

**SPECIALIST MATHS**

**TRIAL** **EXAMINATION 1**

**SOLUTIONS**

**2020**

**(Adjusted Study Design)**

# Question 1 (4 marks)



**(1 mark)**

1. The 4 kg mass will accelerate upwards. **(1 mark)**

Around the 5 kg mass Around the 4 kg mass

(motion downwards) (motion upwards)



**(1 mark)**



**(1 mark)**

**Question 2** (3 marks)



**(1 mark)**

**(1 mark)**

**(1 mark)**

**Question 3** (4 marks)

1. 



**(1 mark)**

**(1 mark)**

1. The coefficients of the terms on the left hand side of the equation are all real so using the conjugate root theorem, the others two solutions must be .

**(1 mark)**



**(1 mark)**

**Question 4** (3 marks)

The graph of  has horizontal asymptotes at , so the graph of  has horizontal asymptotes at .

The graph of  is obtained by translating the graph of  one unit to the right.

*y* – intercept occurs when 





**(1 mark)** - correct asymptotes

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

**(1 mark)** -correct shape

**Question 5** (4 marks)



**(1 mark)**

**(1 mark)**

Since ,





**(1 mark)**



Equating terms,



Double check with the constant terms .

**(1 mark)**

**Question 6** (4 marks)





Do a quick sketch.



**(1 mark)**







**(1 mark)**

**(1 mark)**

**(1 mark)**

**Question 7** (5 marks)

1.  is the angle between .

Also 



**(1 mark)**



**(1 mark)**

1. 



**(1 mark)**

1. area of trapezium





**(1 mark)**







 **(1 mark)**

**Question 8** (4 marks)

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**(1 mark)**

**(1 mark)**

**(1 mark)**

**(1 mark)**

**Question 9** (4 marks)



**(1 mark)** left side **(1 mark)** right side

At , we have



**(1 mark)**

**(1 mark)**

**Question 10** (5 marks)



1. Do a quick sketch, noting

that the graph passes through the origin

and 





**(1 mark)**

**(1 mark)**

1. ****



**(1 mark)**



**(1 mark)**

**(1 mark)**