

**SPECIALIST MATHS**

**TRIAL** **EXAMINATION 1**

**SOLUTIONS**

**2019**

# Question 1 (3 marks)



**(1 mark)**

**(1 mark)**

Equation of tangent is



**(1 mark)**

**Question 2** (4 marks)

1. Draw a force diagram.



Let *N* be the reaction force of the lift floor on the trolley.

**(1 mark)**



**(1 mark)**

1. Draw a force diagram.



**(1 mark)**



**(1 mark)**

**Question 3** (4 marks)

1. 



**(1 mark)**

Another root is  (conjugate root theorem). **(1 mark)**

Because the third root must be real we can use the factor theorem.



so the third root is −1.

**(1 mark)**



**(1 mark)**

**Question 4** (3 marks)

Let *X* represent the mass, in grams, of mussels farmed in the bay.



For the sample,



**(1 mark)**

**(1 mark)**



**(1 mark)**

Note that we use the integer multiple of 2 for *z*, remembering that

**Question 5** (4 marks)







**(1 mark)**



**(1 mark)**

**(1 mark)**

Squaring both sides,



**(1 mark)**





**(1 mark)**

**Question 6** (4 marks)

 **(1 mark)**

**(1 mark) (1 mark)**



**(1 mark)**

**Question 7** (4 marks)



*x*-intercepts occur when 



*x*-intercept is 

*y*-intercepts occur when 



There are no *y*-intercepts.

Asymptotes are 







So there are no stationary points.



**(1 mark)** correct asymptotes

**(1 mark)** correct *x*-intercept

**(1 mark)** correct shape of middle branch

with no stationary point of inflection

**(1 mark)** correct shape of outer branches

**Question 8** (3 marks)

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**(1 mark)**

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**(1 mark)**

**(1 mark)**

**Question 9** (4 marks)



**(1 mark)**



**(1 mark)**



 **(1 mark)**

**(1 mark)**

**Question 10** (7 marks)

1. 



**(1 mark)**

**(1 mark)**

1. ****

Swap *x* and *y* for inverse.



**(1 mark)**

1. Do a quick sketch of .

*x*-intercept occurs when 





**(1 mark)**

*S* is the region shaded.



**(1 mark)**

**(1 mark)**

**(1 mark)**