**Laura Taalman** **MTH 161 Fall 2003**

**WeBWorK assignment number Algebra is due : 08/31/2012 at 10:10am EDT.**

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This is likely the only WebWork assignment we will have in this class. Its purpose is to help you review algebra and precalculus topics in preparation for Thursday's quiz.

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The primary purpose of WeBWorK is to let you know that you are getting the correct answer or to alert you if you are making some kind of mistake. Usually you can attempt a problem as many times as you want before the due date. However, if you are having trouble figuring out your error, you should consult the book, or ask a fellow student, one of the TA's or your professor for help. Don't spend a lot of time guessing – it's not very efficient or effective.

Give 4 or 5 significant digits for (floating point) numerical answers. For most problems when entering numerical answers, you can if you wish enter elementary expressions such as $2 \wedge 3$ instead of 8, $sin(3 * pi/2)$instead of -1, $e \wedge (ln(2))$ instead of 2, $(2+tan(3)) * (4-sin(5)) \wedge 6-7/8$ instead of 27620.3413, etc. Here's the **list of the functions** which WeBWorK understands.

You can use the Feedback button on each problem page to send e-mail to the professors.

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**1.** **(1 pt) Library/Utah/Calculus_I/set1_Preliminaries/1210s1p3.pg**

Indicate whether the following statements are True (T) or False (F).

___1. The sum of two rational numbers is always a rational number.
___2. The quotient of two rational numbers is always a rational number (provided the denominator is non-zero).
___3. The quotient of two rational numbers is always a real number (provided the denominator is non-zero).
___4. The ratio of two rational numbers is always positive
___5. The product of two rational numbers is always a rational number.
___6. The difference of two rational numbers is always a natural number.
___7. The difference of two rational numbers is always a rational number.

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**2.** **(1 pt) Library/Utah/College_Algebra/set2_Functions_and_Their_Graphs-/1050s2p9.pg**

Enter "=" if the proposed identity holds, and "N" otherwise.

$(a+b)^2$ ___ $a^2+b^2$.

$(a+b)^2$ ___ $a^2+2ab+b^2$.

$(a-b)^2$ ___ $a^2-b^2$.

$(a-b)^2$ ___ $a^2-2ab+b^2$.

$a^2-b^2$ ___ $(a-b)(a+b)$.

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**3.** **(1 pt) Library/Utah/College_Algebra/set2_Functions_and_Their_Graphs-/1050s2p7.pg**

Enter "=" if the proposed identity holds, and "N" otherwise.

$\left(\frac{1}{2}a\right)\left(\frac{1}{2}b\right)$ ___ $\frac{1}{2}ab$.

$\left(\frac{1}{2}a\right)\left(\frac{1}{2}b\right)$ ___ $\frac{ab}{2}$.

$\left(\frac{1}{2}a\right)\left(\frac{1}{2}b\right)$ ___ $\frac{ab}{4}$.

$\left(\frac{1}{2}a\right)\left(\frac{1}{2}b\right)$ ___ $\frac{1}{4}ab$.

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**4.** **(1 pt) Library/Utah/College_Algebra/set2_Functions_and_Their_Graphs-/1050s2p8.pg**

Enter "=" if the proposed identity holds, and "N" otherwise.

$(x+3)^2$ ___ $x^2+9$.

$(x+3)^2$ ___ $x^2+6$.

$\frac{x^2+9}{x+3}$ ___ $x+3$.

$\sqrt{x^2+9}$ ___ $x+3$.

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**5.** **(1 pt) Library/Utah/College_Algebra/set2_Functions_and_Their_Graphs-/1050s2p10.pg**

Enter "=" if the proposed identity holds, and "N" otherwise.

$\left(x^2\right)^3$ ___ $x^5$.

$\left(x^2\right)^3$ ___ $x^6$.

$x^2x^3$ ___ $x^5$.

$x^2x^3$ ___ $x^6$.

