L2 Algebra Revision #3

1. Solve: $\log_3(x) = 4$

2. Solve: $15x^2 + 36 = 48x$

3. Solve: $\frac{3t+1}{10} > \frac{1}{5}$

4. A polygon with n sides has $\frac{n}{2}(n-3)$ diagonals.

   How many sides does a polygon need to have 189 diagonals?

5. Simplify: $\frac{16x^2+8x-15}{4x-3}$

6. Simplify fully: $\frac{k}{\sqrt{36k^4}}$

7. Simplify and write using positive indices: $(4x^{-3})^2$

8. Find all pairs of numbers which differ by 3 and whose squares differ by 75.

Answers: L2 Algebra Revision #3

1. $\log_3(x) = 4$ If $y = b^x$ then $\log_b y = x$ $x = 3^4$ **$x = 81$**

2. $15x^2 + 36 = 48x$ $15x^2 - 48x + 36 = 0$ calculator **$x = 1.2$ or 2**

3. $\frac{3t+1}{10} > \frac{1}{5}$ $5(3t + 1) > 10$ $15t + 5 > 10$ **$t > \frac{1}{3}$ (0.333)**

4. $189 = \frac{n}{2}(n - 3)$ $378 = n(n - 3)$ $n^2 - 3n - 378 = 0$ $n = 21$ or -18

   (negative sides are meaningless) **The polygon has 21 sides**

5. $\frac{16x^2+8x-15}{4x-3}$ $= \frac{(4x+5)(4x-3)}{4x-3}$ $= \frac{(4x+5)\cancel{(4x-3)}}{\cancel{4x-3}}$ **$= 4x + 5$**

6. $\frac{k}{\sqrt{36k^4}}$ $= \frac{k}{\sqrt{36}\sqrt{k^4}}$ $= \frac{k}{6k^2}$ **$= \frac{1}{6k}$**

7. $(4x^{-3})^2$ $= (4)^2 (x^{-3})^2$ $= 16x^{-6}$ **$= \frac{16}{x^6}$**

8. Our equations are: $a - b = 3$ and $a^2 - b^2 = 75$ rearranging the first: $a = 3 + b$

   substituting to remove a: $(3 + b)^2 - b^2 = 75$

   $9 + 6b + b^2 - b^2 = 75$ $6b = 75 - 9$

   $b = 66 \div 6 = 11$ solving using $a - b = 3$ gives $a = 14$

   11 and 14, but **−**11 and **−**14 also work **11 and 14 or −11 and −14**

(4 and 8 are Merit)