L2 Algebra Revision #6

1. Solve: $\frac{4}{t+2} = \frac{3}{t+5}$

2. Solve: $3^x = 2$

3. Simplify: $\left(\frac{64}{x^{-2}}\right)^{\frac{2}{3}}$

4. An ice cube is originally 350 grams.

   It loses 4% of its weight every minute.

   How long will it take it to reach 200 grams?

5. Simplify: $(2x^2 - 3x - 9)(x - 3)^{-1}$

6. Solve: $\log_x(2187) = 3.5$

7. Simplify: $\frac{5}{t-2} - \frac{3}{t+5}$

8. Solve: $5x^2 - 33x < 14$

Answers: L2 Algebra Revision #6

1. Solve: $\frac{4}{t+2} = \frac{3}{t+5}$ $= 4(t + 5) = 3(t + 2)$

$4t + 20 = 3t + 6$ $4t - 3t = 6 - 20$ $\mathbf{t = -14}$

2. Solve $3^x = 2$ $\log(3^x) = \log(2)$ $x \log(3) = \log(2)$

$x = \log(2) \div \log(3)$ $\mathbf{x = 0.631}$

3. Simplify: $\left(\frac{64}{x^{-2}}\right)^{\frac{2}{3}}$ =: $(64x^2)^{\frac{2}{3}}$ $= (64)^{\frac{2}{3}} (x^2)^{\frac{2}{3}}$ $= \sqrt[3]{64^2}\, x^{2 \times \frac{2}{3}}$ $= \mathbf{16x^{\frac{4}{3}}}$

4. $W_{end} = W_{start} (1 + \text{change})^t$ $200 = 350 \times 0.96^t$

$\log(200) = \log(350 \times 0.96^t)$ $\log(200) = \log(350) + t \log(0.96)$

$t = \frac{\log(200) - \log(350)}{\log(0.96)} = 13.7$ minutes 0.7 mins × 60 = 42.5 seconds

No need to round in this context **It will take 13 min 42½ sec**

5. Simplify: $(2x^2 - 3x - 9)(x - 3)^{-1}$ $\frac{2x^2 - 3x - 9}{x - 3}$

$= \frac{2(x+1.5)(x-3)}{x-3}$ $= \frac{2(x+1.5)\cancel{(x-3)}}{\cancel{x-3}}$ $= 2(x + 1.5)$ $= \mathbf{2x + 3}$

6. $\log_x(2187) = 3.5$ If $y = b^x$ then $\log_b y = x$ $2187 = x^{3.5}$

$x = \sqrt[3.5]{2187}$ on calculator using $x\sqrt{}$ button, or (2187)^(2⅃7) $\mathbf{x = 9}$

7. $\frac{5}{t-2} - \frac{3}{t+5}$ $= \frac{5(t+5)}{(t-2)(t+5)} + \frac{-3(t-2)}{(t+5)(t-2)}$ $= \frac{5(t+5) - 3(t-2)}{(t-2)(t+5)}$

$\frac{5t + 25 - 3t + 6}{(t-2)(t+5)}$ $= \mathbf{\frac{2t+31}{(t-2)(t+5)}}$ or $\frac{2t+31}{t^2+3t-10}$

8. $5x^2 - 33x < 14$ $5x^2 - 33x - 14 < 0$ this is inequation, so we get a range

solving $5x^2 - 33x - 14 = 0$ gives $x = 7$ and -0.4, so these are the limits of the range

when $x = 0$, then $5x^2 - 33x < 14$ is true, so 0 is inside the range $\mathbf{-0.4 < x < 7}$

(4 and 8 are Merit)