

**SPECIALIST MATHS UNITS 3 & 4**

**TRIAL** **EXAMINATION 1**

**SOLUTIONS**

**2021**

# Question 1 (4 marks)

1. 

**(1 mark)**





**(1 mark)**

1. 

**(1 mark)**





**(1 mark)**

**Question 2** (2 marks)





Do a quick sketch.



**(1 mark)**

**(1 mark)**

**Question 3** (3 marks)

Since  are perpendicular,







**(1 mark)**



**(1 mark)**

**(1 mark)**

**Question 4** (4 marks)





**(1 mark)** – some attempt to use product rule

**(1 mark)** – correct line





**(1 mark)**





**(1 mark)**

**Question 5** (5 marks)

1. 









**(1 mark)**





 **(1 mark)**

1. 





**(1 mark)**

**(1 mark)**

**(1 mark)**

**Question 6** (6 marks)





Asymptotes occur at .

We are sketching a reciprocal quadratic

graph.

*y*-intercepts occur when 



*x*-intercepts occur when 



No solutions so no

*x*-intercepts.

**(1 mark)** – correct asymptotes

**(1 mark)** – correct turning point and *y*-intercept

**(1 mark)** – correct shape



has a minimum turning point at ,

then the graph of the reciprocal function

 will have a maximum

turning point at

ie at .

1.  (negative since area is below *x*-axis) **(1 mark)**







**(1 mark)**

**(1 mark)**

**Question 7** (3 marks)

Method 1



 **(1 mark)**

 **(1 mark)**

Given that ,





 **(1 mark)**

**Question 7** (cont’d)

Method 2



 **(1 mark)**

 **(1 mark)**

Given that ,





 **(1 mark)**

**Question 8** (3 marks)





Do a quick sketch, all we really need to know

is that there are *x*-intercepts at .

The region being rotated is shaded in the diagram.



**(1 mark)**

**(1 mark)**



**(1 mark)**

**Question 9** (5 marks)

1. For to be defined**,** we require  to be defined so



But .

**(1 mark)**

1. Maximum distance from *x*-axis occurs when - component is a maximum.

****

** (1 mark)**

****





**(1 mark)**

1. 

 **(1 mark)**

Magnitude of the initial acceleration is .

**(1 mark)**

**Question 10** (5 marks)

1. 





**(1 mark)**

**(1 mark)**

1. 



**(1 mark)**





**(1 mark)**



**(1 mark)**