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**SEMESTER ONE**

**MATHEMATICS**

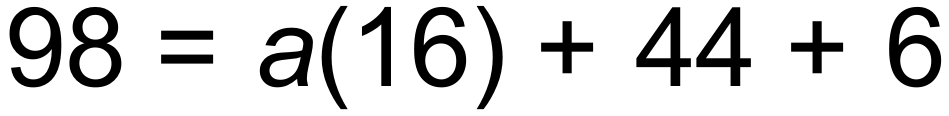
**METHODS**

**UNITS 1**

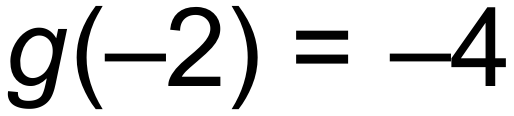
**2018**

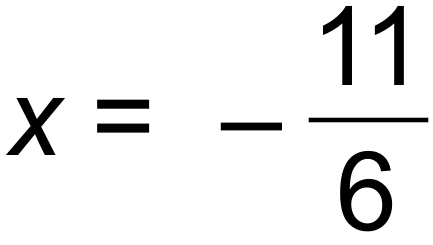
**SOLUTIONS**

***Calculator−free Solutions***

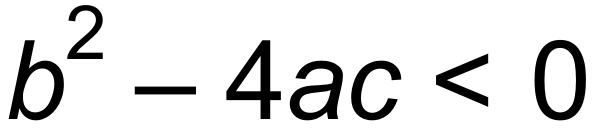
1. (a) (i) 

 ✓

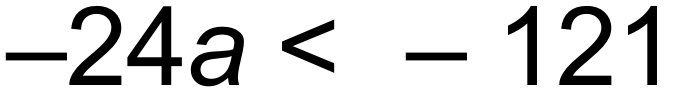
 ✓

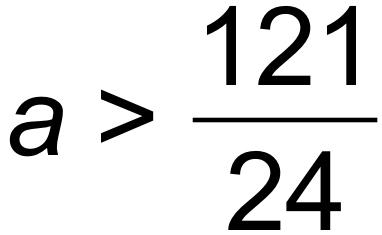
(ii)  ✓

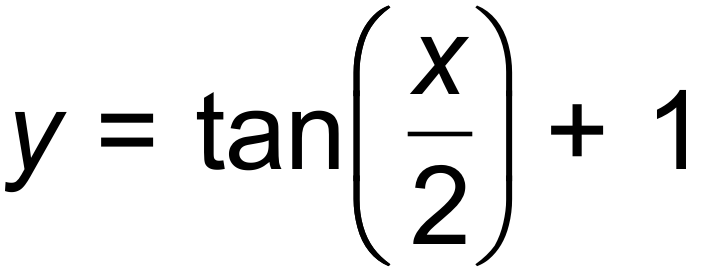
(iii) Minimum ✓

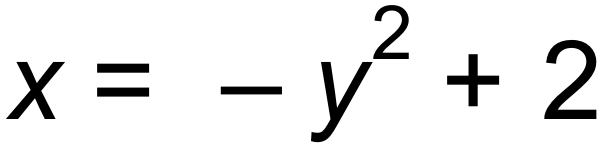
(b) 

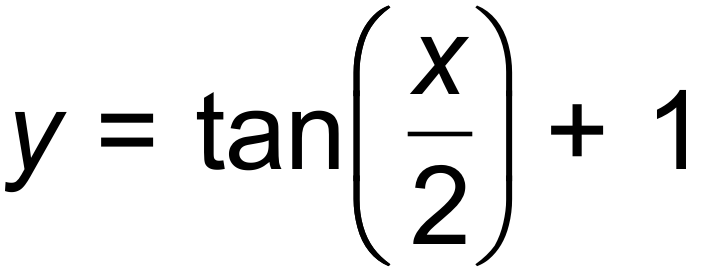
 ✓

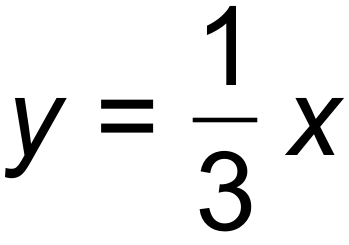


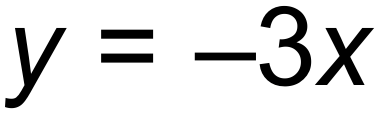
 ✓ [6]

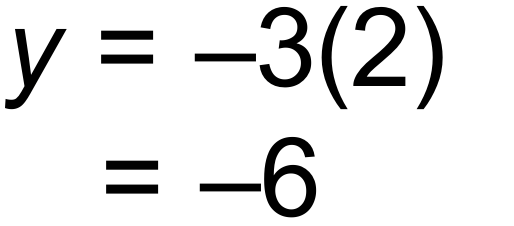
2. (a) (i)  ✓✓

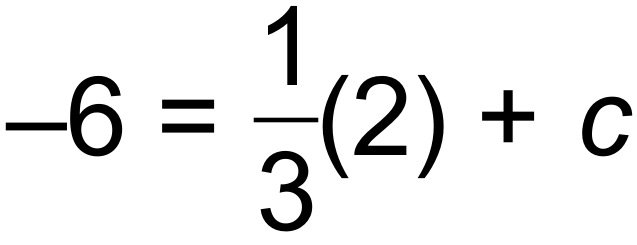
(ii)  ✓✓

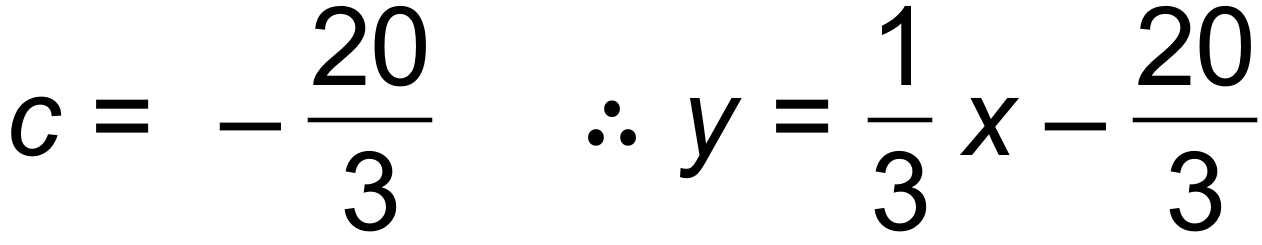
(b)  is a function. For each value of *x* there is only one corresponding *y* value. (If a vertical line is drawn anywhere on this function it will only intersect the graph a maximum of once.) ✓✓ [6]

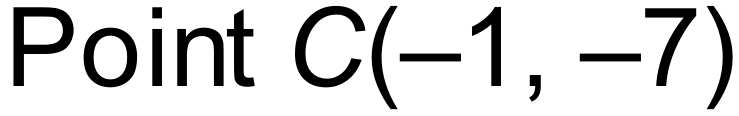
3. (a) Line *A:* 

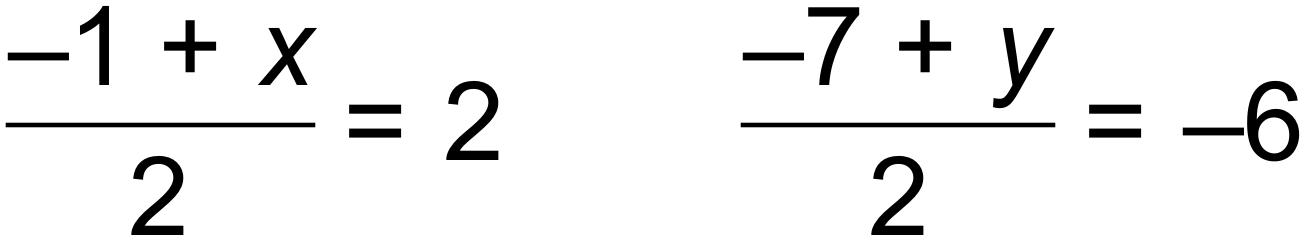
Line *B:*  ✓

 ✓

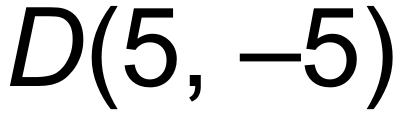
(b) Line CD: 

