3 **(a)** Find the vector which has magnitude 39 and is in the same direction as $\begin{pmatrix} 12 \\ -5 \end{pmatrix}$. [2]

(b) Given that $\mathbf{a} = \begin{pmatrix} 2 \\ -1 \end{pmatrix}$ and $\mathbf{b} = \begin{pmatrix} -4 \\ 5 \end{pmatrix}$, find the constants λ and μ such that $5\mathbf{a} + \lambda\begin{pmatrix} 4 \\ 6 \end{pmatrix} = \mu\mathbf{b}$. [4]

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4 **(a)** Given that $\dfrac{q^{-2}\sqrt{pr}}{\sqrt[3]{r}(pq)^{-3}} = p^a q^b r^c$, find the value of each of the constants a, b and c. [3]

(b) Solve the equation $3x^{\frac{4}{5}} - 8x^{\frac{2}{5}} + 5 = 0$. [4]

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