

**MATHS METHODS 3 & 4**

**TRIAL** **EXAMINATION 1**

**SOLUTIONS**

**2020**

**(Adjusted Study Design)**

# Question 1 (3 marks)

1. 



**(1 mark)**

1. 



**(1 mark)**

**(1 mark)**

**Question 2** (4 marks)

1. 



**(1 mark)**

**(1 mark)**

1. 



**(1 mark)**

**(1 mark)**

**Question 3** (3 marks)

1. 





**(1 mark)**



**(1 mark)** – correct shape and endpoints

**(1 mark)** – correct intercepts

**Question 4** (2 marks)



**a.** Note that since the variance of *X*

is 9 then the standard deviation of

*X* is .

 **(1 mark)**

**b.** 



Because of the symmetry of the

Normal curve,



So  **(1 mark)**

**Question 5** (3 marks)



 **(1 mark)**



 **(1 mark)**





**(1 mark)**

**Question 6** (4 marks)

1. 

Let 

Swap *x* and *y* for inverse.



**(1 mark)**

**(1 mark)**

1. Do a quick sketch.



*P* is the point . *Q* is the point .



Min/max occurs when

 **(1 mark)**





**(1 mark)**

**Question 7** (3 marks)



Do a quick sketch.

The vertical asymptote is located at .

The horizontal asymptote is located at .

The *y*-intercept occurs when , so .

The *x*-intercept occurs when , so .

The shaded region shows the area required.

From the diagram,

 **(1 mark)**

 **(1 mark)**



**(1 mark)**

**Question 8** (5 marks)



1. The graph of *g* is an upright parabola with a

turning point at 

So .

**(1 mark)**

1. 

**(1 mark)**

* 1. 

 **(1 mark)**

* 1. Stationary point occurs when 

 

The stationary point occurs at .

**(1 mark)** – for *x*-coordinate

**(1 mark)** – for *y*-coordinate

**Question 9** (6 marks)

1. Point *B* is an *x* - intercept.

Let **



*B* is the point   **(1 mark)**

1. Method 1





 **(1 mark)**





**(1 mark)**

Method 2



 **(1 mark)**





**(1 mark)**

**c.** From part **b.**,



**(1 mark)**

**d.**  (using working from part **b.** Method 1)



**(1 mark)**

**(1 mark)**

**Question 10** (7 marks)

1.  **(1 mark)**



**(1 mark)**

1. *P* is the point 



**(1 mark)**



**(1 mark)**

Equation of tangent is



**(1 mark)**

1. 

Let 

The transformation *T* involves a dilation from the *x*-axis by a factor of *n.*

After a dilation by a factor of *n* from the *x*-axis, the rule is



**(1 mark)**

Using our working from part **b.**,



so point of tangency is 



Equation of tangent is



*x*-intercept occurs when 



**(1 mark)**

The coordinates of the *x*-intercept are .

If you have time, check that the *x*-intercept for the tangent found in part **b.** is also .