

pg. 21 K. $3^x = 8$

1st way

$$\log(3^x) = \log(8)$$

$$x \log(3) = \frac{\log(8)}{\log(3)}$$

$$x = \frac{\log(8)}{\log(3)} = 1.89$$

2nd

$$3^x = 8$$

$$\log_3 8 = x$$

$$x = \frac{\log(8)}{\log(3)} = 1.89$$

"What do you call pants worn in a flood?"

Solve each equation. Round your answer only at your last step, and round the answer to the nearest hundredth. The two letter answer to each problem will match a letter that will allow you to figure out the joke.

- | | |
|--|-------------|
| 1. $e^x = 5$ | TR: 0.35 |
| 2. $\ln x = 7$ | WA: 3 |
| 3. $\ln(x-1) + \ln 3 = 8$ | TE: 994.65 |
| 4. $e^{2x} = 12$ | ED: 1.61 |
| 5. $\ln(x+2) + \ln x = \ln 35$ | BL: 6 |
| 6. $e^{3x} = 4$ | RS: -0.39 |
| 7. $4 \ln x - \ln 2 = \ln 128$ | BR: 182.77 |
| 8. $\ln 3 - (\ln x + \ln 6) = \ln x - \ln 8$ | IT: 1096.63 |
| 9. $e^x \cdot e^x = 4$ | ES: 1.79 |
| 10. $x = \ln 3 + \ln 4 - \ln 2$ | ER: 12 |
| 11. $e^x = (e^x)^{\left(\frac{1}{e^x}\right)}$ | CH: 2 |
| 12. $\ln 3 + \ln 2x = 7$ | OU: 5 |
| 13. $\ln e^x = 6$ | OV: 4 |

12 12 2 2 8 8 10 10 7 7 4 4
4 4 5 5 11 11 1 1 13 13 3 3 6 6

"Why do shoes make poor debaters?"

Solve each equation. Round your answer to the nearest hundredth at the end of your work. To figure out the joke, place the letter of each problem above the answer on the lines below.

- | |
|------------------------------|
| R: $3^x = 8$ |
| H: $5^{x+1} = 12$ |
| I: $7^x = 11$ |
| S: $5^x = 3^{x+1}$ |
| U: $2^{x+1} = 9^x$ |
| T: $3^{x+1} = 5^{x+1}$ |
| D: $5(3^x) = 7$ |
| A: $2^x + 3^x = 8$ |
| L: $5 + 3^x = 4^x$ |
| E: $2^{x+1} + 3 = 5^{x+1}$ |
| Y: $3^{x+1} + 2^{x+1} = 8^x$ |

H: $5^{x+1} = 12$

$$\log_5 12 = x+1$$

$$(\log_5 12) - 1 = x$$

$$x = .54$$

THE YARE
EAS I L Y S U E D E
-3.07 1.16 2.15 0.62 5.59 -1 2.15 0.46 -3.07 0.31 -3.07

J: $5^x = 3^{x+1}$

$$\log 5^x = \log 3^{x+1}$$

$$x \log 5 = (x+1) \log 3$$

$$x \log 5 = x \log 3 + \log 3$$

$$-x \log 3 - x \log 3$$

$$x \log 5 - x \log 3 = \log 3$$

$$\frac{x(\log 5 - \log 3)}{(\log 5 - \log 3)} = \frac{\log 3}{\log 5 - \log 3}$$

$$x = 2.15$$

Pg. 21

$$A: 2^x \cdot 3^x = 8$$

$$\log(2^x \cdot 3^x) = \log(8)$$

$$\log 2^x + \log 3^x = \log 8$$

$$x \log 2 + x \log 3 = \log 8$$

$$\frac{x(\log 2 + \log 3)}{\log 2 + \log 3} = \frac{\log 8}{\log 2 + \log 3}$$

$$E: 2^{x-1} \cdot 3 = 5^{x+2}$$

$$\log(2^{x-1} \cdot 3) = \log(5^{x+2})$$

$$\log 2^{x-1} + \log 3 = (x+2) \log 5$$

$$(x-1) \log 2 + \log 3 = (x+2) \log 5$$

$$x \log 2 - \log 2 + \log 3 = x \log 5 + 2 \log 5 + \log 2 - \log 3$$
$$-x \log 5 + \log 2 - \log 3 - x \log 5 - 2 \log 5 - \log 2 + \log 3$$

$$\frac{x(\log 2 - \log 5)}{\log 2 - \log 5} = \frac{(2 \log 5 + \log 2 - \log 3)}{(\log 2 - \log 5)}$$

pg. 20

$$\textcircled{1} e^x = 5$$

$$\ln(e^x) = \ln(5) \rightarrow$$

$$x = \ln(5)$$

$$x = 1.61$$

$$\ln(x) = \log_e(x)$$

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

$$\ln(e^6) = 6$$

$$\ln(e^{-2}) = -2$$

$$\textcircled{2} \ln x = 7$$

$$\log_e x = 7$$

$$e^7 = x$$

$$x = 1096.6$$

$$\textcircled{4} e^{x^3} = 12$$

$$x = 12$$

$$\textcircled{3} \ln(x-1) + \ln 3 = 8$$

$$\ln((x-1) \cdot 3) = 8$$

$$\ln(3x-3) = 8$$

$$e^8 = \frac{3x-3}{+3}$$

$$\frac{e^8 + 3}{3} = \frac{3x}{3}$$

$$x = 994.7$$

$$\textcircled{3} \ln(x+2) + \ln x = \ln(35)$$

$$\ln(x^2 + 2x) = \ln(35)$$

$$x^2 + 2x = 35$$

$$x^2 + 2x - 35 = 0$$

$$(x+7)(x-5) = 0$$

$$x = -7 \text{ or } x = 5$$

$$\begin{aligned} x+7 &= 0 \\ -7 & -7 \\ x &= -7 \end{aligned}$$

$$x = 5$$