1. (1 pt) Algebraically find the inverse function of $f(x) = 9 - 3e^x$.

$f^{-1}(x) =$ _____

Graph f, f^{-1} and the line $y = x$ on the same screen and check whether the graphs of f and f^{-1} are reflections about the line.

Answer(s) submitted:

- `log((9-x)/3)`

(correct)

Correct Answers:

- `ln((9-x)/3)`

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2. (1 pt) Consider the function $f(x) = \sqrt{x-10}$.

(A) Find $f^{-1}(10) =$ _____

(B) Use Theorem 7, page 156 of the Stewart Essential Calculus textbook to find $(f^{-1})'(10)$
$(f^{-1})'(10) =$ _____

(C) Calculate $f^{-1}(x)$ and state domain and range of f^{-1}.
Use interval notation. If needed enter *inf* for ∞ or *minf* for $-\infty$.
$f^{-1}(x) =$ _____
Domain = _____
Range = _____
Calculate $(f^{-1})'(10)$ from the formula for $f^{-1}(x)$ and check that it agrees with the result of part (B)

Answer(s) submitted:

- `110`
- `20`
- `x^2 + 10`
- `[0, inf)`
- `[10, inf)`

(correct)

Correct Answers:

- `110`
- `20`
- `x**2+10`
- `[0,infinity)`
- `[10,infinity)`

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3. (1 pt) Consider the function $f(x) = \dfrac{3}{x-1}$ for $x > 1$.

(A) Find $f^{-1}(2) =$ _____

(B) Use Theorem 7, page 156 of the Stewart Essential Calculus textbook to find $(f^{-1})'(2)$
$(f^{-1})'(2) =$ _____

(C) Calculate $f^{-1}(x)$ and state domain and range of f^{-1}.
Use interval notation. If needed enter *inf* for ∞ or *minf* for $-\infty$.
$f^{-1}(x) =$ _____
Domain = _____
Range = _____
Calculate $(f^{-1})'(2)$ from the formula for $f^{-1}(x)$ and check that it agrees with the result of part (B)

Answer(s) submitted:

- `5/2`
- `-3/4`
- `((x+3)/x)`
- `(0,inf)`
- `(1,inf)`

(correct)

Correct Answers:

- `2.5`
- `-0.75`
- `1+3/x`
- `(0,infinity)`
- `(1,infinity)`

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4. (1 pt) For each of the given functions $f(x)$, find the derivative $\left(f^{-1}\right)'(c)$ at the given point c, first finding $a = f^{-1}(c)$. (See Theorem 7, page 156 of the Stewart Essential Calculus textbook)

$f(x) = 5x + 6x^{15}$; $\quad c = -11$
$a =$ _____

$\left(f^{-1}\right)'(c) =$ _____

$f(x) = x^2 - 11x + 41$ on the interval $[5.5, \infty)$; $\quad c = 13$
$a =$ _____

$\left(f^{-1}\right)'(c) =$ _____

Answer(s) submitted:

- `dne`
- `2.9259E-17`
- `7`
- `1/3`

(score 0.5)

Correct Answers:

- `-1`
- `0.0105263157894737`
- `7`
- `0.333333333333333`

5. (1 pt) Evaluate the following expressions.

(a) $\ln e^{-7} =$ _____

(b) $e^{\ln 7} =$ _____

(c) $e^{\ln(3^2)} =$ _____

(d) $\ln(1/e^4) =$ _____

Answer(s) submitted:

- -7
- 7
- 9
- -4

(correct)

Correct Answers:

- -7
- 7
- 9
- -4

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6. (1 pt) Use the Laws of logarithms to rewrite the expression

$$\ln(\sqrt[4]{xy})$$

in a form with no logarithm of a product, quotient or power.
After rewriting we have

$$\ln(\sqrt[4]{xy}) = A\ln(x) + B\ln(y)$$

with the constant

$A =$ _____

and the constant

$B =$ _____

Answer(s) submitted:

- 1/4
- 1/4

(correct)

Correct Answers:

- 1/4
- 1/4

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7. (1 pt) Use the Laws of logarithms to rewrite the expression

$$\ln\left(\frac{x^3\sqrt{x-1}}{3x-6}\right)$$

in a form with no logarithm of a product, quotient or power.
After rewriting we have

$$\ln\left(\frac{x^3\sqrt{x-1}}{3x-6}\right) = A\ln x + B\ln(x-1) + C\ln(3x-6)$$

with the constant $A =$ _____

the constant $B =$ _____

and the constant $C =$ _____

Answer(s) submitted:

- 3
- 1/2
- -1

(correct)

Correct Answers:

- 3
- 0.5
- -1

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8. (1 pt) Find the solution of the exponential equation

$$e^{1-4x} = 8$$

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

$x =$ _____

Answer(s) submitted:

- -0.2699

(correct)

Correct Answers:

- -0.269860385419959

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9. (1 pt) Find the solution of the logarithmic equation

$$16 - \ln(5-x) = 0$$

correct to four decimal places.
Your answer is

$x =$ _____

Answer(s) submitted:

- -8886100

(correct)

Correct Answers:

- -8886105.52050787

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10. (1 pt)

Find the following limits. If needed, enter *inf* for ∞ and *minf* for $-\infty$.

(a) $\lim_{x\to\infty} \ln(2+11x) - \ln(11+2x) =$ _____

(b) $\lim_{x\to 0^+} \ln(2\sin x) =$ _____

Answer(s) submitted:

- 1.7047
- minf

(correct)

Correct Answers:

- 1.70474809223843
- minf