**2020**

**VCE**

**Mathematical Methods**

**Trial Examination 2**

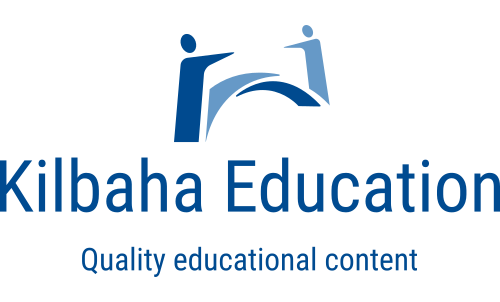
**Detailed Answers**



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**SECTION A**

**ANSWERS**

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **1** |  | **A** |  | **B** |  | **C** |  | **D** |  | **E** |
| **2** |  | **A** |  | **B** |  | **C** |  | **D** |  | **E** |
| **3** |  | **A** |  | **B** |  | **C** |  | **D** |  | **E** |
| **4** |  | **A** |  | **B** |  | **C** |  | **D** |  | **E** |
| **5** |  | **A** |  | **B** |  | **C** |  | **D** |  | **E** |
| **6** |  | **A** |  | **B** |  | **C** |  | **D** |  | **E** |
| **7** |  | **A** |  | **B** |  | **C** |  | **D** |  | **E** |
| **8** |  | **A** |  | **B** |  | **C** |  | **D** |  | **E** |
| **9** |  | **A** |  | **B** |  | **C** |  | **D** |  | **E** |
| **10** |  | **A** |  | **B** |  | **C** |  | **D** |  | **E** |
| **11** |  | **A** |  | **B** |  | **C** |  | **D** |  | **E** |
| **12** |  | **A** |  | **B** |  | **C** |  | **D** |  | **E** |
| **13** |  | **A** |  | **B** |  | **C** |  | **D** |  | **E** |
| **14** |  | **A** |  | **B** |  | **C** |  | **D** |  | **E** |
| **15** |  | **A** |  | **B** |  | **C** |  | **D** |  | **E** |
| **16** |  | **A** |  | **B** |  | **C** |  | **D** |  | **E** |
| **17** |  | **A** |  | **B** |  | **C** |  | **D** |  | **E** |
| **18** |  | **A** |  | **B** |  | **C** |  | **D** |  | **E** |
| **19** |  | **A** |  | **B** |  | **C** |  | **D** |  | **E** |
| **20** |  | **A** |  | **B** |  | **C** |  | **D** |  | **E** |

**SECTION A**

**Question 1 Answer E**

## The domain of is ,

## but for we require ,

## since , the domain of *f* is

## Question 2 Answer D



**A.** **B.** **C.** and **E.** are all true

## Question 3 Answer A

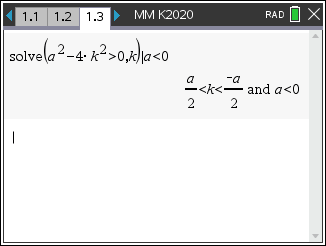
 reflect in the *y*-axis so replace  it becomes 

translate one unit to the right so replace  it becomes 

dilate by *a* away from the *y*-axis or parallel to the *x*-axis, so replace  , it becomes