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**6.** **(1 pt) Library/Utah/Calculus_I/set1_Preliminaries/1210s1p30.pg**

This problem addresses some common algebraic errors. For the equalities stated below assume that $x$ and $y$ stand for real numbers. Assume that any denominators are non-zero. Mark the equalities with $T$ (true) if they are true for all values of $x$ and $y$, and $F$ (false) otherwise.

___ $(x+y)^2 = x^2+y^2$.
___ $(x+y)^2 = x^2+2xy+y^2$.
___ $\frac{x}{x+y} = \frac{1}{y}$.
___ $x-(x+y) = y$.
___ $\sqrt{x^2} = x$.

___ $\sqrt{x^2} = |x|$.
___ $\sqrt{x^2+4} = x+2$.
___ $\frac{1}{x+y} = \frac{1}{x} + \frac{1}{y}$.

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**7.** **(1 pt) Library/Utah/Trigonometry/set2_Algebra/s2p2.pg**

For each statement below enter a *T* (true) the statement is true and an *F* (false) otherwise. In this problem you need to get everything correct before receiving credit. Whenever there is a division below, **we assume that the divisor is non-zero.**

___ For all real numbers $a$, $b$, and $c$

$$a(b+c) = ab+ac$$

___ For all real numbers $a$, $b$, $c$ and $d$

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

___ For all real numbers $a$, $b$, $c$ and $d$

$$\frac{a}{b} + \frac{c}{d} = \frac{ad+bc}{bd}$$

___ For all real numbers $a$, $b$, and $c$

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

___ For all real numbers $a$, $b$, and $c$

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

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**8.** **(1 pt) Library/Utah/Trigonometry/set2_Algebra/s2p3.pg**

For each statement below enter a *T* (true) the statement is true and an *F* (false) otherwise. In this problem you need to get everything correct before receiving credit. Whenever there is a division below,**we assume that the divisor is non-zero.**

___ For all real numbers $a$, $b$, $c$, and $d$

$$\frac{a-b}{c-d} = \frac{b-a}{d-c}.$$

___ For all real numbers $a$, $b$, and $c$

$$\frac{ab+ac}{a} = b+c.$$

___ For all real numbers $a$, $b$, and $c$

$$\frac{\frac{a}{b}}{c} = \frac{b}{ac}.$$

___ For all real numbers $a$, $b$, and $c$

$$\frac{\frac{a}{b}}{c} = \frac{a}{bc}.$$

___ For all real numbers $a$, $b$, and $c$

$$\frac{a}{\frac{b}{c}} = \frac{ba}{c}.$$

___ For all real numbers $a$, $b$, and $c$

$$\frac{a}{\frac{b}{c}} = \frac{ca}{b}.$$

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**9.** **(1 pt) local/Library/maCalcDB/setAlgebra03Expressions-/Test1_13b.pg**
Multiply out and simplify: $(3\sqrt{x}+5\sqrt{y})(3\sqrt{x}-5\sqrt{y})$ = _____

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**10.** **(1 pt) local/Library/ma112DB/set1_2/sw1_4_73c.pg**
If $x^4+2x^2-3 = (x+A)(x+B)(x^2+C)$ for some integers $A$, $B$, and $C$ with $A < B$,
then $A$ = _____
and $B$ = _____
and $C$ = _____

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**11.** **(1 pt) Library/Utah/College_Algebra/set13_Review/1050s13p6.pg**
**Rules of Exponents.** Understand how to combine powers.

$$(6y^2)^2(2y^3)^{-1} = ay^b$$

where

$a$ = _____ and
$b$ = _____.

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**12.** **(1 pt) Library/Utah/Intermediate_Algebra/set14_Review/s14p23.pg**
If you write the following expression