 ✓

 ✓

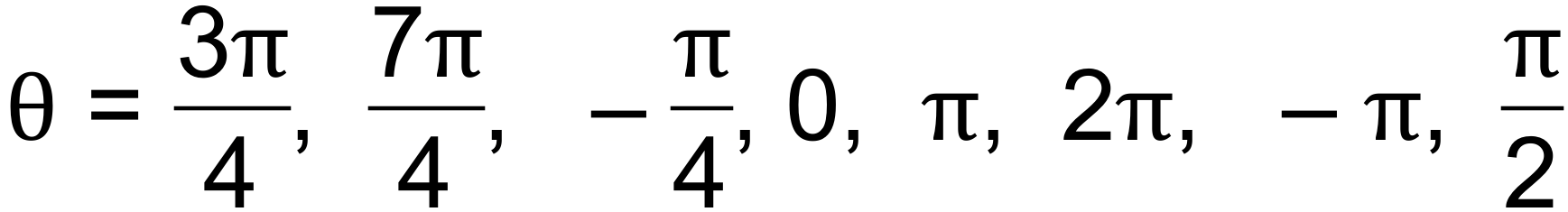
 ✓

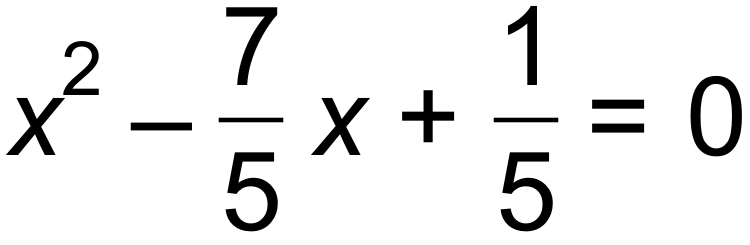


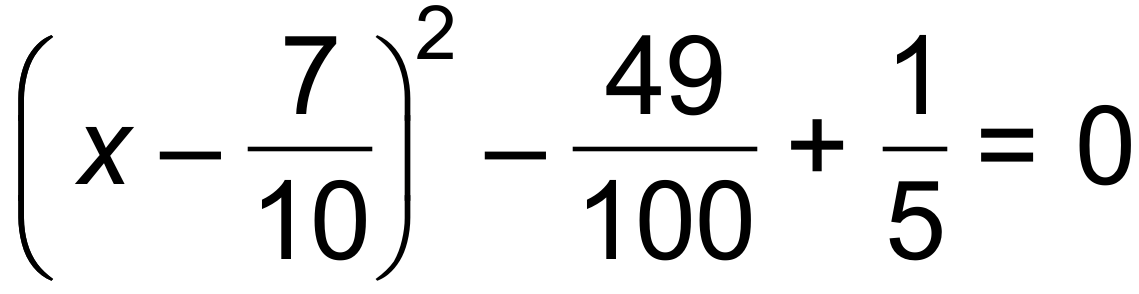
 ✓ [6]

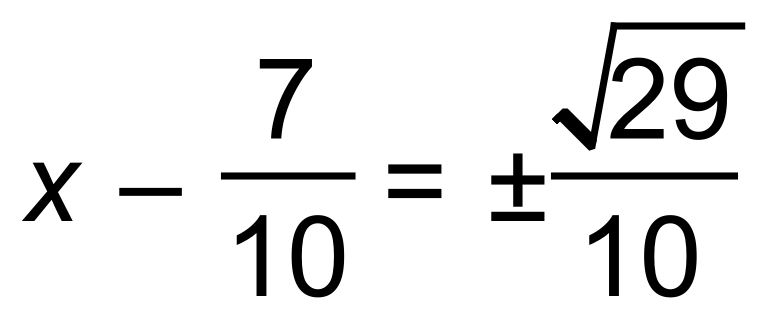
4. (a)  ✓

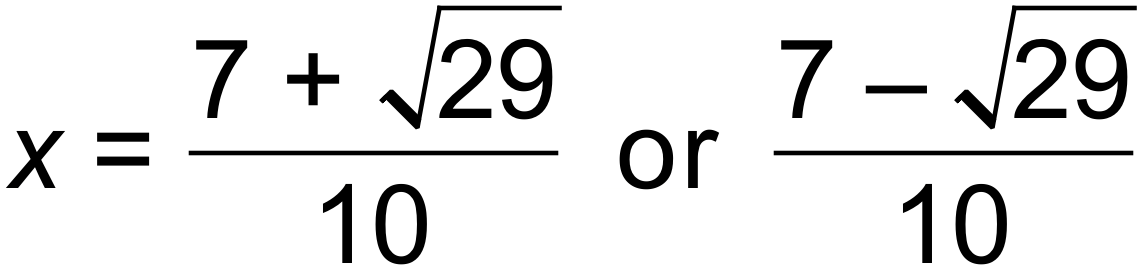
(b)  ✓

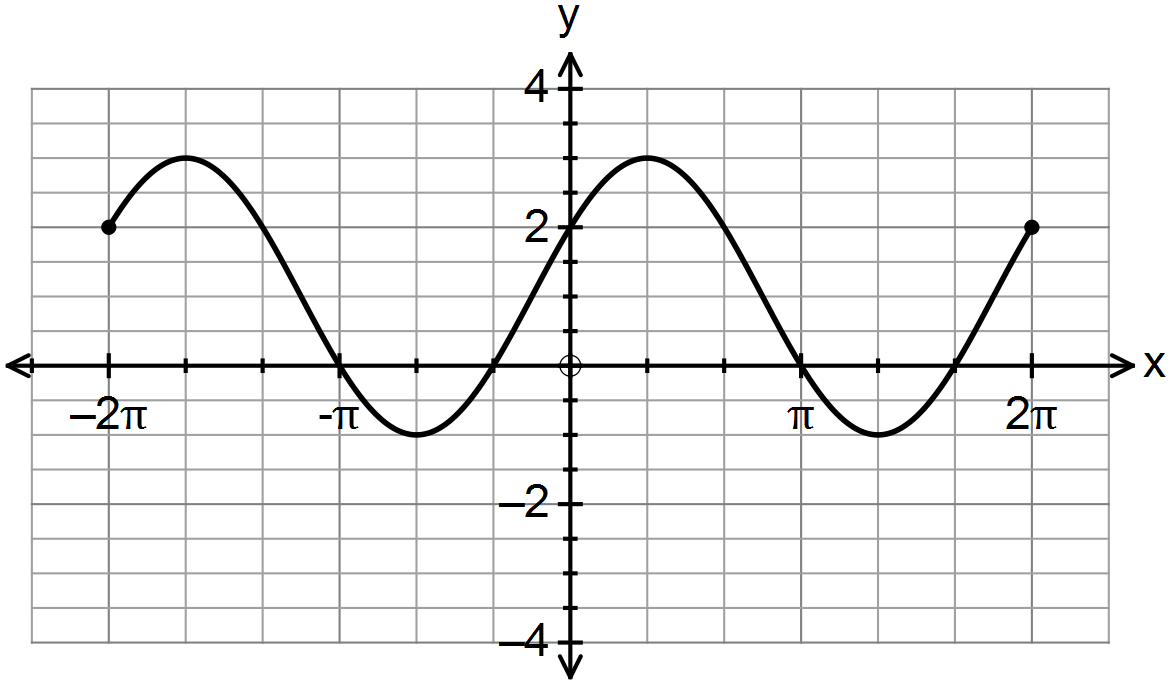
** ✓✓ [4]

5. 