## Question 4 Answer C



 , since 

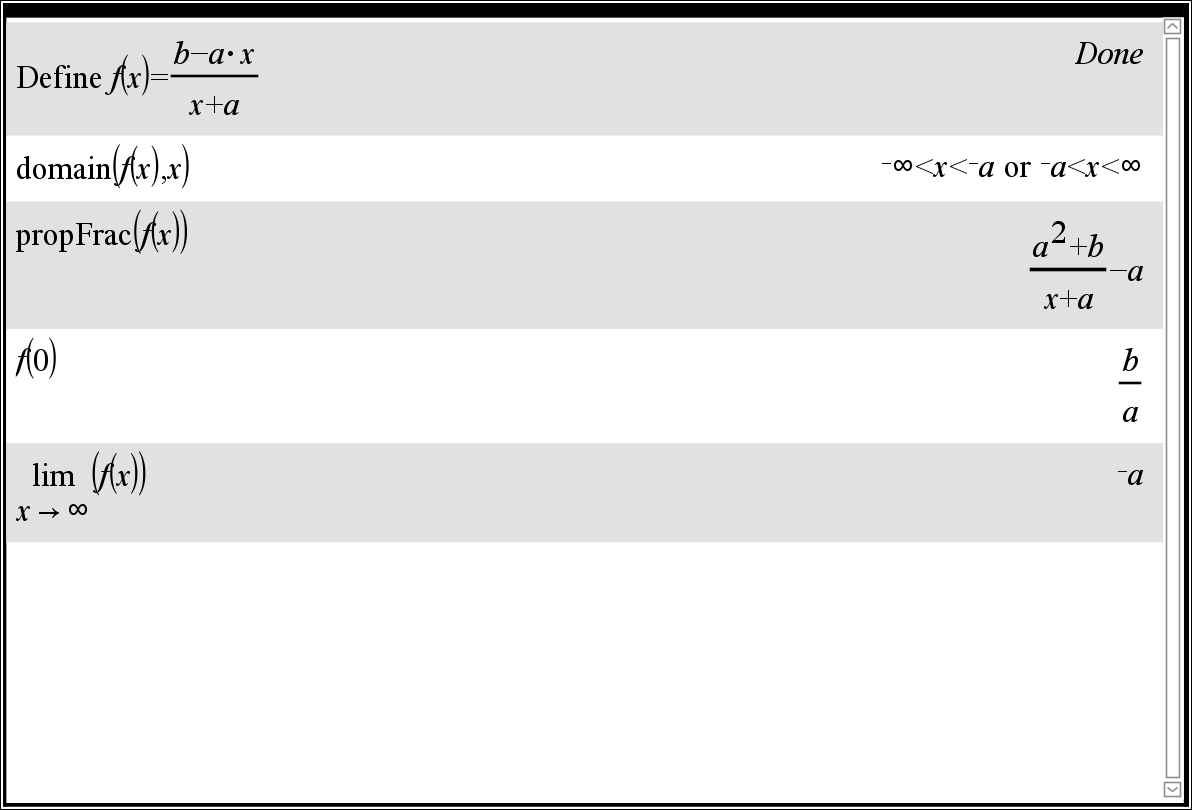
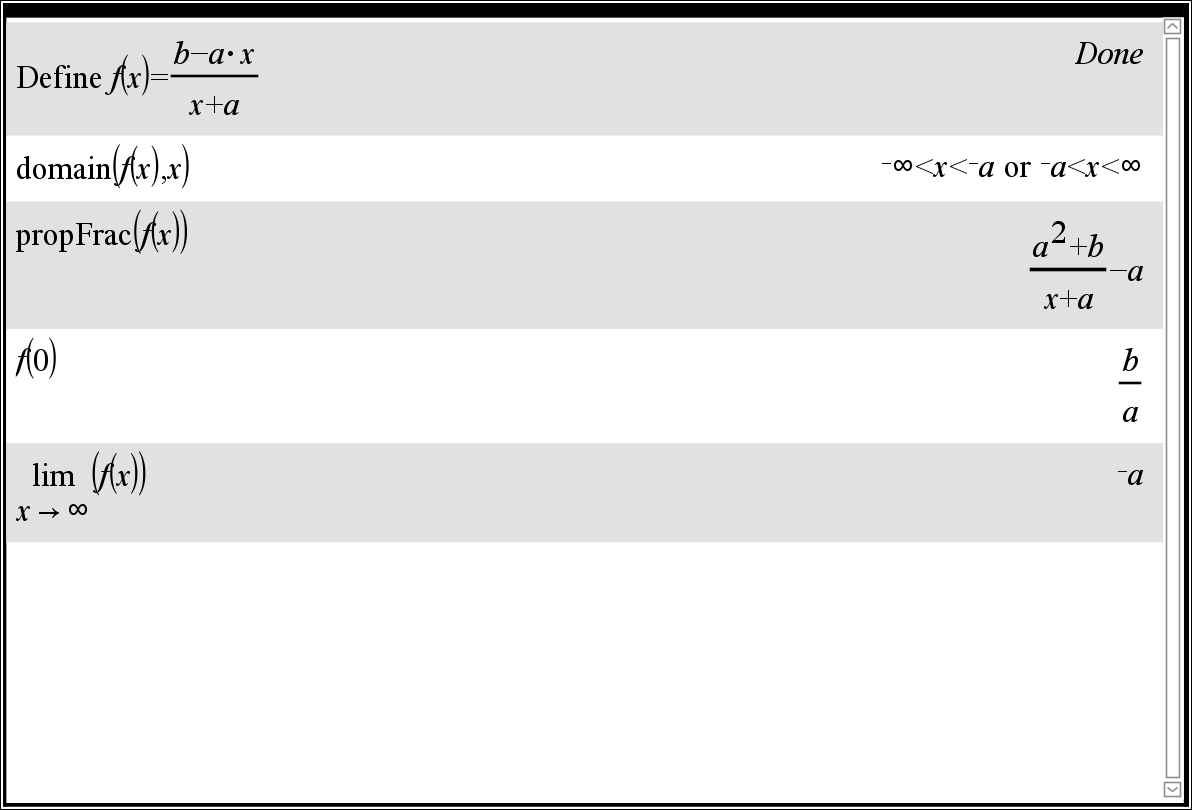
**Question 5 Answer C**