$$\left(\frac{x^{-1/3}x^{1/6}}{x^{1/4}x^{-1/2}}\right)^{-1/3}$$

as a single power of $x$ then the exponent is _____

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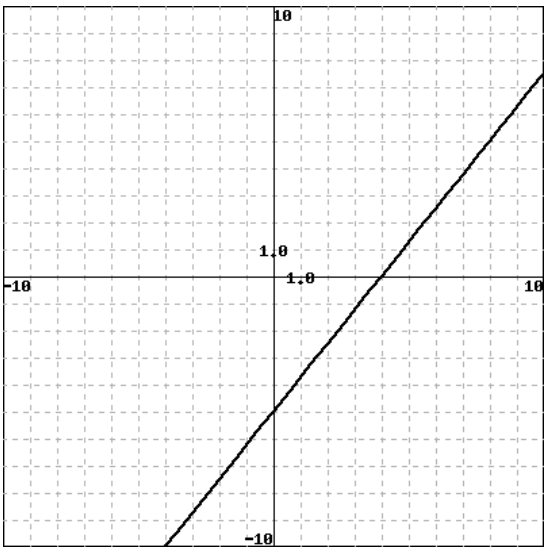
**13.** **(1 pt) Library/ma112DB/set3/sw2_4_11.pg**
Find an equation $y = mx+b$ for the line whose graph is sketched (**click on the graph to view an enlarged graph** ):




The number $m$ equals _____;.
The number $b$ equals _____;.

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**14.** **(1 pt) Library/maCalcDB/setAlgebra14Lines/pt_slope_to_slope_int.pg**
The equation of the line with slope $-5$ that goes through the point $(-4,-6)$ can be written in the form $y = mx+b$ where $m$ is: _____
and where $b$ is: _____

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**15.** **(1 pt) Library/Rochester/setAlgebra07PointsCircles-/equidist_off_axis.pg**
Find the point $(x,y)$ on the line $y = x$ that is equidistant from the points $(9,5)$ and $(0,2)$.

$x =$_____
$y =$_____

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**16.** **(1 pt) Library/Utah/College_Algebra/set5_Functions_and_Their_Graphs-/1050s5p17.pg**
Suppose

$$f(x) = \frac{x}{x+1}.$$

Then

A. $f(1)$ = _____,

B. $f(t)$ = _____,

C. $f(x^2)$ = _____, and

D. $f(f(x))$ = _____.

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**17.** **(1 pt) Library/ASU-topics/setFunctions/srw2_1_23.pg**
Given the function

$$f(x) = \begin{cases} x^2+2x, & \text{if} \quad x \le -1 \\ x+3, & \text{if} \quad x > -1 \end{cases}$$

Calculate the following values:
$f(-4) =$ _____
$f(-1) =$ _____
$f(3) =$ _____

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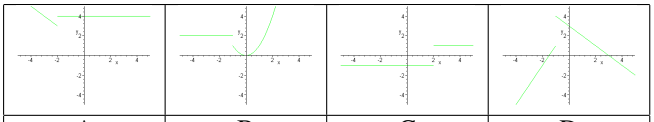
**18.** **(1 pt) Library/ma112DB/set6/c4s2p59_72/c4s2p59_72.pg**
Match the functons with their graphs. Enter the letter of the graph below which corresponds to the function. (**Click on image for a larger view** )

___1. Piecewise fucntion : $f(x) = 2x+3$, if $x < -1$ and $f(x) = 3-x$, if $x \ge -1$
___2. Piecewise fucntion : $f(x) = 1-x$, if $x < -2$ and $f(x) = 4$, if $x \ge -2$
___3. Piecewise fucntion : $f(x) = 2$, if $x \le -1$ and $f(x) = x^2$, if $x > -1$
___4. Piecewise fucntion : $f(x) = -1$, if $x < 2$ and $f(x) = 1$, if $x \ge 2$



| A | B | C | D |
|---|---|---|---|

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**19.** **(1 pt) Library/Utah/Quantitative_Analysis/set1_Preview/q10.pg**
Match the statements defined below with the letters labeling their equivalent expressions.
You must get all of the answers correct to receive credit.

___1. $|x-5| \le 8$
___2. $|x-5| < 8$
___3. $|x-5| < \infty$
___4. $|x-5| = 8$
___5. $|x-5| \ge 8$

A. $x \in \{-3, 13\}$
B. $x \in (-\infty, \infty)$
C. $x \in (-3, 13)$
D. $x \in (-\infty, -3] \cup [13, \infty)$
E. $x \in [-3, 13]$

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**20.** **(1 pt) Library/Utah/Quantitative_Analysis/set1_Preview/q1.pg**
Match the statements defined below with the letters labeling their equivalent expressions.
You must get all of the answers correct to receive credit.

