L2 Algebra Practice #6

1. Simplify fully to one log: $2\log(A) - \log(AB)$

2. Write as one fraction: $\frac{2}{k} + 7$

3. Simplify: $\frac{2x^2 + 7x + 3}{x + 3}$

4. A spaceship arrives on earth, carrying Martians and Venusians.

   Martians have 2 feelers and 6 legs.

   Venusians have 5 feelers and 12 legs.

   There were a total 90 feelers.

   There were a total 258 legs.

   How many of each type were there?

5. Solve: $\log_9(x) = 4$

6. Solve: $5 - 4x \leq 8$

7. Solve: $16x^2 + 6x = 1$

8. A certain type of bacteria, given a favourable growth medium, increases according to the basic formula

   $$N = A\,(2.4)^t$$

   where N is the number of bacteria and t is the time in hours.

   Given that there were approximately 100 bacteria to start with, how long will it be before there are 1000 bacteria?

Answers: L2 Algebra Practice #6

1. $2\log(A) - \log(AB)$ $= \log(A^2) - \log(AB)$ $= \log\left(\frac{A^2}{AB}\right)$ $= \mathbf{\log\left(\frac{A}{B}\right)}$

2. Write as one fraction: $\frac{2}{k} + 7$ $= \frac{2}{k} + \frac{7k}{k}$ $= \mathbf{\frac{7k+2}{k}}$

3. Simplify: $\frac{2x^2+7x+3}{x+3}$ $= \frac{(x+3)(2x+1)}{(x+3)}$ $= \frac{(2x+1)\cancel{(x+3)}}{\cancel{(x+3)}}$ $= \mathbf{2x + 1}$

4. Feelers = 90 and 2 × number Martians + 5 × number Venusians $\Rightarrow$ 90 = 2m + 5v

   Legs = 258 and 6 × number Martians + 12 × number Venusians $\Rightarrow$ 258 = 6m + 12v

   Solving by hand or calculator gives **4 Venusians and 35 Martians**

5. Solve: $\log_9(x) = 4$ If $y = b^x$ then $\log_b y = x$ $x = 9^4$ $\mathbf{x = 6561}$

6. $5 - 4x \leq 8$ $-4x \leq 3$ $4x \geq -3$ $\mathbf{x \geq \frac{-3}{4}}$ (−0.75)

7. $16x^2 + 6x = 1$ $16x^2 + 6x - 1 = 0$ calculator **x = 0.125 or −0.5**

8. $N = A(2.4)^t$ $1000 = 100 \times 2.4^t$

   $\log(1000) = \log(100 \times 2.4^t)$ $\log(1000) = \log(100) + t\log(2.4)$

   $t = \frac{\log(1000) - \log(100)}{\log(2.4)} = 2.63$ hours 0.63 hours × 60 = 38 minutes

   No need to round in this context **It will take 2 hours 38 minutes**.

(Q4 and Q8 are Merit)