 since 



**Question 6 Answer E**



Allan stated that the maximal domain  and that the function has no turning points,

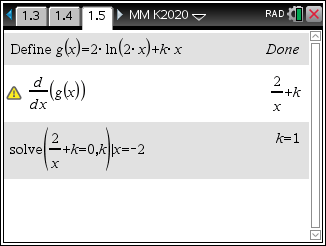
as it is a one-to-one function. Allan is correct.

Ben stated that the graph crosses the *x*-axis at  and the graph crosses the *y*-axis at . Ben is correct.

Colin stated that the graph has a vertical asymptote at  and a horizontal asymptote at.

Colin is correct.

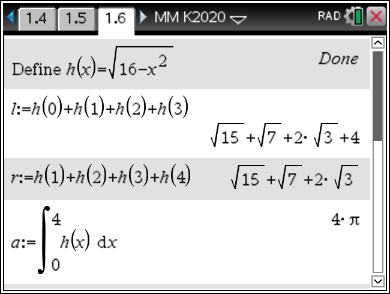
**Question 7 Answer B**

****

**Question 8 Answer B**



**Question 9 Answer C**

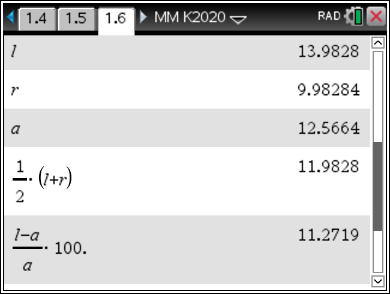






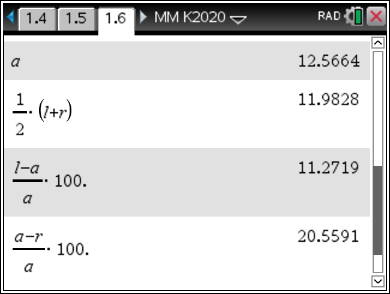




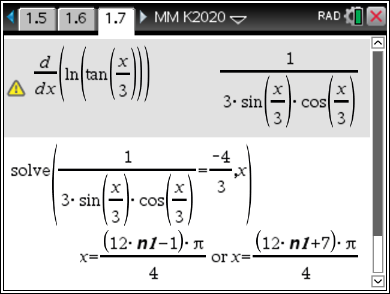
****

, **A.** is true

