to determine if a function's___________.
'Cause there's a mathematical test you can do
by just checking to see that three details are_________.
For every value in the domain you must first find
if the function at that spot is clearly_______________.
Next look closely to see as you near it
whether the function at that point- has a___________.
If to both questions you answer emphatically-YES!
and they're equal, the function is_________________.

Eccentricity!

It's not shocking, like electricity,
that a conic's shaped by it's___________.
For a conic's nothing but a locus
whose ratio is fixed from directrix to__________.
For example, a circle's a shape we all know,
its eccentricity's value's exactly___________.
As the value gets larger, elongating the tips,
the curve that you get is now an______________.
But when e equals one, that oughta tell ya,
the locus you have is now a_________________.
As e grows much bigger, it shouldn't perturb ya,
you'll just get a shape we call a_______________.

Function Composition

(A poem which ranges across the cognitive domain)

f(x)=I know x

f('functions') =_________

f °f('functions') = __________

f ° f ° f('functions') =_______________

f ° f ° f ° f('functions') = _______________

f ° f ° f ° f ° f('functions') = ________________

(Dane R. Camp, Fractal geometry in the high school classroom, International Reviews on Mathematical Education, May, 1995:149)

A Horse of The Same Color.

Induction is easy, so easy to do,
For the steps are the same and there are only________.

Take a statement that's suspected of being a rule
For the numbers you learned to count with in___________.

First show that some initial case is a fact,
If you can't then the statement you hafta________.

Then make the wild assumption the statement is true
for some number k, (and all values________)

If from this you can show that k + 1 lurks,
the statement is proved now, and it always _____!

But be careful with induction whatever you do,
For it's easy to slip and make a________.

For example consider the following "proof"
listen and see if you can locate the_____.

"All horses are the same color" is easily said,
but can they all be brown, black, white or__________?

The basic step quickly goes on the shelf,
For if you have one horse it's the same as__________!

Now assume for any k horses you find,
they're always the same color, no matter the________.

Consider now, and here it gets fun,
a group of horses numbering_________.

Remove one of the horses, so that there are k,
"they're all the same color" by the assumption you_______.

Whatever the color they are, it can't change
when we take that one horse and we_______.

The horses again number exactly k,
So they're all the same color, as before by the_______.

For a horse that remained in the group keeps its
shade, so the color never varies and the proof now is_____.

But there's something wrong, there must be you
know, for this statement is false, at least I think_____.

But where is the error, please tell me will you?
Or I'll go through my life thinking this statement's ______!

"In Verse"

For ANY operation it is plain to see, things
NEVER change if you use the____________.

when you add numbers it should be clear, oh,
nothing changes if you use___________.

and you all know that for multiplicaTION, we've
certainly got to use number______________.

since each domain value it guards and protects,
for function composition it's f(x)=_________.

To undo operations and go in reverse,
you apply something special we call the________.

anything turns to zero by adding to it,
a number that's special, called it's_____________.

and the number one we always reveal,
when multiplying by the_____________.

input values for a function come back unchanged
if composed with it's inverse, swapping
___________and ___________.

A function's inverse you often can try,
to find by exchanging the x and the______.

don't bother to do this, though it may seem fun,
if the original function is not_____.

graphically speaking you can see this best,
for it must first of all pass the________.

the sketch of an inverse simply reflects,
flipping across the line____________.

(Dane R. Camp, 1997)

Logarithmic Limerick

You'll experience a "powerful" sensation,
By repeating this short incantation:
"The base stays the base,
Switch the terms and replace
The logarithm with exponentiation!

There's a verse which has the same rhythm
about powers, and everything with'm
"The base stays the base,
Switch the terms and just place
in front of it all a logarithm!"

"Prime Rhyme"

Let's take a few moments to sketch out in rhyme,
exactly what you know when you've got f_________.

For example, when positive, it's visually pleasing,
and the graph of the function is clearly________.

If it's be-low zero, like days that are freezing,
the graph of the function must now be____________.

When f prime is zero, the graph seems to tarry,
and the point that you find is called__________.

Yet there's a lot more, as you may have guessed,
a thing called the first derivative______________.

Find a stationary point and consider the facts,
If it goes plus to minus you must have a___________.

If those signs are reversed, it's really no sin,
you've stumbled across a point that's a_____________.