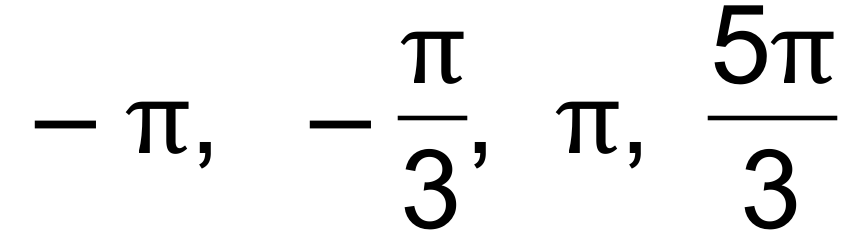
 ✓

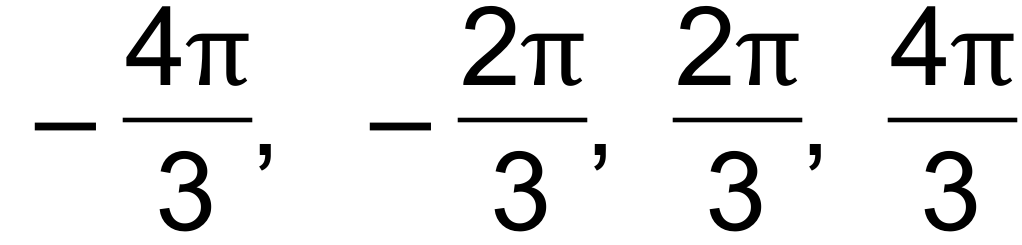
 ✓

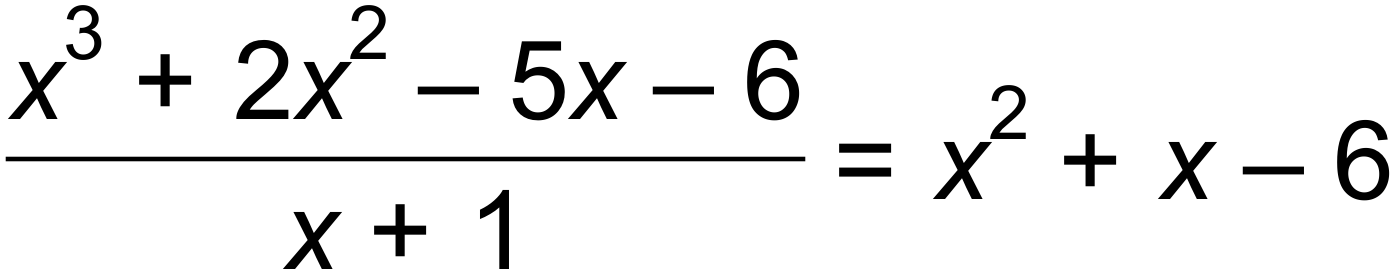
 ✓ [3]

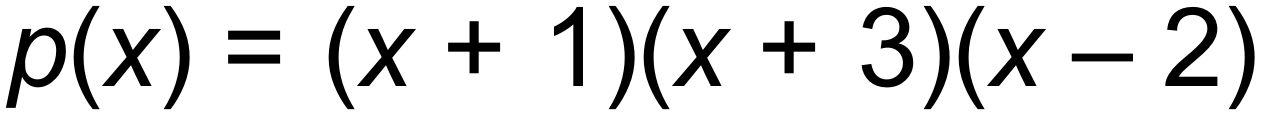
6. (a)

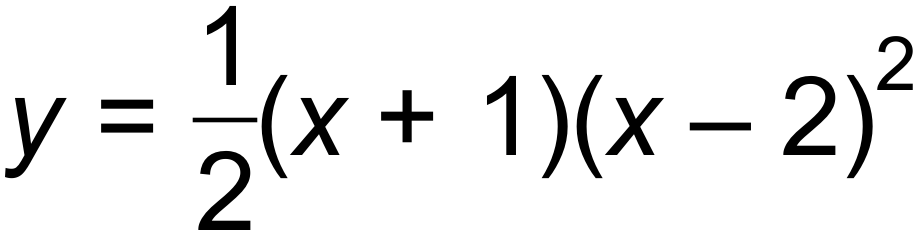
✓✓✓

(b) (i)  ✓✓

(ii)  ✓✓ [7]

7. (a)  ✓

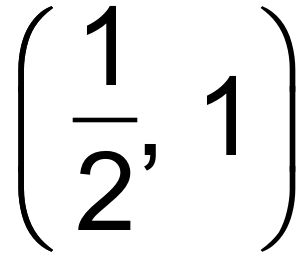
 ✓✓

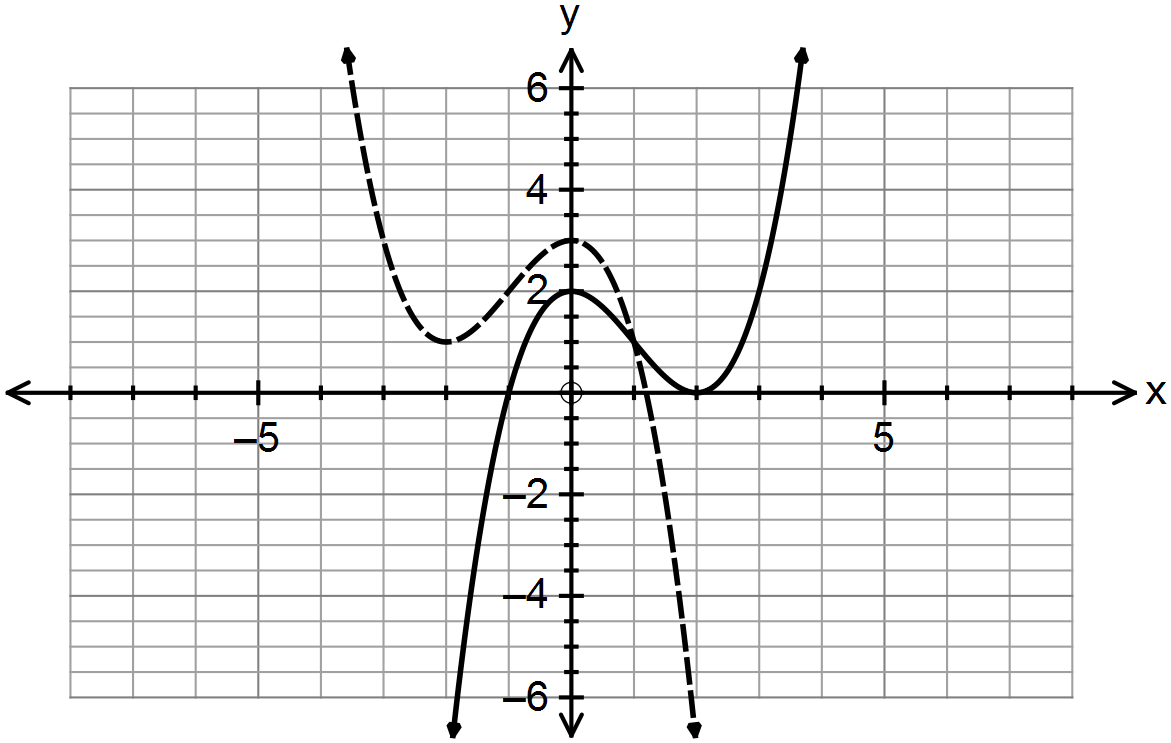
(b) (i)  ✓✓

(ii) Vertical dilation, factor . ✓

Horizontal translation one unit to the right ✓

Horizontal dilation, factor . ✓

(ii)  ✓

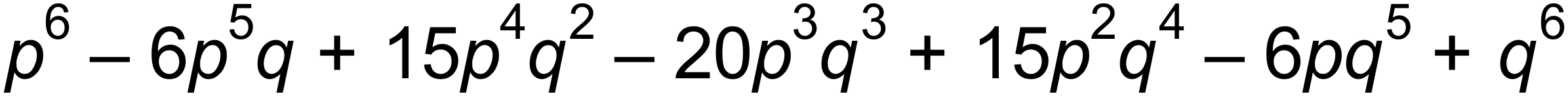
 (iii)

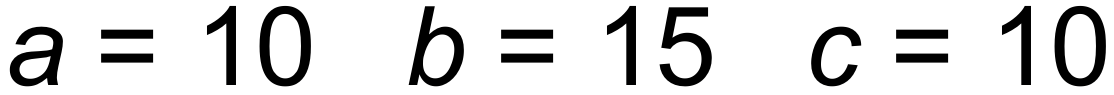
✓✓ [11]

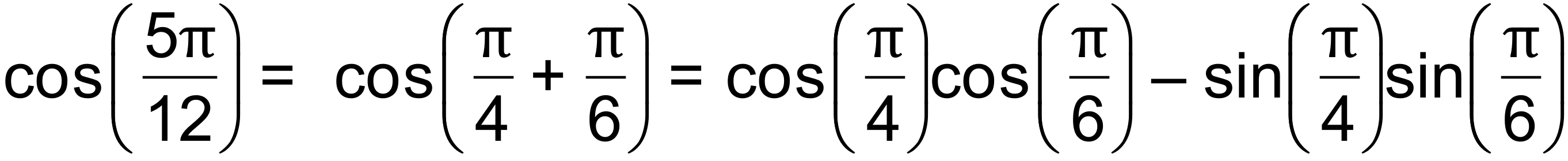
|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| 5 | 1 | 5 | 10 | 10 | 5 | 1 |  |
| 6 | 1 | 6 | 15 | 20 | 15 | 6 | 1 |