 , **D.** is true

**** , **E.** is true , **B.** is true

 , **C.** **is false**

**Question 10 Answer D**

**Question 11 Answer A**



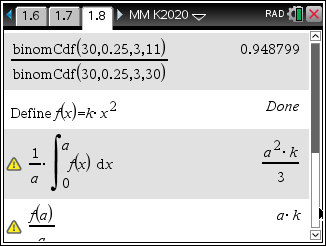
## Question 12 Answer A

Given  and , where ,





## Question 13 Answer B

40% of 30 is 12, 10% of 30 is 3, 



## Question 14 Answer C

 differentiating using product and chain rules



## Question 15 Answer E



**Question 16 Answer D**

 has period  and range 

## Question 17 Answer D



## Question 18 Answer B



**A.** 

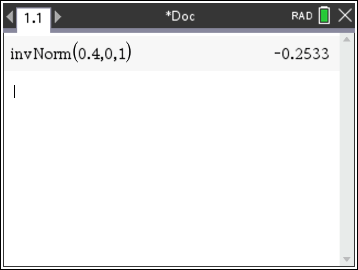
**B.**  **B.** is not satisfied

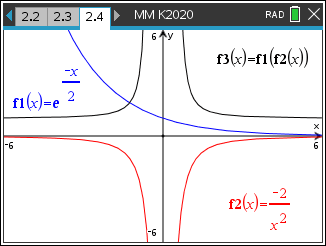
**C.** 

**D.** 

**E.** 

## Question 19 Answer A

The heights of the trees



