L2 Algebra Revision #2

1. Solve: $\log_2(x) = 5$

2. Expand and simplify: $x(x + 2) - 3(x - 3)$

3. Solve: $3(x + 7) < 9x$

4. Solve: $1 - \frac{1}{x} = \frac{6}{x^2}$

5. Simplify: $\frac{2z}{z+1} + \frac{3}{z}$

6. Expand and simplify: $(2x + 6)(x - 5)(6x - 1)$

7. Simplify: $(9x^{-1}y^{6})^{-½}$

8. A drug is absorbed by your body at the rate of 75% per hour. If the original dose is 800 mg then the amount of drug in the body is given by:

$$D = 800\,(0.75)^{t}$$

Where D = the amount of drug remaining in *mg*.
And t = the time in hours since the start dose.

How long would it take for there to be only 100 mg of the drug remaining?

Answers: L2 Algebra Revision #2

1. $\log_2(x) = 5$ If $y = b^x$ then $\log_b y = x$ $x = 2^5$ **$x = 32$**

2. $x(x + 2) - 3(x - 3)$ $= x^2 + 2x - 3x + 9$ **$= x^2 - x + 9$**

3. $3(x + 7) < 9x$ $3x + 21 < 9x$ $21 < 6x$ **$x > 3.5$**

4. $1 - \frac{1}{x} = \frac{6}{x^2}$ $x^2\left(1 - \frac{1}{x}\right) = \frac{x^2 \times 6}{x^2}$ $x^2 - \frac{x^2}{x} = \frac{\cancel{x^2} \times 6}{\cancel{x^2}}$

   $x^2 - x = 6$ $x^2 - x - 6 = 0$ $(x - 3)(x + 2) = 0$ **$x = 3$ or -2**

5. $\frac{2z}{z+1} + \frac{3}{z}$ $= \frac{2z \times z}{(z+1)z} + \frac{3(z+1)}{z(z+1)}$ $= \frac{\mathbf{2z^2 + 3z + 3}}{\mathbf{z(z+1)}}$ or $\frac{\mathbf{2z^2 + 3z + 3}}{\mathbf{z^2 + z}}$

6. $(2x + 6)(x - 5)(6x - 1) = (2x + 6)(6x^2 - 31x + 5)$ $= 12x^3 - 62x^2 + 10x$
   $+ \quad 36x^2 - 186x + 30$
   $= \mathbf{12x^3 - 26x^2 - 176x + 30}$

7. $(9x^{-1}y^6)^{-½}$ $= (9)^{-½}(x^{-1})^{-½}(y^6)^{-½}$ $= \mathbf{\frac{1}{3}\, x^{½} y^{-3}}$
   which can also be written as: $= \frac{\sqrt{x}}{3y^3}$ etc

8. $D = 800\,(0.75)^t$ Writing our equation: $100 = 800 \times 0.75^t$
   $\log(100) = \log(800 \times 0.75^t)$ $= \log(100) = \log(800) + t\log(0.75)$
   Rearranging: $t = \frac{\log(100) - \log(800)}{\log(0.75)} = 7.228$ hours
   No need to round. × 60 to convert decimal hours to minutes **7 hours 13.7 minutes**

(Q4 and Q8 are Merit)