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Subject: Re: Need Math Instruction

Posted by [wlandsman](#) on Thu, 07 Mar 2013 02:30:51 GMT

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An exponent has higher precedence than negation. So

```
IDL> print,(-0.5)^(0.5)
```

```
-NaN
```

% Program caused arithmetic error: Floating illegal operand

i.e. you can't take the square root of a negative number, but

```
IDL> print,-0.5^(0.5)
```

```
-0.707107
```

says to negate the result of  $0.5^{(0.5)}$

--Wayne

On Wednesday, March 6, 2013 8:22:00 PM UTC-5, David Fanning wrote:

> Folks,

>

>

>

> I need some help with a math problem. Here are some values and an

>

> expression. The result of the expression is a NaN.

>

>

>

> arec= 7.0380332e-005

>

> brec= 0.011374851

>

> crec= 0.010008938

>

> drec= 3.8378659e-005

>

> Tprec = (brec-(brec^2 -4\*arec)^(1.0/2))/(2\*arec)

>

>

>

> IDL> help, Tprec

>

> TPREC        FLOAT    =        -NaN

```
>
>
>
> I want to know why this is a NaN and how to explain the following
>
> results:
>
>
> IDL> help, brec, arec
>
> BREC      FLOAT   =  0.0113749
>
> AREC      FLOAT   = 7.03803e-005
>
>
> IDL> print, (brec^2 -4*arec)
>
> -0.000152134
>
> IDL> d = (brec^2 -4*arec)
>
> IDL> help, d
>
> D        FLOAT   = -0.000152134
>
>
> IDL> print, d^(1.0/2)
>
> -NaN
>
>
> IDL> print, -0.000152134^(1.0/2)
>
> -0.0123343
>
>
> IDL> print, d, format='(F0.12)'
>
> -0.000152134089
>
>
> IDL> print, -0.000152134089D^(1.0/2)
```

```
>
> -0.012334265
>
>
>
> IDL> print, Float(-0.0001521340891486)^(1.0/2)
>
> -NaN
>
>
> IDL> print, -0.0001521340891486^(1.0/2)
>
> -0.0123343
>
>
> IDL> print, Double(-0.0001521340891486D)^(1.0/2)
>
> -NaN
>
>
> IDL> print, -0.0001521340891486D^(1.0/2)
>
> -0.012334265
>
>
> Any ideas?
>
>
> Thanks,
>
>
> David
>
> --
>
> David Fanning, Ph.D.
>
> Fanning Software Consulting, Inc.
>
> Coyote's Guide to IDL Programming: http://www.idlcoyote.com/
>
> Sepore ma de ni thue. ("Perhaps thou speakest truth.")
```

---

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Subject: Re: Need Math Instruction

Posted by [David Fanning](#) on Thu, 07 Mar 2013 03:25:21 GMT

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wlandsman writes:

```
> An exponent has higher precedence than negation. So
>
> IDL> print,(-0.5)^(0.5)
>      -NaN
> % Program caused arithmetic error: Floating illegal operand
>
> i.e. you can't take the square root of a negative number, but
>
> IDL> print,-0.5^(0.5)
>      -0.707107
>
> says to negate the result of 0.5^(0.5)
```

Ah, Occam's Razor again. I had conspiracy theories in mind. ;-)

Thanks!

David

--

David Fanning, Ph.D.

Fanning Software Consulting, Inc.

Coyote's Guide to IDL Programming: <http://www.idlcoyote.com/>

Sepore ma de ni thue. ("Perhaps thou speakest truth.")

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Subject: Re: Need Math Instruction

Posted by [Jeremy Bailin](#) on Thu, 07 Mar 2013 04:52:54 GMT

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Is it  $-4*arec$  or  $-4*arec*crec$ ?

-Jeremy.

On 3/6/13 7:22 PM, David Fanning wrote:

```
> Folks,
>
> I need some help with a math problem. Here are some values and an
> expression. The result of the expression is a NaN.
>
```

```

> arec= 7.0380332e-005
> brec= 0.011374851
> crec= 0.010008938
> drec= 3.8378659e-005
> Tprec = (brec-(brec^2 -4*arec)^(1.0/2))/(2*arec)
>
> IDL> help, Tprec
> TPREC      FLOAT    =      -NaN
>
> I want to know why this is a NaN and how to explain the following
> results:
>
> IDL> help, brec, arec
> BREC      FLOAT    =    0.0113749
> AREC      FLOAT    = 7.03803e-005
>
> IDL> print, (brec^2 -4*arec)
> -0.000152134
> IDL> d = (brec^2 -4*arec)
> IDL> help, d
> D        FLOAT    = -0.000152134
>
> IDL> print, d^(1.0/2)
> -NaN
>
> IDL> print, -0.000152134^(1.0/2)
> -0.0123343
>
> IDL> print, d, format='(F0.12)'
> -0.000152134089
>
> IDL> print, -0.000152134089D^(1.0/2)
> -0.012334265
>
> IDL> print, Float(-0.0001521340891486)^(1.0/2)
> -NaN
>
> IDL> print, -0.0001521340891486^(1.0/2)
> -0.0123343
>
> IDL> print, Double(-0.0001521340891486D)^(1.0/2)
> -NaN
>
> IDL> print, -0.0001521340891486D^(1.0/2)
> -0.012334265
>
> Any ideas?
>

```

> Thanks,  
>  
> David  
>

---

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Subject: Re: Need Math Instruction  
Posted by [Craig Markwardt](#) on Thu, 07 Mar 2013 22:30:44 GMT  
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On Wednesday, March 6, 2013 11:52:54 PM UTC-5, Jeremy Bailin wrote:  
> Is it  $-4*arec$  or  $-4*arec*crec$ ?

Hah, nice catch! David, you should check your math again. Also whether the first term should be -BREC.

Craig

---