## Question 20 Answer E

Let 



**END OF SECTION A SUGGESTED ANSWERS**

**SECTION B**

**Question 1**

**a.** 





 A1

……

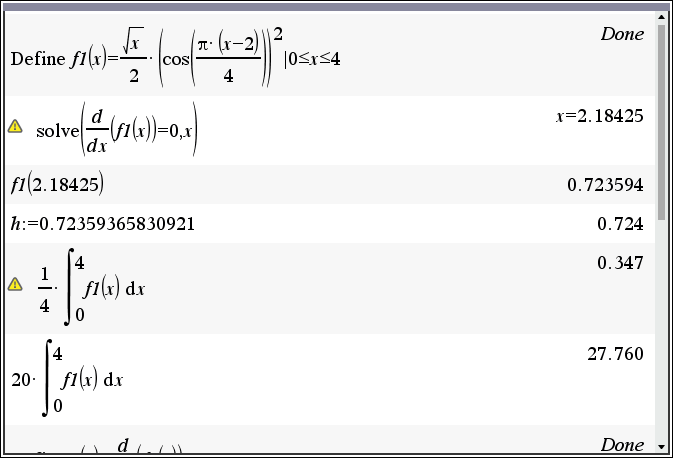


 A1

 A1

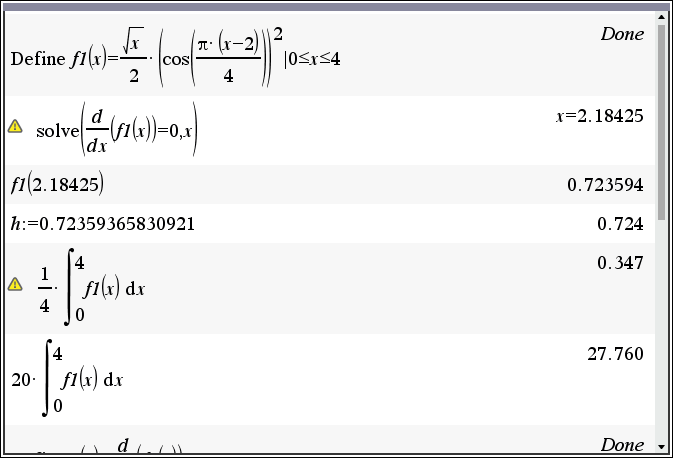
**b.** solving  gives  A1

 A1



**c.**  A1

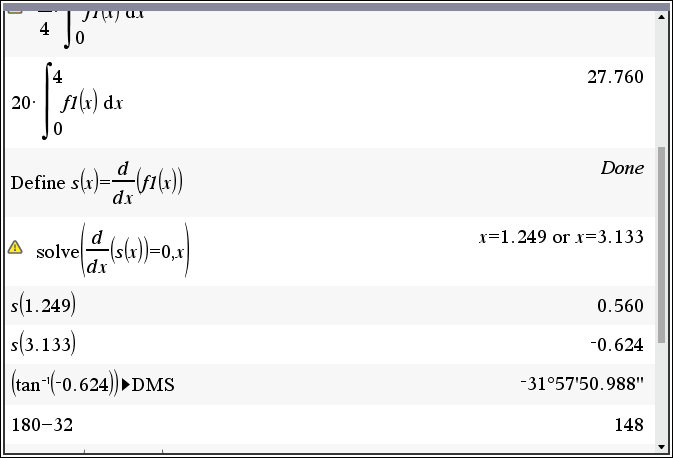
**d.**  A1

****

**e.** Let  solving  gives  A1

Now 

 A1



**f.** Solving  gives 

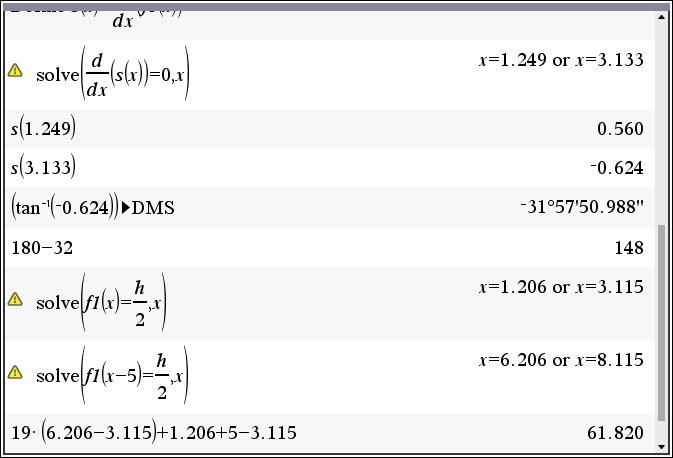
Solving  gives  M1

There are 19 beams of lengths  and

two end pieces the first of length 1.206, the last by symmetry has a length of 

Total length 

Alternatively  A1



**Question 2**

**a.** **** , , ****  , 

Tangent 

 A1

