3. **In this question you must show all stages of your working.**

Solutions relying on calculator technology are not acceptable.

(a) Write $\dfrac{8 - \sqrt{15}}{2\sqrt{3} + \sqrt{5}}$ in the form $a\sqrt{3} + b\sqrt{5}$ where a and b are integers to be found.

(3)

(b) Hence, or otherwise, solve

$$\left(x + 5\sqrt{3}\right)\sqrt{5} = 40 - 2x\sqrt{3}$$

giving your answer in simplest form.

(3)

4. **In this question you must show all stages of your working.**
Solutions relying on calculator technology are not acceptable.

(i) Using the laws of indices, solve

$$2^{4k-3} = \frac{8^{1-k}}{4\sqrt{2}}$$

(3)

(ii) Solve the equation

$$\frac{x\sqrt{3} + 2}{\sqrt{3} - 1} = x\sqrt{3} - 4$$

giving the answer in the form $a + b\sqrt{3}$, where a and b are rational numbers.

(4)

6. **In this question you must show all stages of your working.**

Solutions relying on calculator technology are not acceptable.

(a) Expand and simplify

$$\left(r - \frac{1}{r}\right)^2$$

(2)

(b) Express $\dfrac{1}{3 + 2\sqrt{2}}$ in the form $p + q\sqrt{2}$ where p and q are integers.

(2)

(c) Use the results of parts (a) and (b), or otherwise, to show that

$$\sqrt{3 + 2\sqrt{2}} - \frac{1}{\sqrt{3 + 2\sqrt{2}}} = 2$$

(3)

3.

In this question you must show all stages of your working.

Solutions relying on calculator technology are not acceptable.

(a) Write $\dfrac{8 - \sqrt{15}}{2\sqrt{3} + \sqrt{5}}$ in the form $a\sqrt{3} + b\sqrt{5}$ where a and b are integers to be found.

(3)

(b) Hence, or otherwise, solve

$$\left(x + 5\sqrt{3}\right)\sqrt{5} = 40 - 2x\sqrt{3}$$

giving your answer in simplest form.

(3)