___1. $x$ is greater than or equal to -7
___2. $x$ is less than or equal to -7
___3. $x$ is greater than -7
___4. The distance from $x$ to -7 is more than 2

___5. The distance from $x$ to -7 is less than or equal to 2

A. $|x+7| > 2$
B. $-7 < x$
C. $x \geq -7$
D. $x \leq -7$
E. $|x+7| \leq 2$

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**21.** **(1 pt) Library/ASU-topics/setRationalFunctions/p2_5_3.pg**
Consider the function

$$f(x) = \frac{x}{\sqrt{9-x^2}}$$

a) Determine the domain of the function.
**Note:** Write the answer in interval notation. If the answer involves more than one interval write the intervals separated by the union symbol, U. If needed enter $\infty$ as *infinity* and $-\infty$ as *-infinity* .
Domain = _____

b) Find the vertical asymptote(s). If there is more than one vertical asymptote give a list of the $x$-values separated by commas. If there are no vertical asymptotes type in *None* .
$x =$ _____

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**22.** **(1 pt) Library/ASU-topics/setRationalFunctions/p2_5_1.pg**
Consider the function

$$f(x) = \sqrt{\frac{7-x}{x-9}}$$

a) Determine the domain.
**Note:** Write the answer in interval notation. If the answer involves more than one interval write the intervals separated by the union symbol, U.
Domain = _____

b) Find the vertical asymptote(s). If there is more than one vertical asymptote give a list of the $x$ -values separated by commas. If there are no vertical asymptotes type in *None* .
$x =$ _____

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**23.** **(1 pt) Library/ASU-topics/setRationalFunctions/bethratfun2.pg**
For the function

$$f(x) = \frac{(2x-5)(x+6)}{(-5x-8)(6x-5)},$$

What are the vertical asymptotes? Give a list of the $x$-values of the asymptotes separated by commas.
$x =$ ____

What is the horizontal asymptote?
$y =$____

What are the $x$ -intercepts? Give a list of the $x$ -intercepts separated by commas (i.e.: (1,2),(3,4)). If there are no $x$-intercepts, type in *none* .
____

What is the $y$ -intercept?
____

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**24.** **(1 pt) Library/OSU/accelerated_calculus_and_analytic_geometry_i/hmwk1/prob2.pg**
This problem tests calculating new functions from old ones:
From the table below calculate the quantities asked for:

| $x$ | 11 | 1 | $-2$ | 2 | 5 |
|---|---|---|---|---|---|
| $f(x)$ | 1451 | 1 | $-5$ | 11 | 149 |
| $g(x)$ | 2408 | $-2$ | $-23$ | 5 | 194 |
| $f'(x)$ | 385 | 5 | 8 | 16 | 85 |
| $g'(x)$ | 681 | 1 | 31 | 15 | 129 |

_____$(fg)(2)$
_____$f(2)/(g(2)+5)$
_____$f(f(1))$

Tip: Sometimes webwork will do arithmetic for you. For example you can type in 4*11 instead of 44 and webwork will do the calculation for you. This works with many numerical problems, although not all of them.

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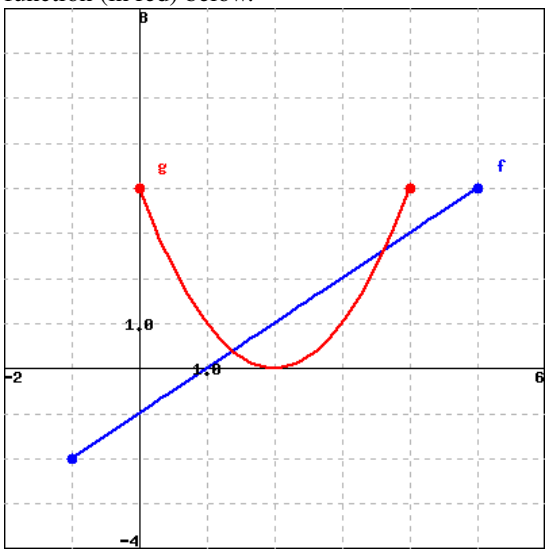
**25.** **(1 pt) Library/maCalcDB/setAlgebra17FunComposition-/ur_fn_2_1.pg**
Let $f$ be the linear function (in blue) and let $g$ be the parabolic

function (in red) below.




