Carlingford High School

2019

Advanced Mathematics

Year 11 Assessment Task One

Time allowed 50 min

Student number……

Teacher: *(Please Circle)*

Mr Cheng	Mrs Strilakos
Ms Bennett	Mrs Blakeley
Mr Gong	Mr Wilson

General Instructions

- Do not write in columns
- Marks may be deducted for careless or badly arranged work
- Only calculators approved by the Board of Studies may be used
- All answers are to be completed in black pen except graphs and diagrams
- No lending or borrowing

Q1 Algebraic Techniques	**Q2** Functions	**Total**
/20	/20	/40

Answer all questions, starting each page with your ***student number*** and ***question number*** at the top of the page.

Question 1 (20 marks)

a. Simplify fully 2

$$5\sqrt{20}-4\sqrt{75}+2\sqrt{45}$$

b. Express with a rational denominator 2

$$\frac{2\sqrt{5}-1}{3-\sqrt{5}}$$

c. Simplify $\dfrac{x^3y^2\times\left(2xy^2\right)^{-2}}{3\sqrt{x}}$ leaving your answer as a fraction with positive indices. 2

d. Solve 1

$$3^{-x}=\frac{1}{243}$$

e. Simplify fully, leaving your answers as single fractions. 5

i. $\dfrac{x^3+8}{x^2+5x}\times\dfrac{x^2-25}{x^2-x-6}$ ii. $\dfrac{1}{x}\div\dfrac{2}{x}+\dfrac{3}{x}$

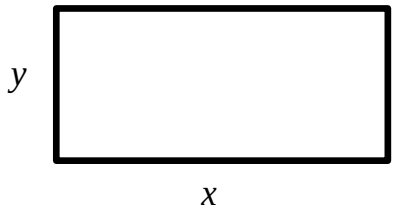
f. Solve 2

$$10x^2-17x+3=0$$

g. Solve ***by completing the square***. Leave in ***exact form***. 2

$$x^2-2x-4=0$$

h. Copy this rectangle onto your answer sheet. 4

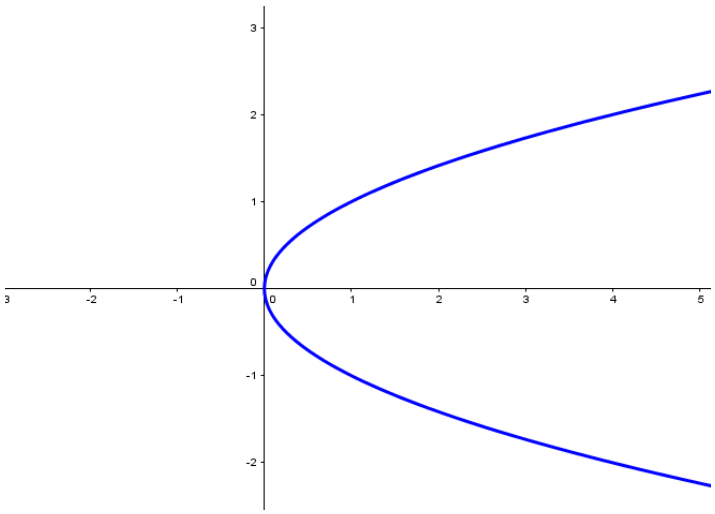


i. The perimeter of this rectangle is 32 m. Write an expression for y in terms of x.

ii. The area of this rectangle is 60 m^2. Write a quadratic equation and solve it to find the dimensions of the rectangle.

Question 2 (20 marks)

a. Is the following graph a function or a relation? Give reasons for your answer. 2



b. Given $f(x)=2x-1$ and $g(x)=10-3x+5x^2$ 3

i. Evaluate $f(3)$

ii. Evaluate $g(-2)$

iii. Simplify $f(a)+g(a)$

c. i. Show that this function is even. 2

$$f(x)=\frac{4x^2}{x^4-1}$$

ii. Describe what this means about the graph f(x)

d. i. Sketch this function showing all important features. 4

$$f(x)=\sqrt{4-x^2}$$

ii. Hence find the domain and range.

e. Write expressions for given values of x, for $|3x+1|$ 2

f. i. For the function $y = |2x-4|$, sketch the graph showing all important features. 4

ii. On the same graph sketch the line $y=3$. Hence or otherwise solve $3 = |2x-4|$

g. Find the coordinates of the centre and the length of the radius for the circle 3

$$x^2+4x+y^2-6y-3=0$$