

L2 Algebra Practice #2

1. Solve: $\log_x(27) = 3$

2. Solve: $4(x + 3) > 8x$

3. Solve: $6(x + 5) - 3(3x - 5) = 7$

4. Simplify fully: $\left(\frac{3x^2}{\sqrt{x^3}}\right)^{-2}$

5. Simplify: $\frac{6z}{z+1} + \frac{3}{10z}$

6. Expand: $(x + 2)(3x - 2)(x + 5)$

7. Simplify fully: $\frac{x^2}{x^3 + 4x^2}$

8. The level of caffeine present in your body after drinking a cup of coffee can be calculated using the formula:

$$C = 75 (0.8)^t$$

Where C = the level of caffeine in the blood in *mg*.

and t = the time in hours since drinking the coffee.

If Kate had a cup of coffee at 8 pm, and she cannot sleep until the caffeine content in her body is half of the original amount (the original amount = 75 mg), at which time will she be able to sleep?

Answers: L2 Algebra Practice #2

1. Solve: $\log_x(27) = 3$ If $y = b^x$ then $\log_b y = x$ $27 = x^3$
 So: $x = \sqrt[3]{27}$ $x = 3$
2. $4(x + 3) > 8x$ $4x + 12 > 8x$ $12 > 4x$ $x < 3$
3. $6(x + 5) - 3(3x - 5) = 7$ $6x + 30 - 9x + 15 = 7$ (note double negative becomes +15)
 $45 - 3x = 7$ $-3x = -38$ $x = 12\frac{2}{3}$ (12.6667)
4. Simplify fully: $\left(\frac{3x^2}{\sqrt{x^3}}\right)^{-2} = \left(\frac{3x^2}{x^{1.5}}\right)^{-2} = \left(\frac{3x^{0.5}}{1}\right)^{-2} = \left(\frac{1}{3x^{0.5}}\right)^2 = \frac{1}{9x}$
5. $\frac{6z}{z+1} + \frac{3}{10z} = \frac{6z \times 10z}{(z+1)10z} + \frac{3(z+1)}{10z(z+1)} = \frac{60z^2 + 3z + 3}{10z(z+1)}$ or $\frac{60z^2 + 3z + 3}{10z^2 + 10z}$
6. $= (x + 2)(3x^2 + 13x - 10) = 3x^3 + 13x^2 - 10x$
 $\quad\quad\quad + \frac{6x^2 + 26x - 20}{\quad\quad\quad}$
 $= \quad\quad\quad \mathbf{3x^3 + 19x^2 + 16x - 20}$ (any order of terms)
7. $\frac{x^2}{x^3 + 4x^2} = \frac{x^2}{x^2(x + 4)} = \frac{\cancel{x^2}}{\cancel{x^2}(x + 4)} = \frac{1}{x + 4}$
8. $C = 75 (0.8)^t$ gives $37.5 = 75 \times 0.8^t$
 $\log(37.5) = \log(75 \times 0.8^t)$ $\log(37.5) = \log(75) + t \log(0.8)$
 Rearranging: $t = \frac{\log(37.5) - \log(75)}{\log(0.8)} = 3.106$ hours
 Need to round and give to actual time = $8 + 3.106 = \mathbf{11:06 \text{ p.m.}}$

(Q4 and Q8 are Merit)