Note: If the answer does not exist, enter 'DNE':

1. $(f \circ g)(2) =$ ___
2. $(g \circ f)(2) =$ ___
3. $(f \circ f)(2) =$ ___
4. $(g \circ g)(2) =$ ___
5. $(f+g)(4) =$ ___
6. $(f/g)(2) =$ ___

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**26.** **(1 pt) Library/ma112DB/set7/sw4_7_33.pg**

**If the answer is $\infty$, input infinity;**
**if the answer is $-\infty$, input -infinity.**

Given that $f(x) = \frac{1}{x}$ and $g(x) = 6x+6$, calculate

(a) $f \circ g(x)$= _____, its domain is all real numbers except _____

(b) $g \circ f(x)$= _____ , its domain is all real numbers except _____

(c) $f \circ f(x)$= _____, its domain is all real numbers except _____

(d) $g \circ g(x)$= _____, its domain is (_____, _____)

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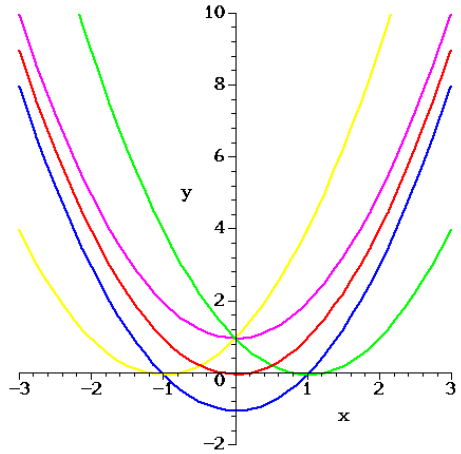
**27.** **(1 pt) Library/Utah/College_Algebra/set6_Polynomial_and_Rational_Functions-/1050s6p5/1050s6p5.pg**




Match the colors of the graphs in this Figure with the functions given below. Enter y for yellow, b for blue, r red, p for purple, and g for green, as appropriate.

A. ___ $f(x) = x^2$
B. ___ $f(x) = (x-1)^2$
C. ___ $f(x) = (x+1)^2$
D. ___ $f(x) = x^2 - 1$
E. ___ $f(x) = x^2 + 1$

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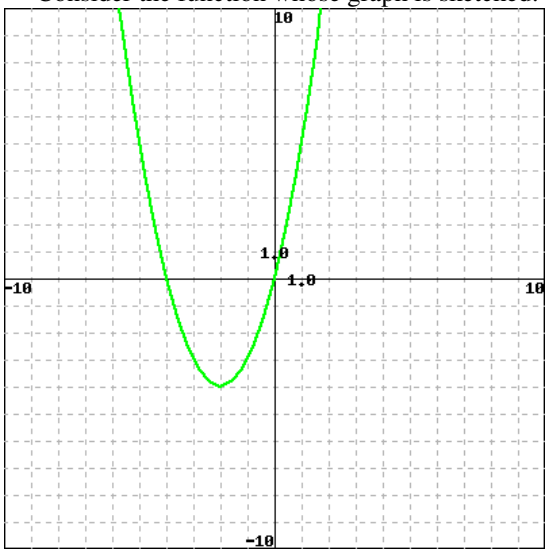
**28.** **(1 pt) Library/Rochester/setAlgebra16FunctionGraphs/lh2-3_30a.pg**

Consider the function whose graph is sketched:



Find the intervals over which the function is strictly increasing or decreasing. Express your answer in **interval notation**.

