Question 1

Convert the following equation containing exponentials to one containing logarithms:

$$2^x = 15$$

1. $x = \log_2 15$
2. $2 \log x = 15$
3. $x = \ln 15$
4. $x = \log 15$
5. $x^2 = \log_2 15$
6. None of the above

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6. None of the above

1. $x = \log_2(15)$

Question 1

To convert the expression

$$2^x = 15$$

to one containing logarithms, use the fact that

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

together with the fact that logarithmic functions are $1:1$ so we can take $\log_2$ of both sides of the equation without changing the solution set:

$$\log_2(2^x) = \log_2(15)$$

which simplifies to

$$x = \log_2(15)$$

Question 2

Convert the following equation containing exponentials to one containing logarithms:

$$4e^x = x + 1$$

1. $x = 4\ln(x+1)$
2. $x = \ln(x+1) - \ln 4$
3. $x = \ln(x+1)$
4. $x = \ln(x+1) - 4$
5. $x^4 = \ln(x+1)$
6. None of the above

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Convert the following equation containing exponentials to one containing logarithms:

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2. $x = \ln(x+1) - \ln 4$
3. $x = \ln(x+1)$
4. $x = \ln(x+1) - 4$
5. $x^4 = \ln(x+1)$
6. None of the above

2. $x = \ln(x+1) - \ln(4)$

Question 2

To convert the equation:

$$4e^x = x + 1$$

to one containing logarithms, use the fact that

$$\ln(e^x) = x$$

together with the fact that logarithmic functions are $1:1$ so we can take $\ln$ of both sides of the equation without changing the solution set:

$$\ln(4e^x) = \ln 4 + \ln e^x = \ln 4 + x = \ln(x+1)$$

which simplifies to

$$x = \ln(x+1) - \ln(4)$$

Question 3

Express the following as a single logarithm

$$\ln 5 + 5 \ln 3$$

1. $5 \ln 8$
2. $\ln(5 + 3^5)$
3. $\ln 5 \cdot 3^5$
4. $\ln 20$
5. $\ln(5 \cdot 5^3$
6. None of the above

Question 3

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4. $\ln 20$
5. $\ln(5 \cdot 5^3$
6. None of the above

3. $\ln 5 \cdot 3^5$

Question 3

Use the fact that $r \ln x = \ln x^r$ to write

$$5 \ln 3 = \ln 3^5$$

then use the fact that $\ln x + \ln y = \ln(xy)$ to combine the logarithmic expressions:

$$\ln 5 + \ln 3^5 = \ln(5 \cdot 3^5)$$

Question 4

Find the inverse of

$$f(x) = \sqrt{10 - 3x}$$

1. $-\frac{1}{3}x^2 + \frac{10}{3}$
2. $3x^2 + \frac{10}{3}$
3. $-\frac{1}{3}x^2 + \frac{3}{10}$
4. $-3x^2 + \frac{10}{3}$
5. $-\frac{1}{3}x^2 - \frac{10}{3}$
6. None of the above

Question 4

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5. $-\frac{1}{3}x^2 - \frac{10}{3}$
6. None of the above

1. $-\frac{1}{3}x^2 + \frac{10}{3}$

Question 4

Starting with $y = \sqrt{10 - 3x}$, solve for x:

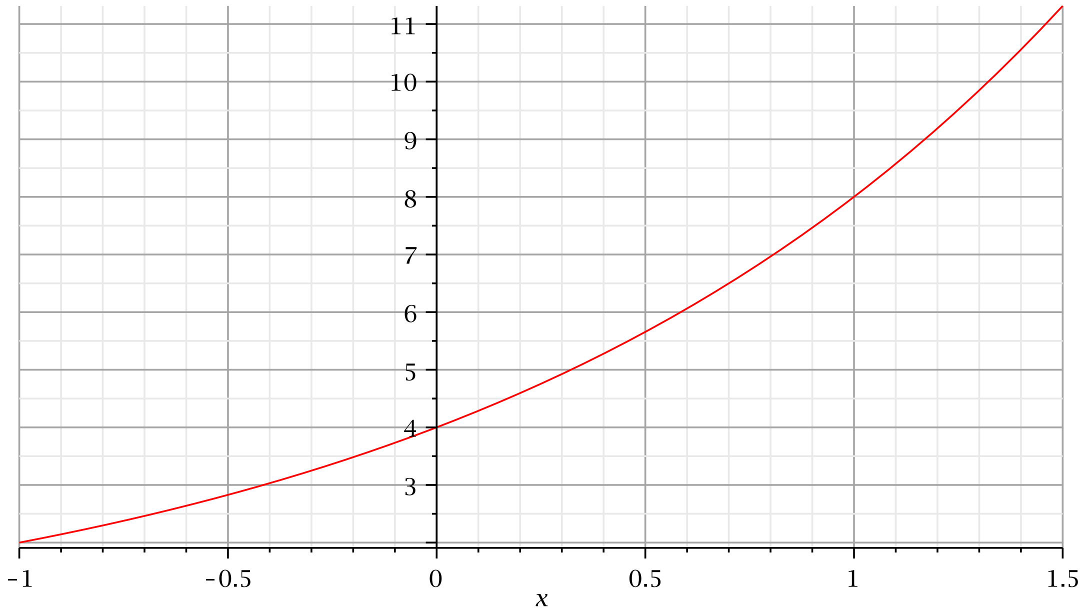
$$y = \sqrt{10 - 3x} \Rightarrow y^2 = 10 - 3x \Rightarrow x = -\frac{y^2}{3} + \frac{10}{3}$$