And lastly if f prime has no change of direction,
the stationary point is a point of__________.

Now if you want to continue to something sublime, consider the meaning of f double_________.

If it's positive the function is shaped like a cup
for the slope is increasing and the graph's concave_______.

And negative values will make functions frown, when the slope's getting smaller the graph's concave________.

But f double prime won't help us to know the concavity if its value's_________.

See the derivative's power is really not strange for it gives you the low down on how functions__________.

Prime Rhyme (Part Deux)

So if f prime is zero it would be best
to apply the second derivative____________.

If the second derivative's positive it must be grinning,
the concavity's up, so the function is___________.

And if less than zero, it's sure not taxing,
the graphs concave down, so the function is_________.

But if it's equal to zero, we have no direction,
as to max, min, neither, or point of___________.

$\frac{P(X)}{Q(X)}$

P of x over Q of x behaves rationally,
and its secrets are clear if you think carefully.

The zeroes of the denominator tell it's not defined,
if they cancel with the top, then a hole you will find.

But if the factors of the denominator are not cancelled out,
then a vertical asymptote must be lurking about.

Now don't mix those up, or you'll sure pull a gaff,
for you won't know your asymptote from a hole in the graph.

Though the ends of the graph may look somewhat neurotic,
long division reveals that they are really asymptotic.

For the quotient, ignoring the remainder that appears,
will determine the shape that the graph slowly nears.

If the degree of the top's less than that down below,
a horizontal asymptote at the x-axis will show.

If the degrees are the same, the asymptote is still flat,
and the quotient of the coefficients will tell where it's at.

When the numerator's degree exceeds by just one,
the asymptote is oblique on a linear run.

When the discrepency's bigger, they won't just be slants,
for the asymptotes will do the "polynomial dance!"

The Towers of Hanoi

In a land far away
in a long distant time
the priests in a temple
played a game quite sublime.

With 100 disks
that were set upon
3 stout upright pegs
they played dusk till dawn.

For the priests of Hanoi
knew when the game was done
the whole world would end
and so would their fun.

The rules were quite simple
for there were but two,
and if you listen closely,
I'll share them with you.

The disks could be moved
to pegs one at a time.,
to put larger on smaller
was considered a crime.

There were 100 priests,
who all played this game
they each had one disk
and took turns by name.

The 100th priest
would utter a curse,
for he could not move,
till the others moved first.

So the job was now left to
priest 99,
who also cursed softly,
and took place in line.

And so they all lined up
cursing and recursing,
waiting their turn,
and mentally rehearsing,
their one special move
their own sacred place
in the cosmic scheme
and the human race.

So let us attempt to
act out this drama
for 4 little disks
to lessen the trauma.

And when we are through
with this smaller version,
you will then understand,
what we call recursion.

The transformation of f(x)

If you add to a function you'll give it a lift,
for the graph will be moved with a vertical shift,
But if you multiply take a close look and see,
the graph's stretched by that factor vertically,
and negating the function will cause a reflection,
across the x-axis in an up-down direction.

But if you add before the function's used, hey
The shift's horizontal the opposite way!
And multiplication by a factor inside reveals,
the graph's being stretched by the reciprocal's
And negating the values before f is applied
reflects across the y axis--it flips side to side!

What is a Radian?

At Baker's Square I crossed my eyes
and every circle became two pies!

It took but a moment to realize,
that to get a central angle's size
divide the arc's length by the radii's!

When are we ever gonna use this?

When are we gonna use this? Mmmm, let me see...
Perhaps never if you win the state lottery,
Or maybe tomorrow there's a chance that you may,
To be perfectly honest, I really can't say!
For mathematics is a lot like a language and, yes
To predict when you'll use it is anyone's guess.
Just as there are those words that we use all the time
And others that we seldom say, like "sublime,"
There are math skills we happen to use every day,
Like estimating change and computing gross pay,
There are others that have a more specialized function,
Like Trigonometric ratios and 'mathematical induction.
But I can tell you this, if you do your part,
And learn with your head as well as your heart,
You'll solve real problems and comfortably mingle
With the world's greatest minds who are also "bi-lingual,"
And you math fluency will grow through the years,
For you'll know when to use it when the right time
appears.

Yes!

Yes! Feel the magic
as tingles run up your spine –
trigonometry.