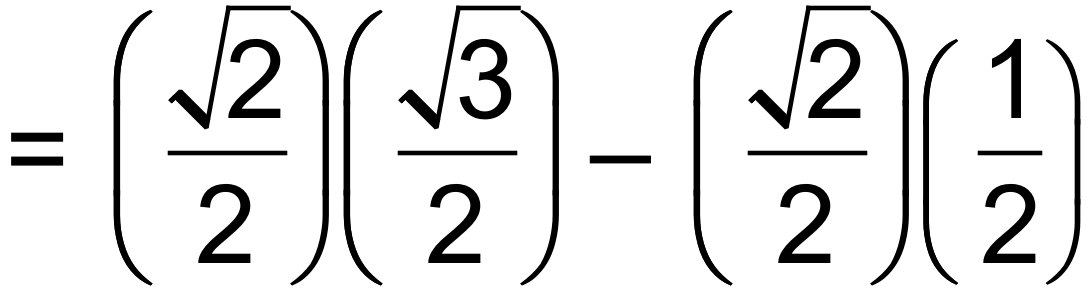
8. (a) (i)

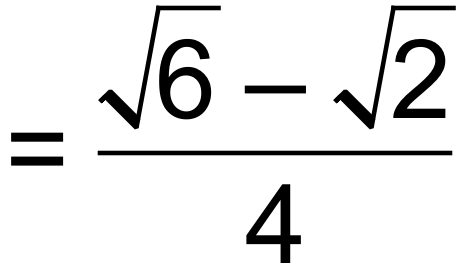
✓✓

(ii)  ✓✓

(b)  ✓✓ [6]

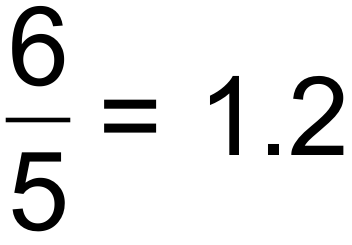
9.  ✓

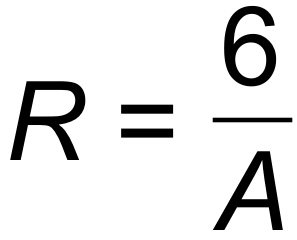
 ✓

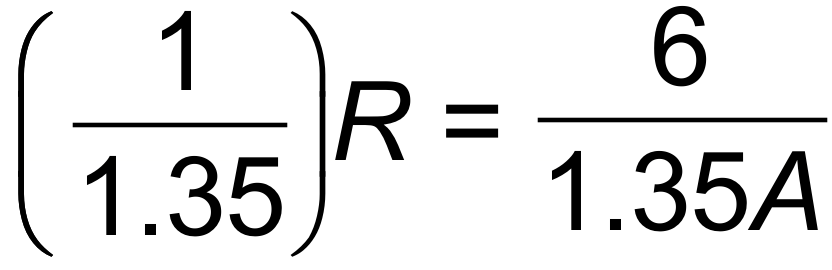
 ✓ [3]

***Calculator−assumed Solutions***

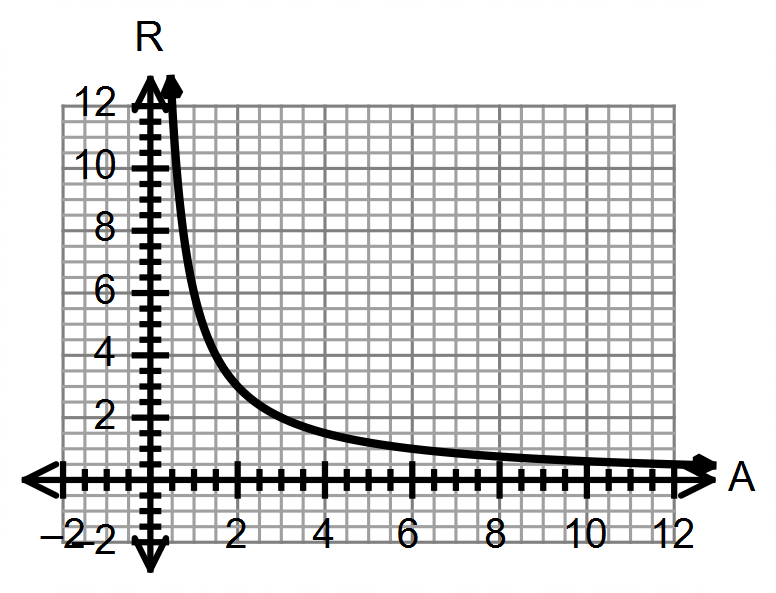
10. (a)  ✓

(b) *R* =  ohms ✓

(c) 

 ✓

R will decrease by 74% ✓

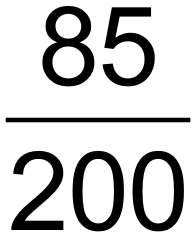
(d)

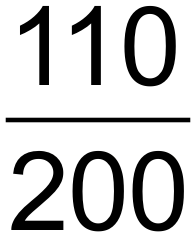
✓✓✓ [7]

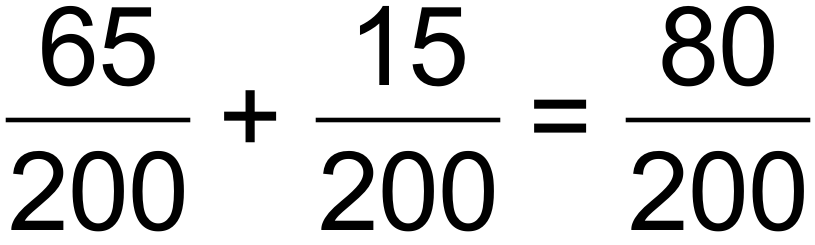
11. (a)

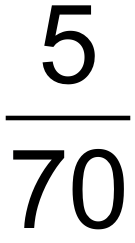
|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  |  | Number of toilets | | |  |
|  |  | **1** | **2** | **3 or more** | **Total** |
| Number of  bedrooms | **1** | 35 | **0** | **0** | 35 |
| **2** | **50** | 5 | 0 | 55 |
| **3** | 5 | 65 | **15** | **85** |
| **4 or more** | 0 | 0 | **25** | 25 |
| **Total** |  | **90** | **70** | **40** | **200** |

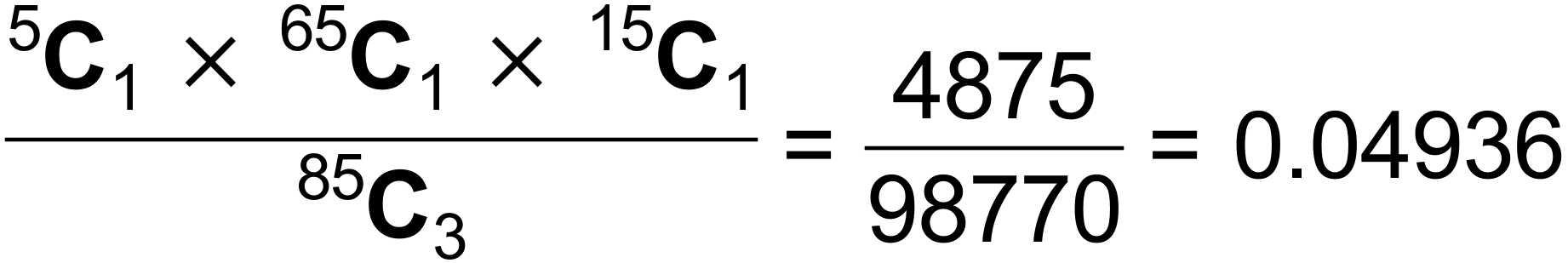
✓✓

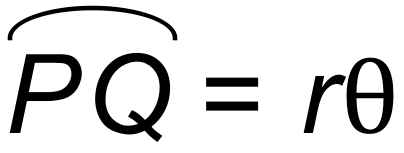
(b) (i)  ✓

(ii)  ✓

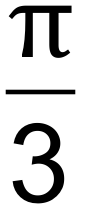
(iii)  ✓✓

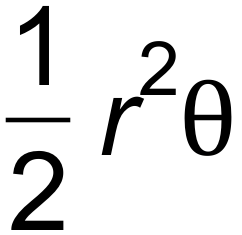
(iv)  ✓✓

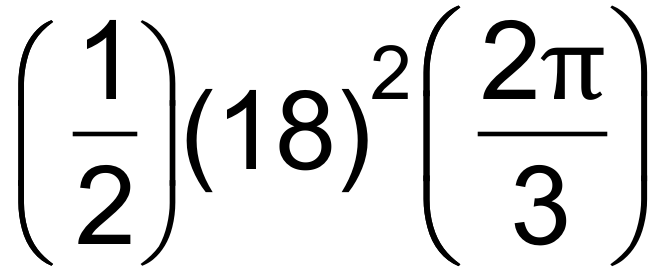
(c)  ✓✓ [10]