**b.** crosses the *x*-axis at  ,  M1

crosses the *y*-axis at  , 

coordinates  A1

**c.** area of larger triangle, ORS minus area of rectangle OMQN

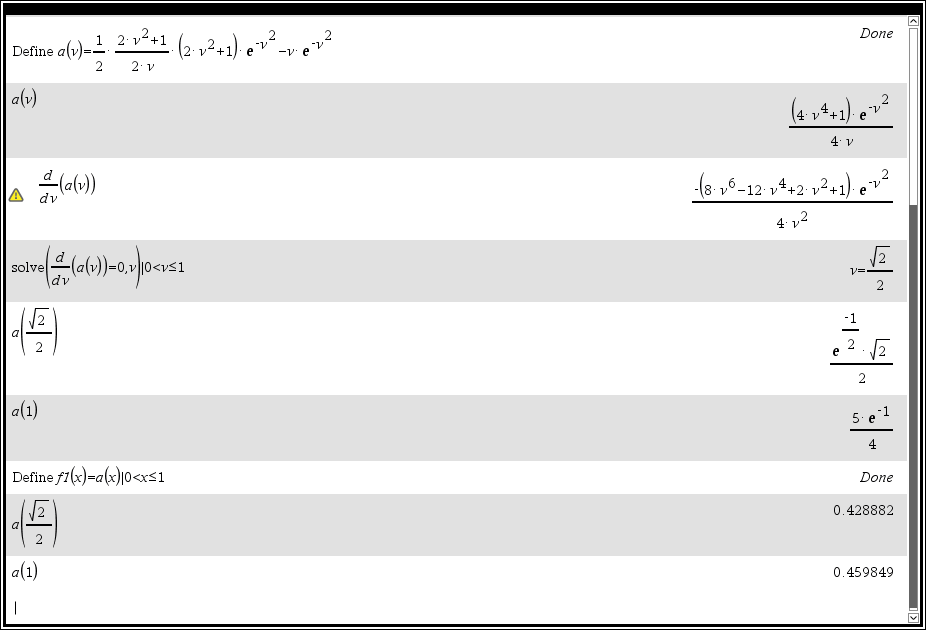
 M1

 and  M1

**d.** solving  with   M1

 A1 the minimum shaded region occurs  and is  A1





**Question 3**

**a.** 



 A1

**b.**  , 

 A1

**c.** 



 A1

 since also *P* lies on the circle A1

**d.** substitute  into 

 into 

 M1

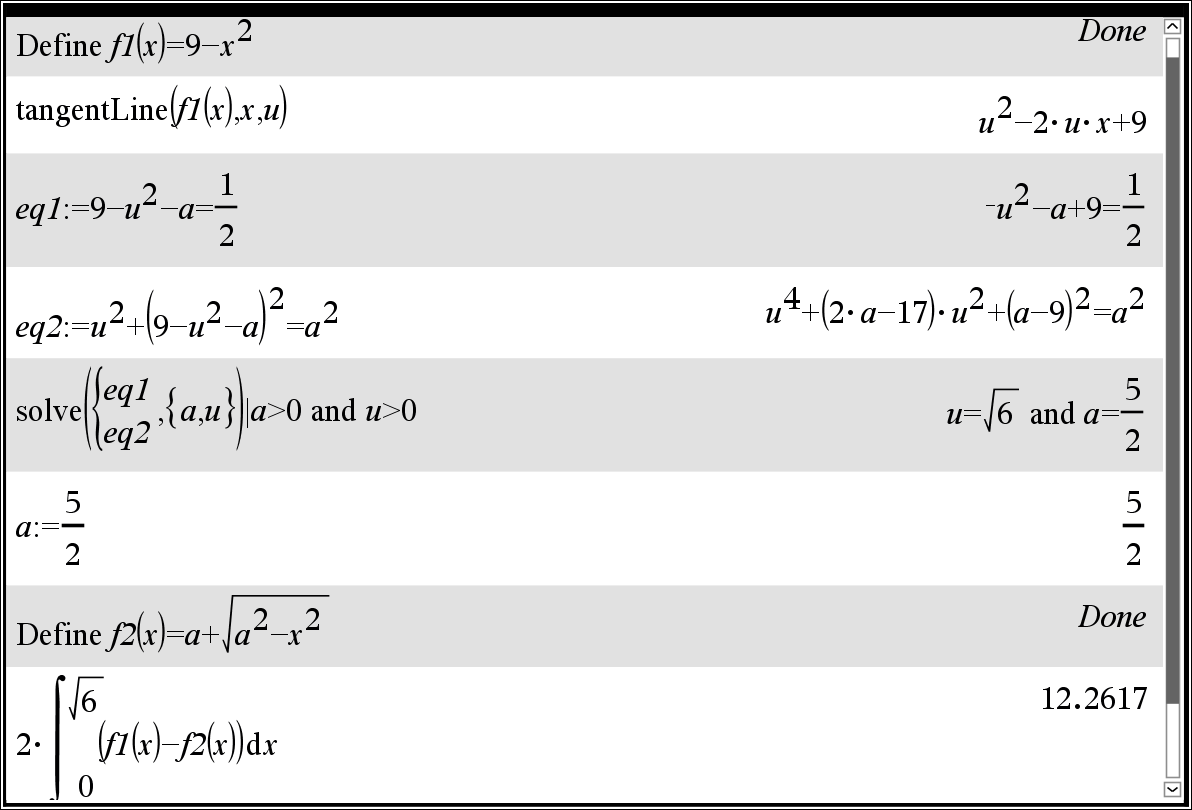
 but 

 A1

**e.i.** the circle  top half of the circle

 A1

**ii.**  A1

****

**f.**  , 

 , 

 A1

 since also *Q* lies on the circle

substitute  into 

 into 

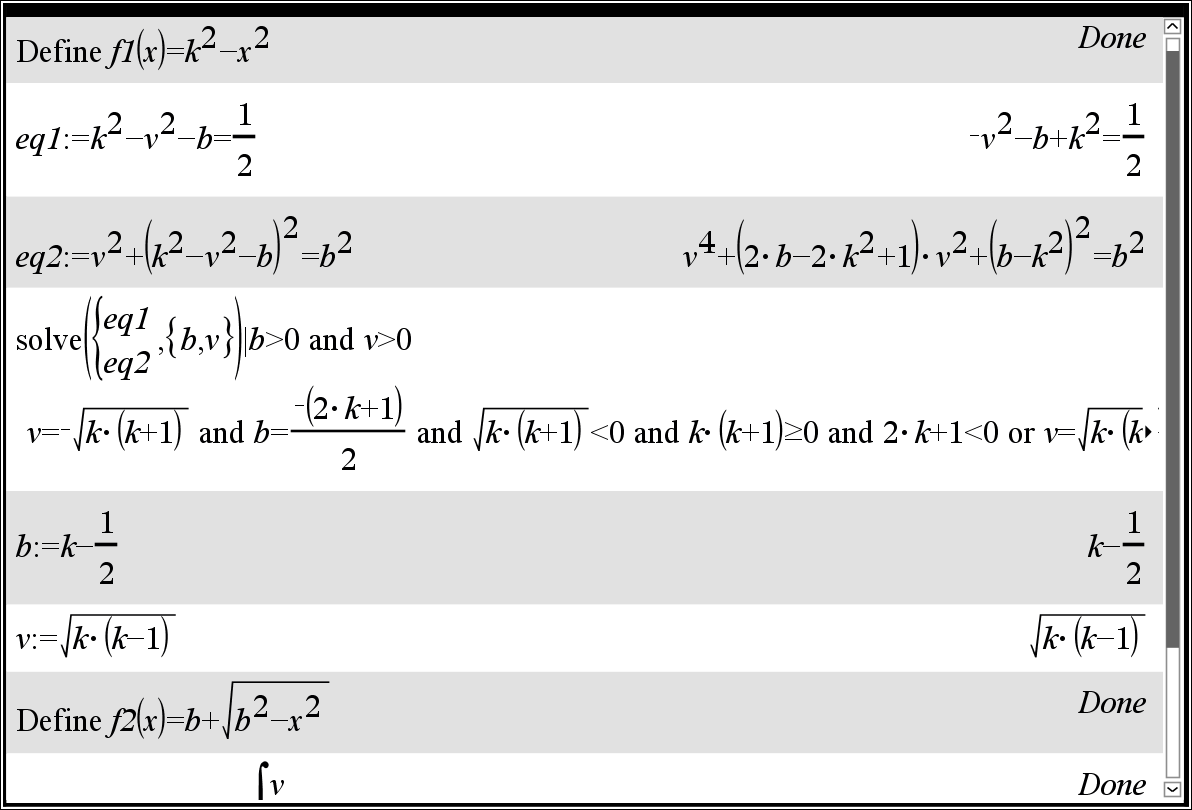
 M1

since  ,  A1

the circle 