The interval over which the function is strictly increasing: _____

The interval over which the function is strictly decreasing: _____

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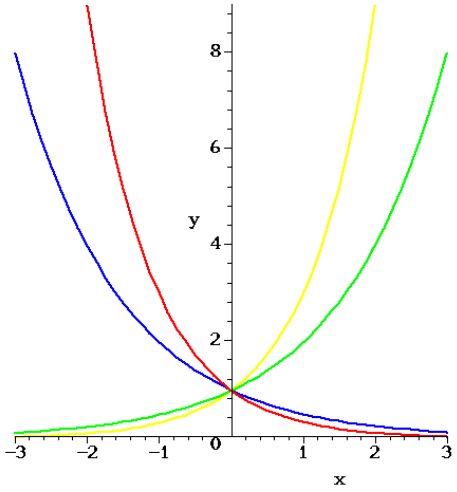
**29.** **(1 pt) Library/Utah/Business_Algebra/set8_Exponential_and_Logarithmic_Functions-/p01/p01.pg**




The figure above shows the graphs of four exponential functions, listed below. Match the functions with the colors, using b for blue, r for red, g for green, and y for yellow.

___: $f(x) = 2^x$.
___: $f(x) = 3^x$.
___: $f(x) = \left(\frac{1}{2}\right)^x$.
___: $f(x) = \left(\frac{1}{3}\right)^x$.

**Hint:** Look at $f(1)$.

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**30.** **(1 pt) Library/maCalcDB/setAlgebra28ExpFunctions-/srw4_1_33.pg**

Find the exponential function $f(x) = Ca^x$ whose graph goes through the points $(0,5)$ and $(3,40)$.

$a =$ _____,
$C =$ _____.

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**31.** **(1 pt) Library/ma112DB/set10/sw6_5_5.pg**

Find the solution of the exponential equation

$$14e^x = 15$$

in terms of logarithms, or correct to four decimal places.

$x =$ _____

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**32.** **(1 pt) Library/maCalcDB/setAlgebra30LogExpEqns/srw4_4_31.pg**

Find the solutions of the exponential equation

$$e^{2x} - 5e^x + 4 = 0.$$

Enter your answer as a comma-separated list, and enter *none* if there are no solutions.

_____

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**33.** **(1 pt) Library/maCalcDB/setAlgebra30LogExpEqns/srw4_3_43-44.pg**

(a) If $4^x = 45$, then $x =$ _____.
(b) If $17^{-x} = 6$, then $x =$ _____.

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**34.** **(1 pt) Library/maCalcDB/setAlgebra30LogExpEqns-/problem14.pg**

Solve for $x$ in terms of $k$.

$$\log_9 x + \log_9(x+7) = k.$$

$x =$ _____

Find $x$ if $k = 3$. _____

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**35.** **(1 pt) Library/Rochester/setAlgebra30LogExpEqns/problem4.pg**

Solve for $x$:

$$\frac{9}{7}\log_4 x = 6$$

$x =$ _____

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**36.** **(1 pt) Library/maCalcDB/setAlgebra29LogFunctions/srw4_3_33-36.pg**

Evaluate the following expressions.

(a) $\ln e^7 =$ _____
(b) $e^{\ln 5} =$ _____
(c) $e^{\ln\sqrt{4}} =$ _____
(d) $\ln(1/e^3) =$ _____

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**37.** **(1 pt) Library/maCalcDB/setAlgebra30LogExpEqns-/problem5a.pg**

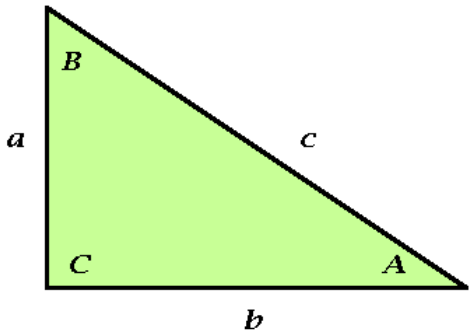
Solve for $x$:

$$(\log_2(\log_2\ x)) = -2$$

$x =$ _____

**38.** **(1 pt) local/Library/Utah/Trigonometry/set5_Trigonometry/s5p2-/s5p2b.pg**

Given that $a = 5$ and $b = 12$, find the values listed below. (Enter answers as fractions.)




