SMC IV – Mid-Term Exam – October 2018

[Answer all Questions]

Name of Student: _____ Final Mark: _____

Parent's Signature: _____

1. Factorise the following:

(i) $6x^2y^2 + 3x^3y^2 - 9x^2y^3$ (ii) $4a^2 - 9b^2$ (iii) $3x^2 - 2x - 5$ (iv) $x^3 + y^3$ (v) $8x^3 - 27y^3$

2. Show using multiplication that $(x - y)(x^2 + xy + y^2) = x^3 - y^3$

3. The area of a rectangle, $A(x) = 6x^2 + 4x - 2$. If the length is given by $(3x - 1)$, find

(i) an expression for the width of the rectangle.

(ii) an expression for the perimeter, $P(x)$, of the rectangle.

4. If $(x+y)^2-(x-y)^2=kxy,$ find the value of k where $k \in \mathrm{N}$

5. Find the real numbers a and b such that

$$x^2+6x+4=(x+a)^2+b$$

6. Simplify the following two algebraic expressions:

(i) $\dfrac{3x^2-16x+5}{x^2-6x+5}$

(ii) $\dfrac{1+\dfrac{3}{2x}}{2-\dfrac{4}{3x}}$

8. Given that $(x - t)^2$ is a factor of $x^3 + 3px + c$.

Show that **(i)** $p = -t^2$ and **(ii)** $c = 2t^3$.