12. (a) 

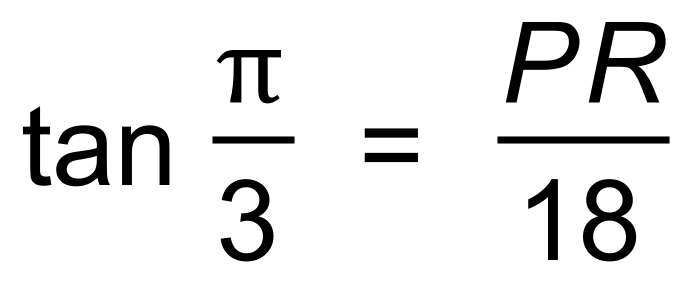
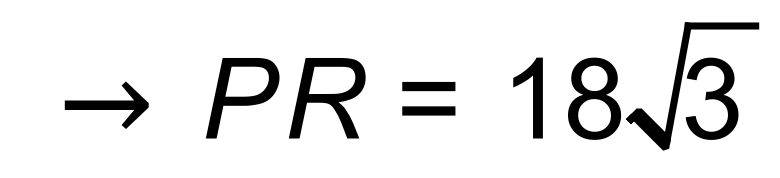
 ✓✓

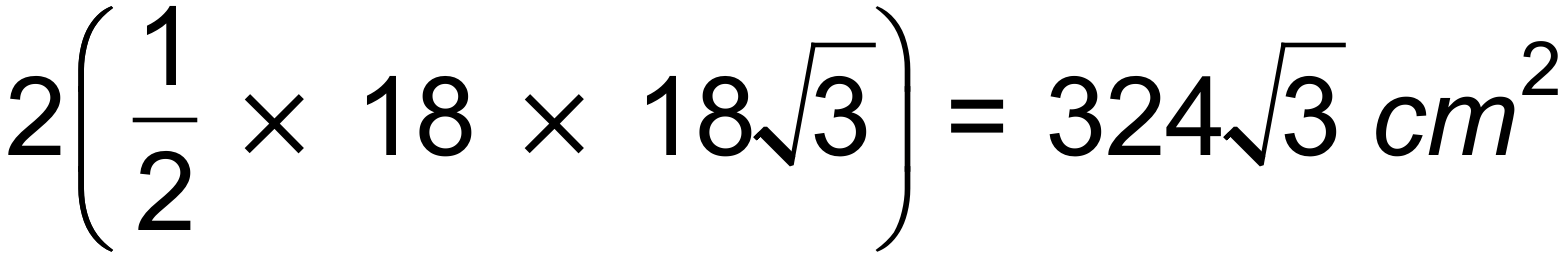
(b)  ✓

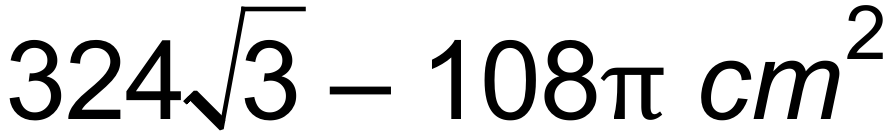
(c) Area of sector = 

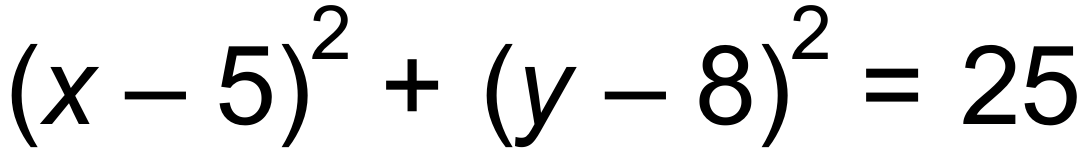
= 

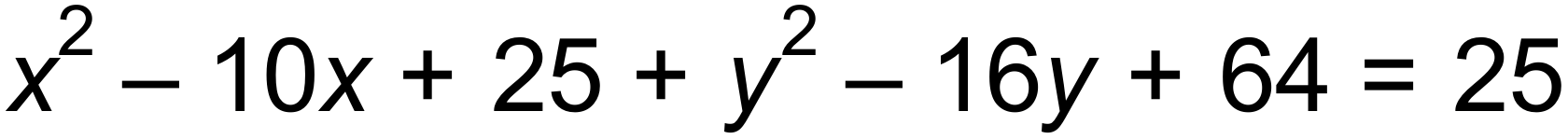
=  ✓

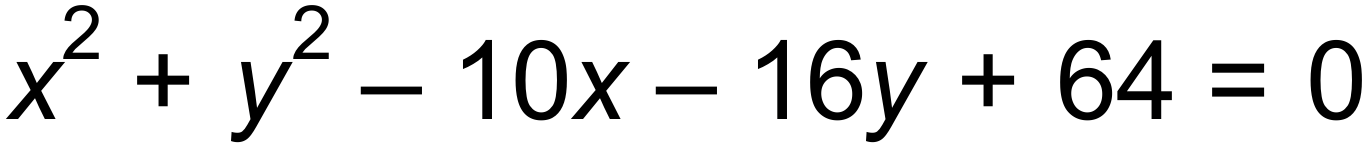
  ✓

Area of kite =  ✓

Area of shaded area =  ✓ [7]

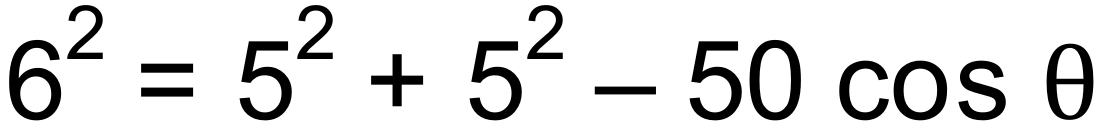
13. (a)  ✓

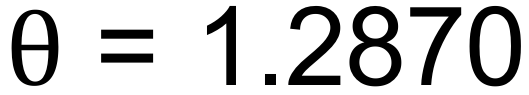
 ✓

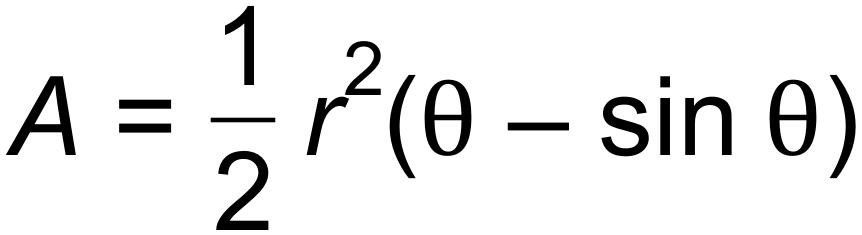


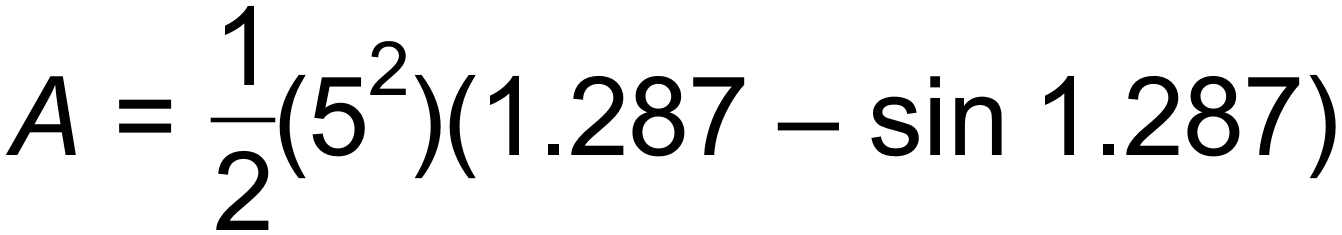
(b) (i) M(2, 4) N(8, 4) ✓

MN = 6 units ✓

(ii) 