$c =$ _____
$\sin(A) =$ _____
$\cos(A) =$ _____
$\tan(A) =$ _____

**39.** **(1 pt) Library/ASU-topics/setAnglesEtc/p1.pg**

For each of the following angles, find the degree measure of the angle with the given radian measure:

$\frac{3\pi}{6}$ _____
$\frac{3\pi}{4}$ _____
$\frac{2\pi}{3}$ _____
$\frac{5\pi}{2}$ _____
$1\pi$ _____

**40.** **(1 pt) local/Library/Utah/Trigonometry/set4_Trigonometry-/s4p19b.pg**

The angle $\frac{\pi}{4}$ equals _____ degrees.

Fill in the following basic trigonometric values:

$\cos\left(\frac{\pi}{4}\right) =$_____.
$\sin\left(\frac{\pi}{4}\right) =$_____.
$\tan\left(\frac{\pi}{4}\right) =$_____.

**41.** **(1 pt) local/Library/Utah/Trigonometry/set4_Trigonometry-/s4p20b.pg**

The angle $\frac{\pi}{3}$ equals _____ degrees.

Fill in the following basic trigonometric values:

$\cos\left(\frac{\pi}{3}\right) =$_____.
$\sin\left(\frac{\pi}{3}\right) =$_____.
$\tan\left(\frac{\pi}{3}\right) =$_____.

**42.** **(1 pt) Library/Utah/Trigonometry/set4_Trigonometry/s4p18.pg**

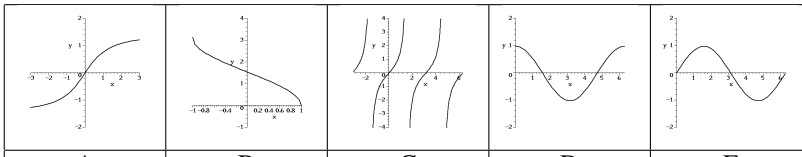
Here are the values of the trigonometric functions at some basic angles. You need not memorize those, but you should be able to figure them out, for example by drawing a suitable picture involving a triangle or the unit circle.

$\cos(0) =$_____.
$\sin(0) =$_____.
$\tan(0) =$_____.
$\cos(\frac{\pi}{2}) =$_____.
$\sin(\frac{\pi}{2}) =$_____.

**43.** **(1 pt) Library/Utah/Trigonometry/set7_Trigonometry/graphs-/graphs.pg**

Match the functions with their graphs.

___1. f(x) = cos(x)
___2. f(x) = sin(x)
___3. f(x) = tan(x)
___4. f(x) = arcsin(x)
___5. f(x) = arccos(x)
___6. f(x) = arctan(x)




(**Click on image for a larger view** . The small images may not show up properly on a hard copy, but they will be fine in a browser.)

**44.** **(1 pt) Library/ASU-topics/setRightAngleTrig/srw6_2_19.pg**

For the acute angle $\theta$ with $\cot\theta = 1$, find
(give exact answers, NO DECIMALS. If the answer involves a square root it should be entered as *sqrt* . E.g. the square root of 2 should be written as sqrt(2))
$\sin\theta =$ _____;
$\cos\theta =$ _____;
$\tan\theta =$ _____;
$\sec\theta =$ _____;
$\csc\theta =$ _____.

**45.** **(1 pt) Library/ASU-topics/setTrigRelations/srw6_3_47.pg**

Evaluate the following expressions.
**Note:** The answer must be given as a fraction, NO DECIMALS. If the answer involves a square root it should be entered as *sqrt* . For instance, the square root of 2 should be entered as sqrt(2).

If $\cos\theta = -2/9$ and $\tan\theta < 0$, then

$\sin(\theta) =$ _____;
$\tan(\theta) =$ _____;
$\cot(\theta) =$ _____;
$\sec(\theta) =$ _____;
$\csc(\theta) =$ _____;