SHENTON COLLEGE

Mathematics Methods Year 11
2016 Test 4

NAME:_____

Teacher (circle one): Friday Mackenzie McRae

Section 1: Calculator Free (No notes; formula sheet given) (25 minutes, 36 marks)

QUESTION 1 [1, 2, 2, 3 = 8 marks]

Evaluate where possible or otherwise simplify (resulting in **positive** indices) the following:

(a) $25^{\frac{3}{2}}$

(b) $\dfrac{(p^2)^0}{(3p)^2}$

(c) $\left(\dfrac{x^4y}{xy^3}\right)^{-2}$

(d) $\dfrac{(a^3b^{-2})^4}{\sqrt{a^2b^4}}$

QUESTION 2 [2, 2, 3, 2 = 9 marks]

Solve the following showing all working:

a) $2a^3 - 1 = 127$

b) $3^{n-2} = 81$

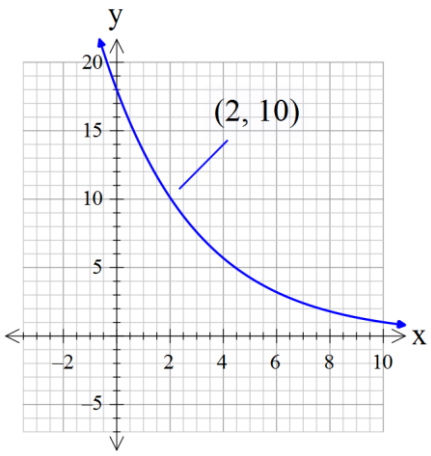
c) $2^{2x} - 3 \times 2^x + 2 = 0$

d) $4^{3x+1} = \dfrac{1}{8}$

Question 3. [3 marks]

If the angles of a triangle are in arithmetic progressions, use working to show that one of the angles must be $60°$ in size.

Question 4. [3, 2, 1 = 6 marks]



The exponential graph on the left has a y intercept of 18 and passes through the point (2, 10).

a) Find the equation of this function, leaving your answer with exact values.

b) What is the domain and range of this function?

c) If the function is translated down 5 units and reflected about the x axis, what would be the new *y* intercept?

Question 5. [3 marks]

Show using first principles how to determine the gradient function of $y = 2x^2 - 3x$

Question 6. [4 marks]

Sketch the graph of a function that satisfies all the conditions stated below

- The functions meets the x axis at (-2,0)
- The function has a positive gradient when $x > -2$ and negative gradient for $x < -2$
- The gradient of the function is zero when $x = -2$ and $x = 3$
- The y intercept is positive