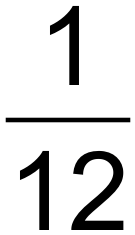
 ✓

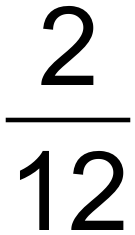


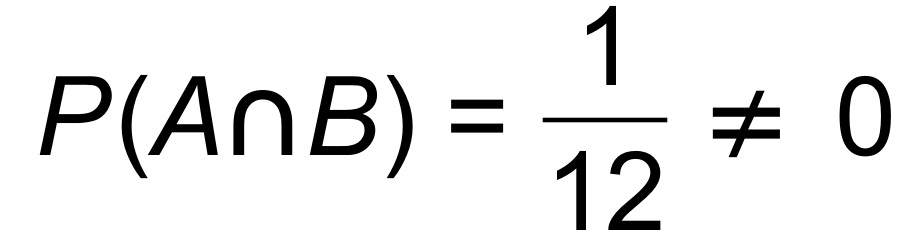
 ✓

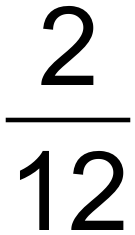
 units2 ✓ [7]

14. (a) (i)  ✓

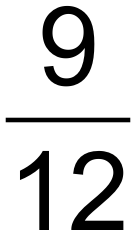
(ii)  ✓

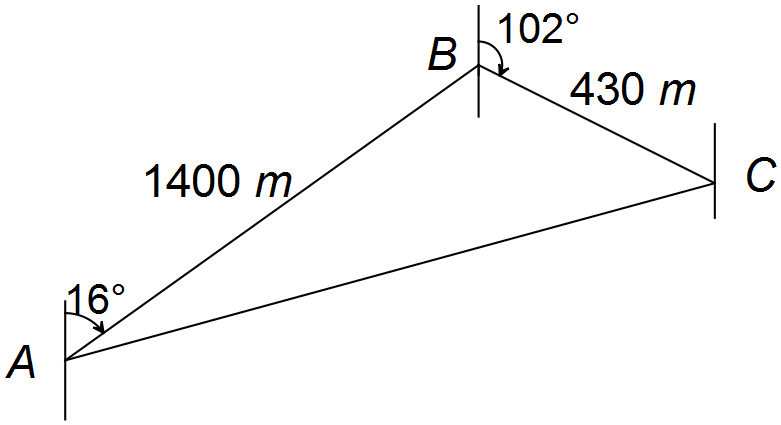
(iii)  ✓

(b)  ✓

(c) (i)  ✓

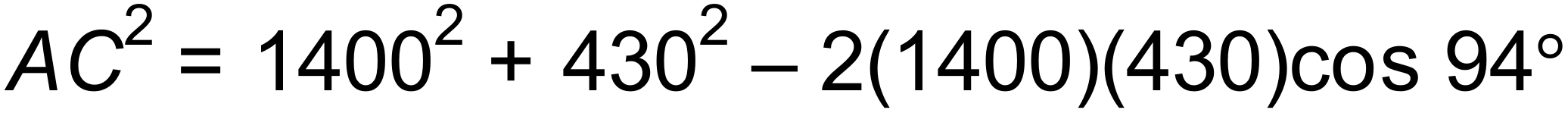
(ii)  ✓

(iii)  ✓ [7]

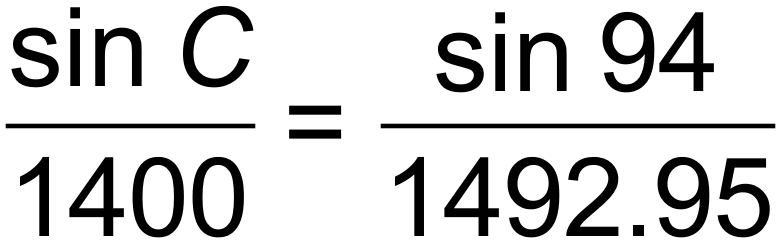


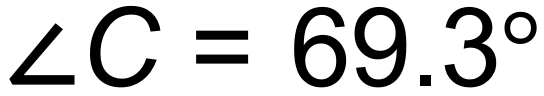
15. (a)

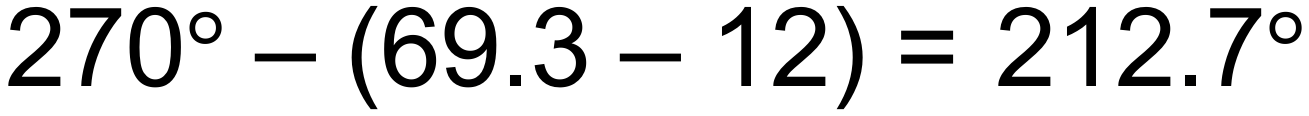
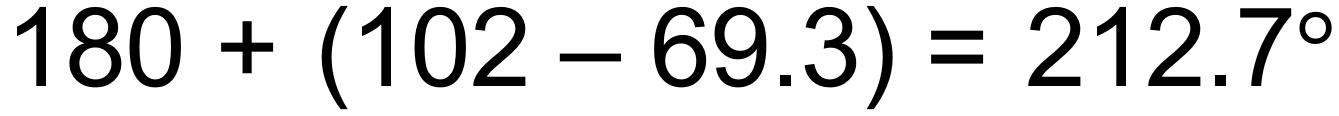
 ✓

 ✓

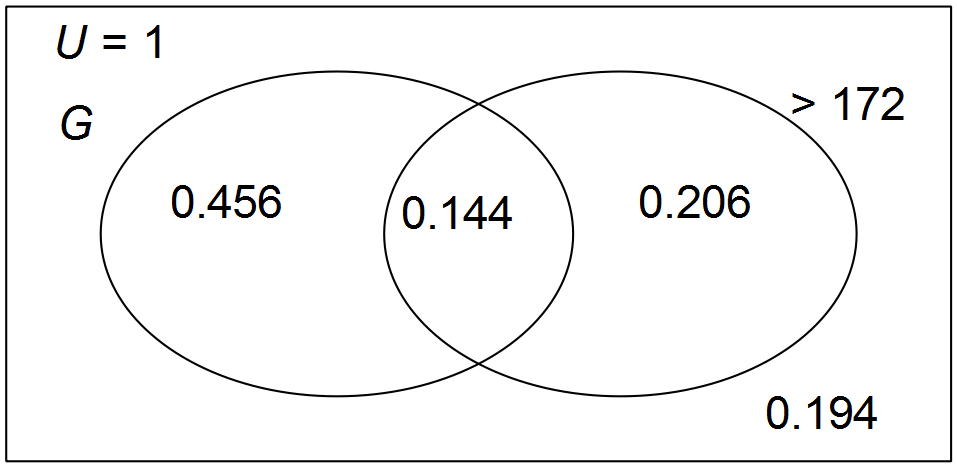
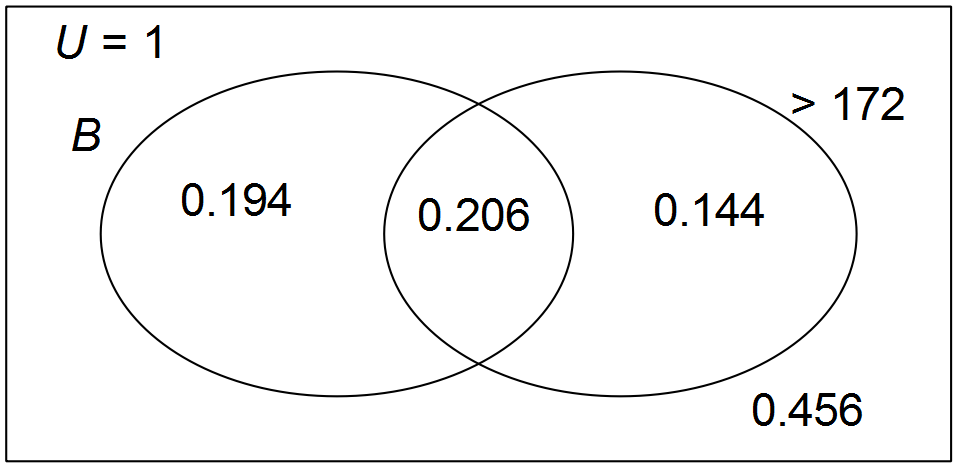
 ✓

