1 (a) Solve $\sqrt{3x+22} = x+4$. x=1 [3]

(b) Express $\frac{5+\sqrt{3}}{3-\sqrt{3}} - \frac{\sqrt{300}}{3} + \sqrt{192}$ in the form $a+b\sqrt{3}$, where $a$ and $b$ are integers.

a=3 b=6 [4]

2 (a) By using an appropriate substitution or otherwise, solve $7^{4x+2} - 3(49^{2x}) = 322$.

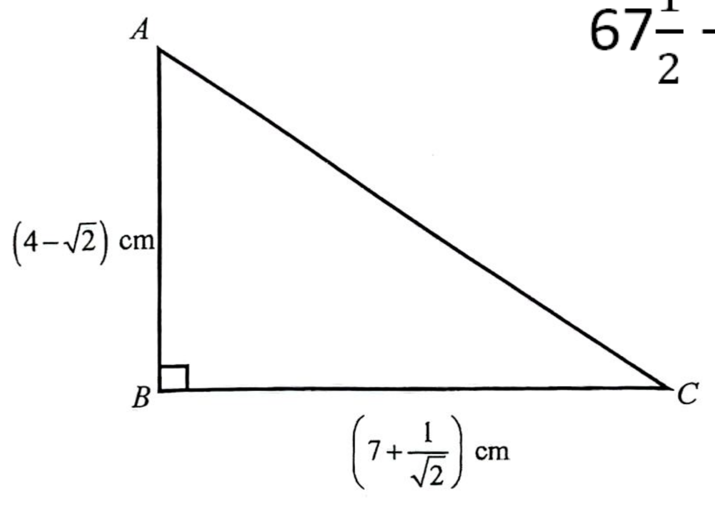
x=1/4 [3]

(b) Simplify $\frac{\sqrt[n]{a^{n+4}}}{\sqrt[n]{a^4}}$, where $a > 0$ and $n$ is a positive integer. a [2]

3 In the triangle $ABC$, $AB = (4-\sqrt{2})$ cm, $BC = (7+\frac{1}{\sqrt{2}})$ cm, and angle $ABC = 90°$.

Find an expression for $(AC)^2$ in the form $(a+b\sqrt{2})$ cm$^2$, where $a$ and $b$ are rational numbers. [3]

$67\frac{1}{2} - \sqrt{2}$




4 The equation of a curve is $y = -2x^2 + 13x - 11$. $-2\left(x - 3\frac{1}{4}\right)^2 + 10\frac{1}{8}$

(a) Express $-2x^2 + 13x - 11$ in the form $a(x-h)^2 + k$, where $a$, $h$ and $k$ are constants. Hence, find the coordinates of the turning point on the curve. [3]

(b) Sketch the graph of $y = -2x^2 + 13x - 11$, indicating clearly the turning point, the $y$-intercept and $x$-intercepts of the curve. [3]

5 (a) The line $y = 10x + 1$ intersects the curve $y = 2x^2 - 12x - 23$ at two points.

Find the $y$-coordinates of these two points. (12, 121) (-1,-9) [3]

(b) Find value of the constant $k$ for which the line $y = 3k - 2x$ just touches the curve $y = 2x^2 - 12x - 23$. [3]

k=-71/6

6 Find the range of values of $x$ for which $(3-x)^2 > 4x$. [3]

x<1 or x>9

**End of Paper**