then interchange x and y:

$$y = -\frac{x^2}{3} + \frac{10}{3}$$

Question 5

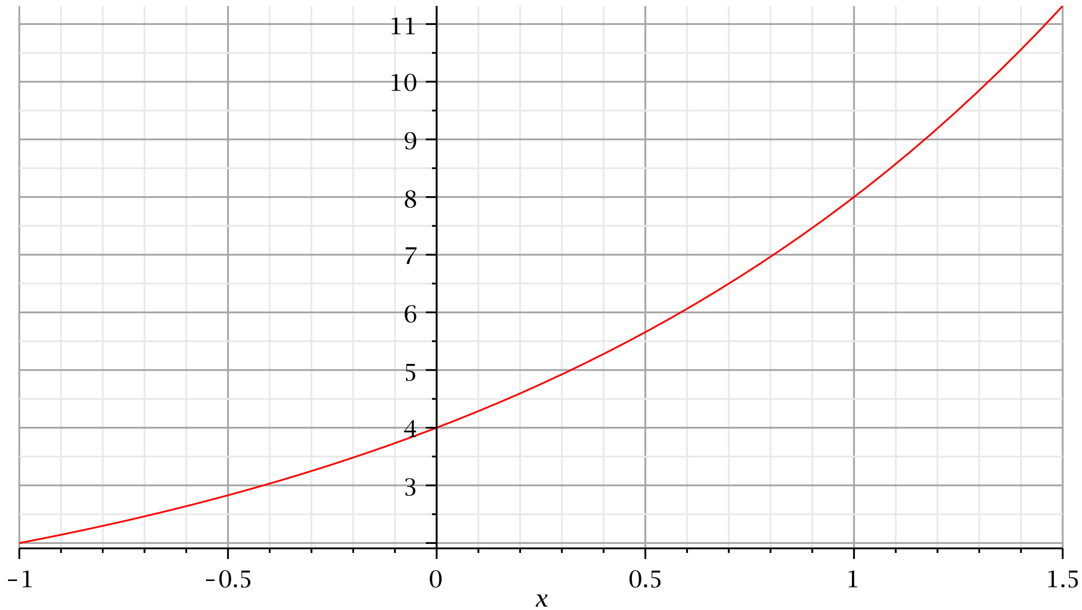
Find C and a if this is the graph of $y = Ca^x$



1. $C = 1 \quad a = 2$
2. $C = 2 \quad a = 4$
3. $C = 4 \quad a = 1/2$
4. $C = 4 \quad a = 2$
5. $C = 2 \quad a = 2$
6. None of the above

Question 5

Find C and a if this is the graph of $y = Ca^x$



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3. $C = 4 \quad a = 1/2$
4. $C = 4 \quad a = 2$
5. $C = 2 \quad a = 2$
6. None of the above

4. $C = 4 \quad a = 2$

Question 5

When $x = 0$, $y = 4$, so

$$y = 4 = Ca^0 = C \cdot 1 = C$$

so $C = 4$. From the graph, $y = 8$ when $x = 1$, so

$$y = 8 = 4a^1 = 4a$$

so $a = 2$.

Question 6

Write the expression 3^x as a natural (base e) exponential.

1. e^{3x}
2. $3^{x/3}$
3. $\log_3 e^x$
4. $x \cdot e^3$
5. $e^{x \cdot \ln 3}$
6. None of the above

Question 6

Write the expression 3^x as a natural (base e) exponential.

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6. None of the above

5. $e^{x \cdot \ln 3}$

Question 6

Use the fact that

$$3 = e^{\ln 3}$$

to write the expression as

$$3^x = \left(e^{\ln 3}\right)^x = e^{x \cdot \ln 3}$$