**g.i.**  A1

**ii.** when  A1

****

**Question 4**

**a.i.** *W***,** weights of basketballs 

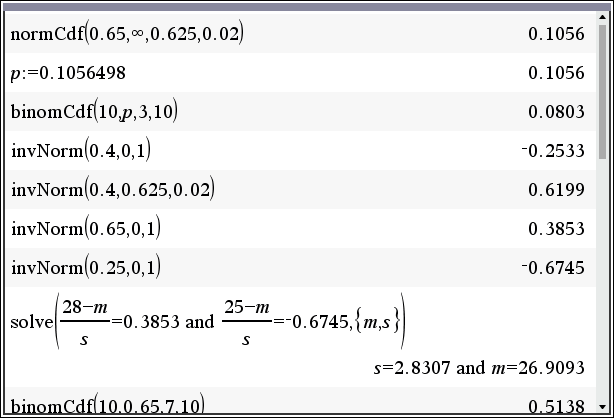
 A1

**ii.** *X*, boxes of 10 basketballs 

 A1

**iii.** 

 A1

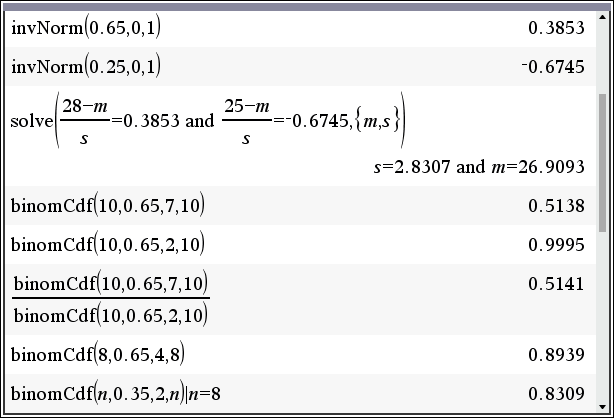


**b.** *B*, the distance Betty throws a basketball, 

 M1

 A1

solving  A1



**c.** **i.** *C*, Colin shooting for a basket 

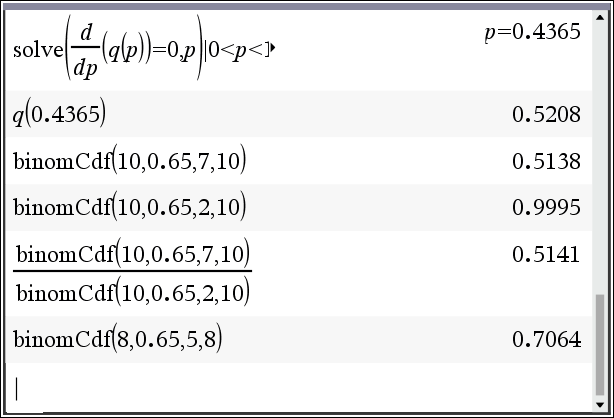
 M1

 A1

**ii.** the first two are baskets, we require more than 4 from the remaining 8

 M1

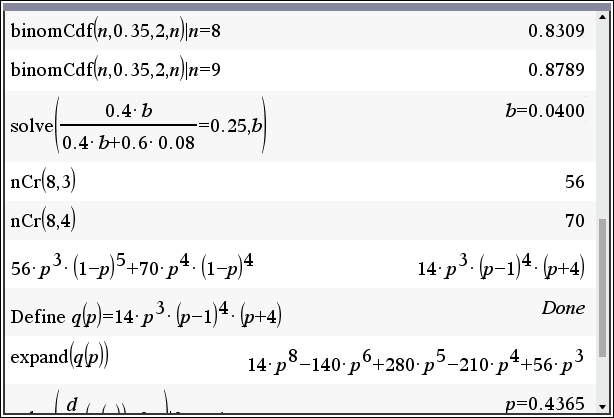
 A1

****

**d.** *D*, Dan shooting for a basket 



 A1



**e.** *A*, from machine *A*, *B*, from machine *B*, *D* defective basketball





B

A

*D*



*D*

0.6

0.4

0.08