(b)  ✓

 ✓

 or 

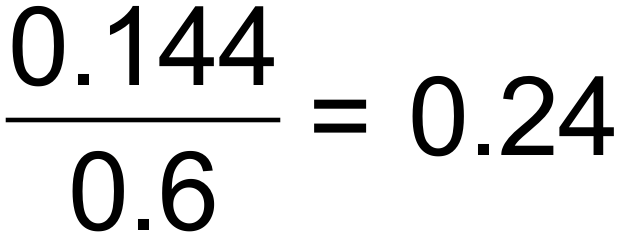
Bearing is 212.7°T ✓ [6]

16. (a) 

✓✓✓

(b) (i) 0.144 ✓

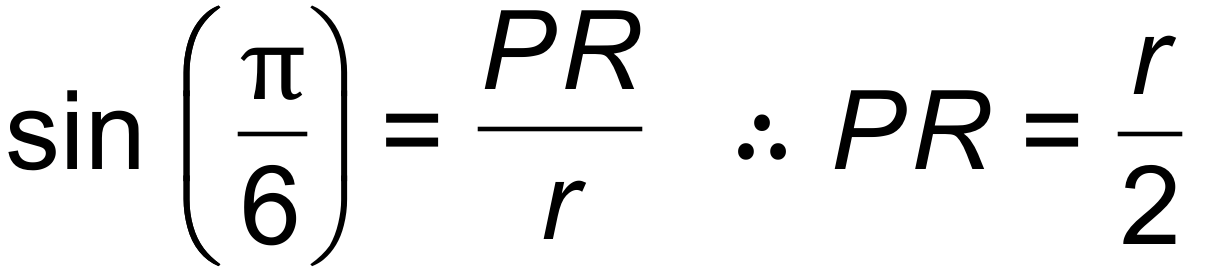
(ii) 0.194 ✓

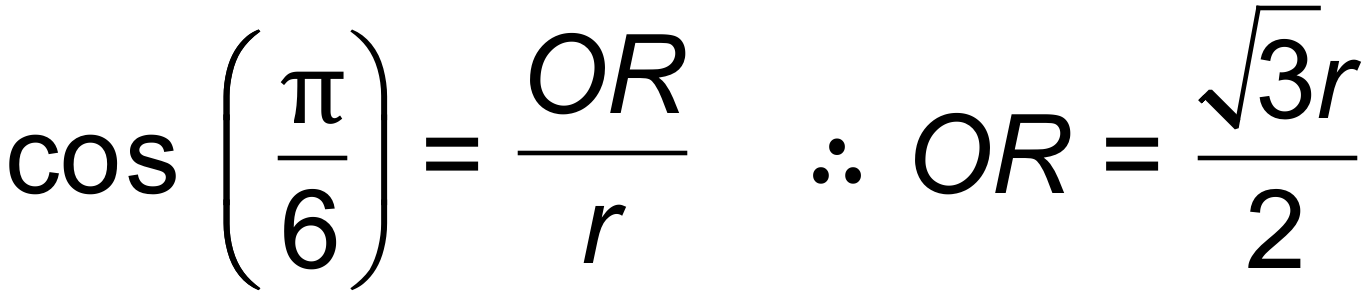
(iii)  ✓✓

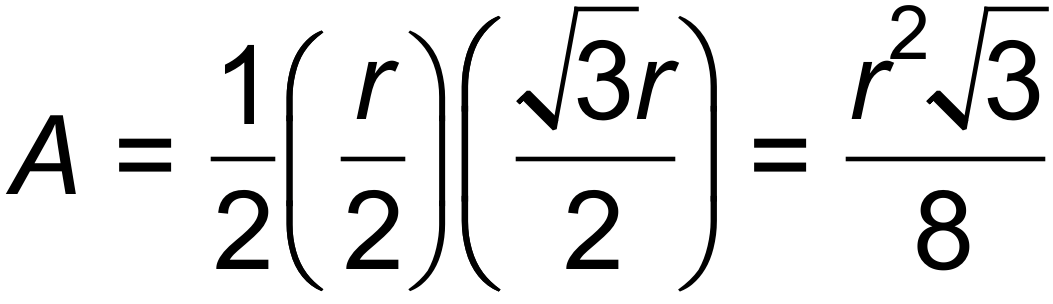
(c) Girls over 172 cm = 38 ✓

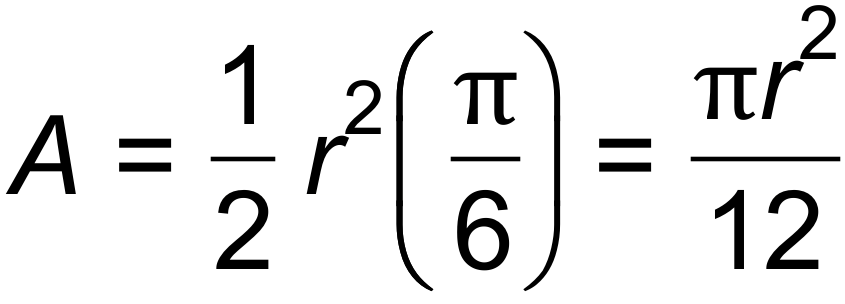
Boys over 172 cm = 55 ✓

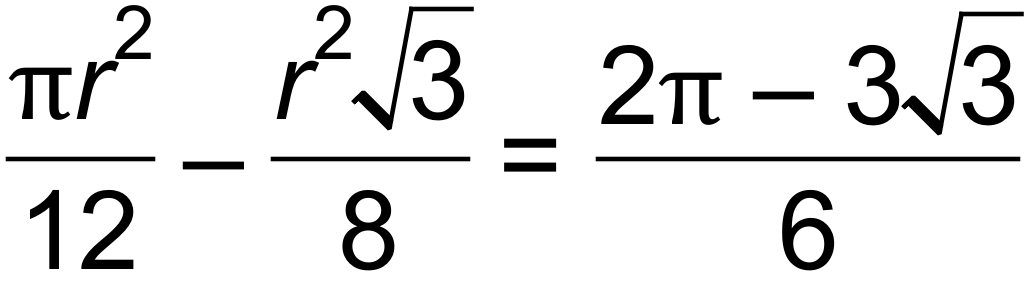
38:55 = 1:1.45 ✓ [10]

