Indices and surds

1Q

Express $\frac{6}{\sqrt{3}}$ in the form $a\sqrt{3}$ where b is an integer. [3]

2Q

Simplify $\frac{3}{\sqrt{6}}$, expressing your answer in surd form. [3]

3Q

Solve the equation

$$3^{2y} - 3^{y+2} - 3^y + 9 = 0$$

by forming a quadratic equation in x where $x = 3^y$. [5]

4Q

Solve the equation

$$2^{2y} - 2^{y+3} - 2^{y+2} + 32 = 0$$

by forming a quadratic equation in x where $x = 2^y$. [5]

5Q

Solve the equation

$$2^y + \frac{16}{2^y} = 17$$ [4]

6Q

Solve the equation

$$2x^{\frac{1}{3}} = x^{-\frac{2}{3}}$$ [3]

7Q

Solve the equation

$$12x^{\frac{1}{4}} - 27x^{-\frac{3}{4}} = x^{\frac{5}{4}}$$ [4]

8Q

Solve the equation

$$y^{\frac{1}{3}} + 12y^{-\frac{1}{3}} = 7$$ [4]

9Q

Solve the equation

$$x^3(x^3 - 26) = 27$$ [3]

10Q

Simplify

$$6\sqrt{5} - \frac{10}{\sqrt{5}} + \frac{1}{\sqrt{5}}$$

expressing your answer in the form $a\sqrt{5}$ where b is an integer. [4]