0.92

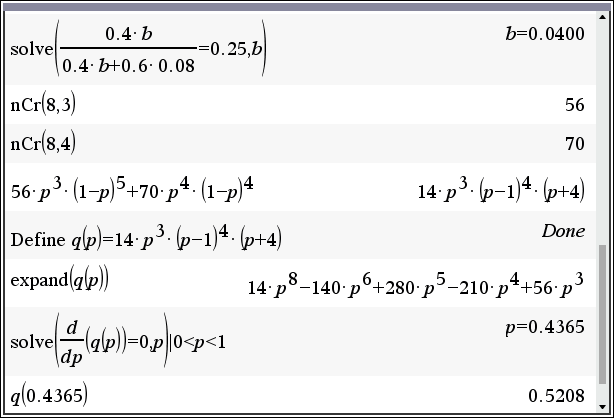
*b*

M1

 A1

solving 

4% are defective from B. A1

****

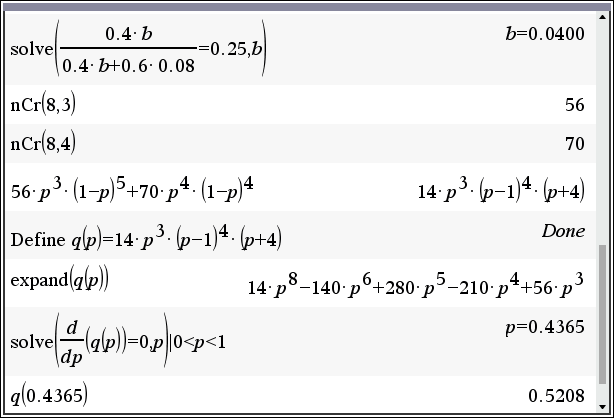
**f.i.** *F*, Fred shooting for a basket 

 M1

 A1

**ii.** since , solving  A1

 A1

****

**Question 5**

**a.** 

 M1

 A1

**b.** 

 M1

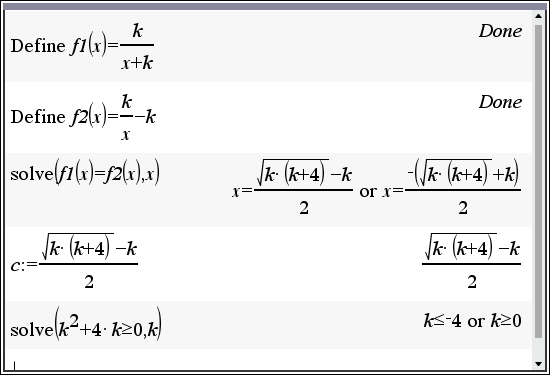
 A1

**c.**   or 

or  all give , solving M1

 both  are acceptable A1

since  ,  A1

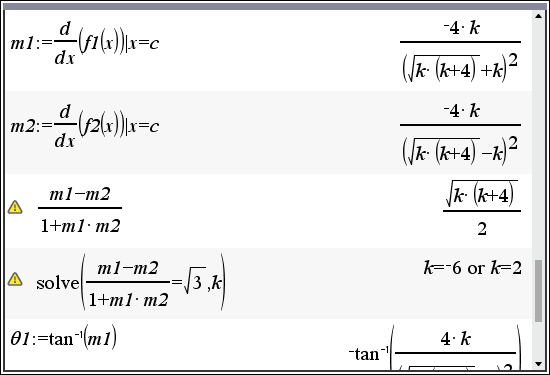


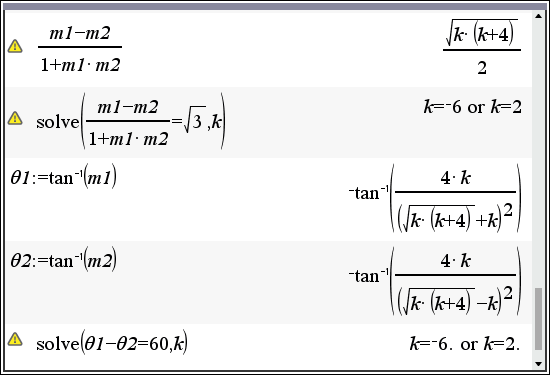
**d.** 

 M1

solving  A1

gives  both answers are acceptable. A1





**END OF SECTION B SUGGESTED ANSWERS**

##### End of detailed answers for the

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