17. (a)  ✓

 ✓

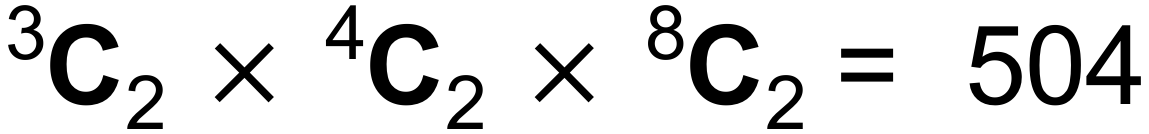
 ✓

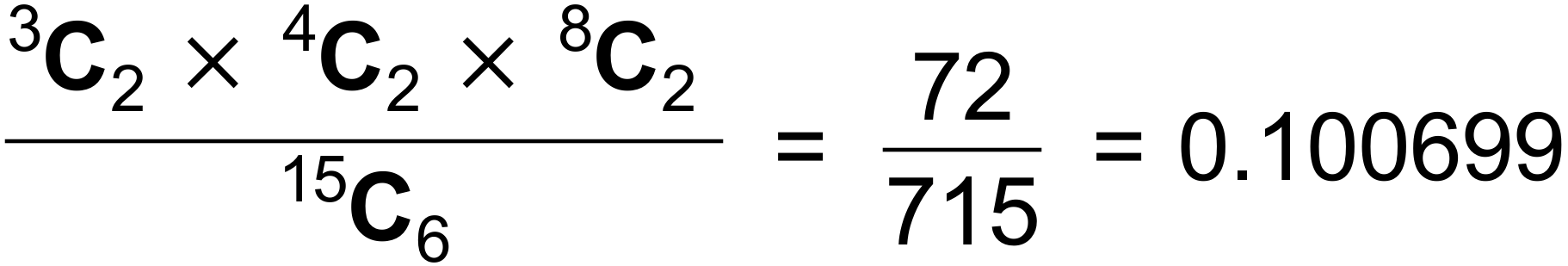
(b)  ✓

 ✓

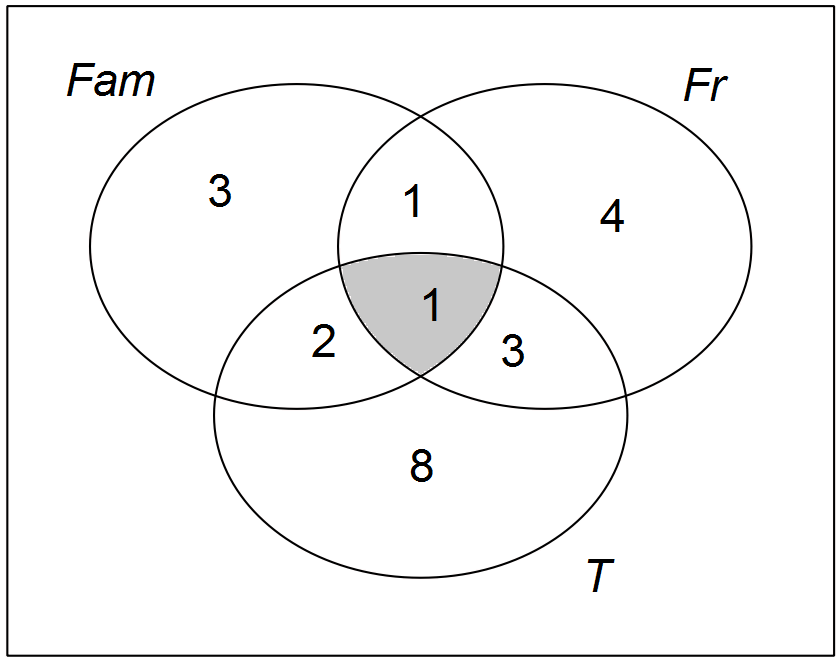
 ✓ [6]

18. (a) (i) 15! = 1 307 674 368 000 ✓

(ii)  ✓✓

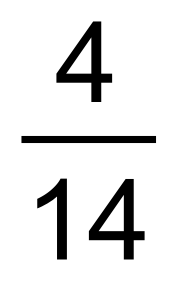
(iii)  ✓✓

(b) (i)



✓

This image has family and friends and travel in it. ✓

(ii)  ✓✓ [9]

19. (a) D H ✓

(b) C G ✓

(c) G ✓

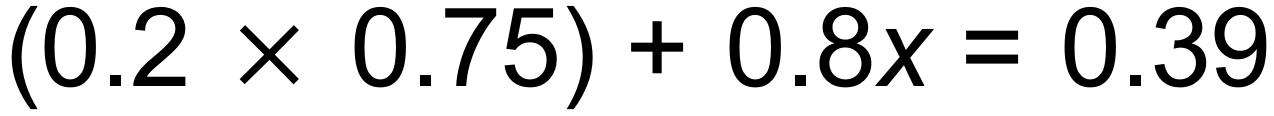
(d) G ✓

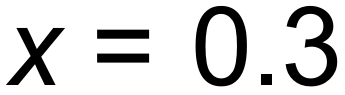
(e) H ✓

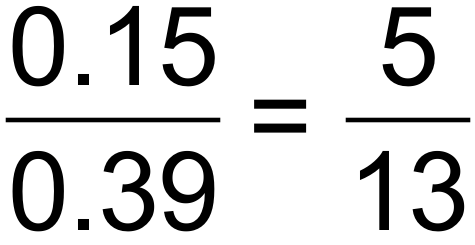
(f) A ✓

(g) E ✓

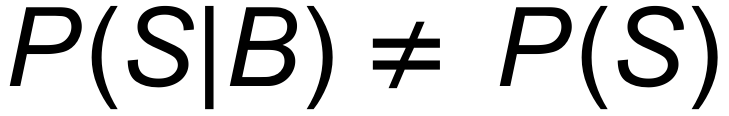
(h) A B ✓ [8]

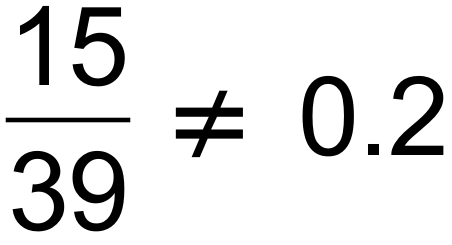
20. (a)  ✓

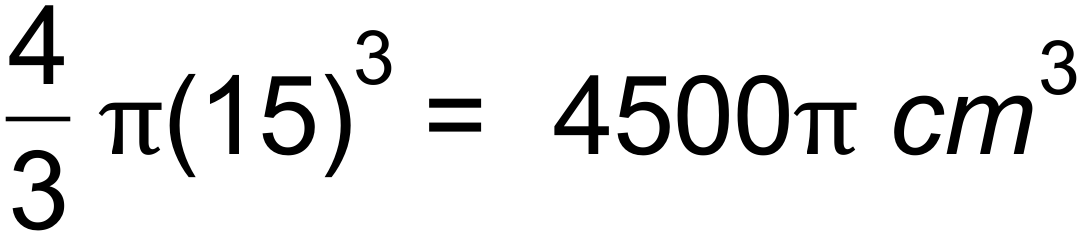
 ✓

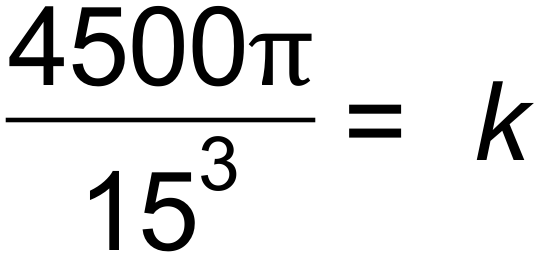
(b)  ✓✓

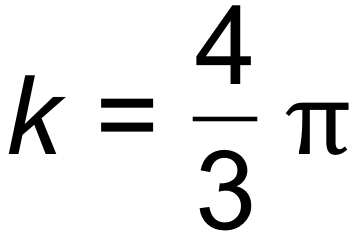
(c) The events are not independent. ✓

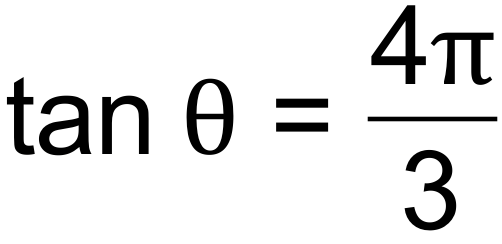


 ✓ [6]

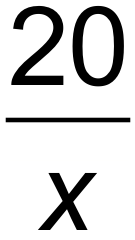
21. (a) (i) V=  ✓

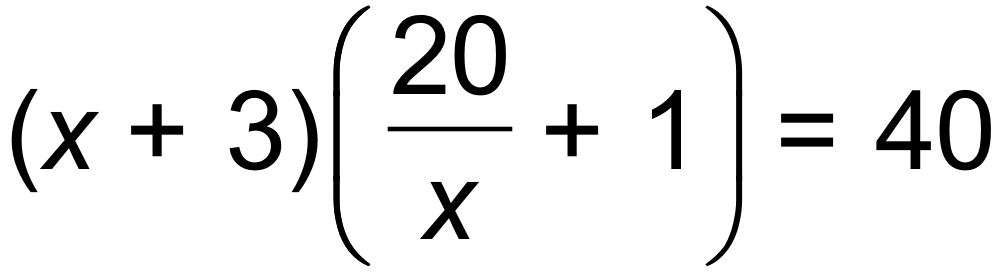
(ii)  ✓



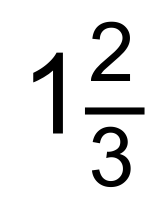
(iii)  ✓

 ✓

(b) Let *x* be the length, then  is the width

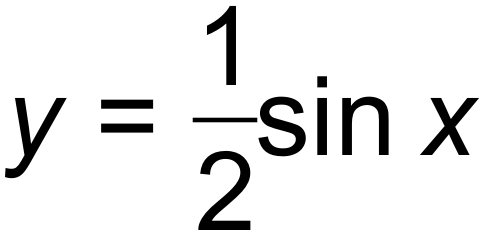
 ✓

 ✓

Original dimensions are 4*m* x 5*m* or *m* x 12*m* ✓

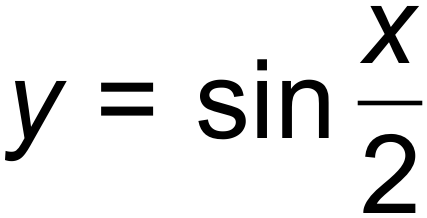
(c) Domain:  ✓

Range:  ✓ [9]

22. A:  B:  ✓✓

The amplitude for a quieter sound is .

The amplitude increases to 3 to produce a louder sound. ✓

C:  D:  ✓✓

The period for a deeper pitch is 

The period for a higher pitch is . ✓ [6]