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**SEMESTER TWO**

**MATHEMATICS**

**SPECIALIST**

**UNITS 1 & 2**

**2018**

**SOLUTIONS**

***Calculator−free Solutions***

1. (a) (i) or ✓

(ii) ✓✓

(b) (i) ✓

(ii) ‘9’ from first set only: ✓

‘9’ from second set only: ✓

no ‘9’ chosen: ✓

total ✓ [8]

2. (a) (i) ✓

(ii) ✓✓

(b) ✓✓

(c)

✓✓ [7]

3. (a) ✓

(b) ✓✓

(c) ✓✓ [5]

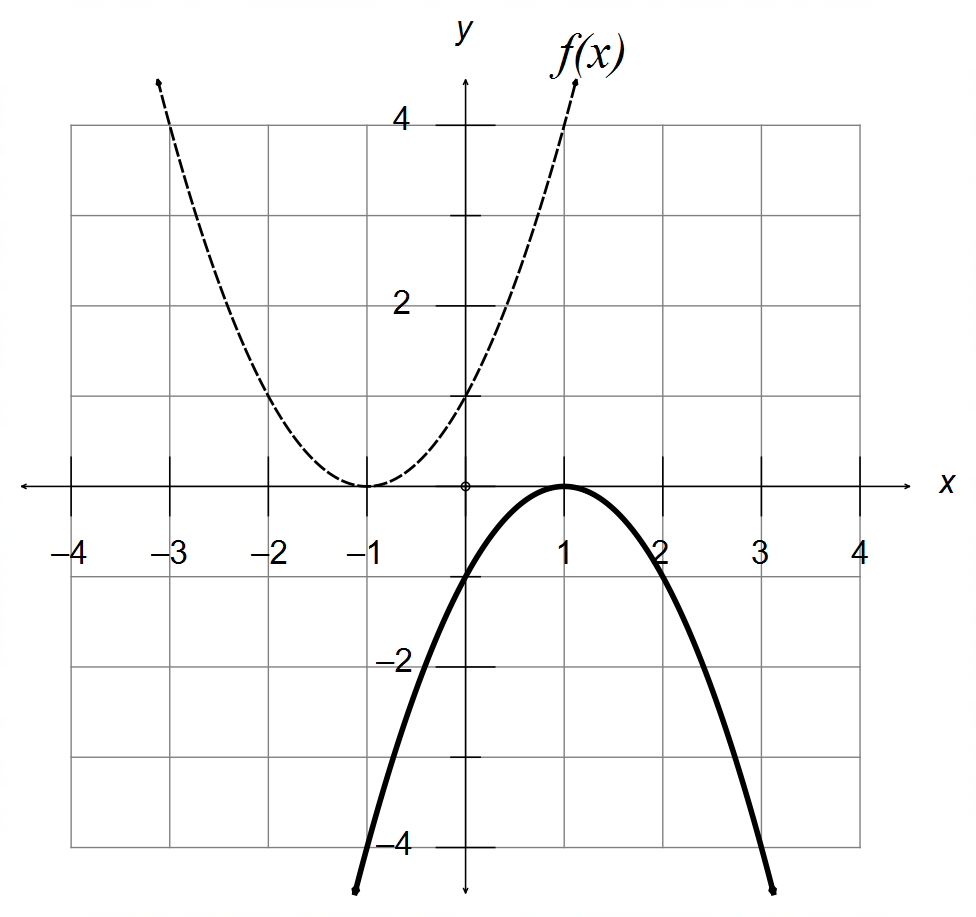
4. (a) (i) ✓✓

A and B are inverses of each other. ✓

(ii) ✓

✓✓

4. (b) (i) T1 performs a rotation of 180°



✓✓

(ii) Reflection of the line ✓

T2 ✓

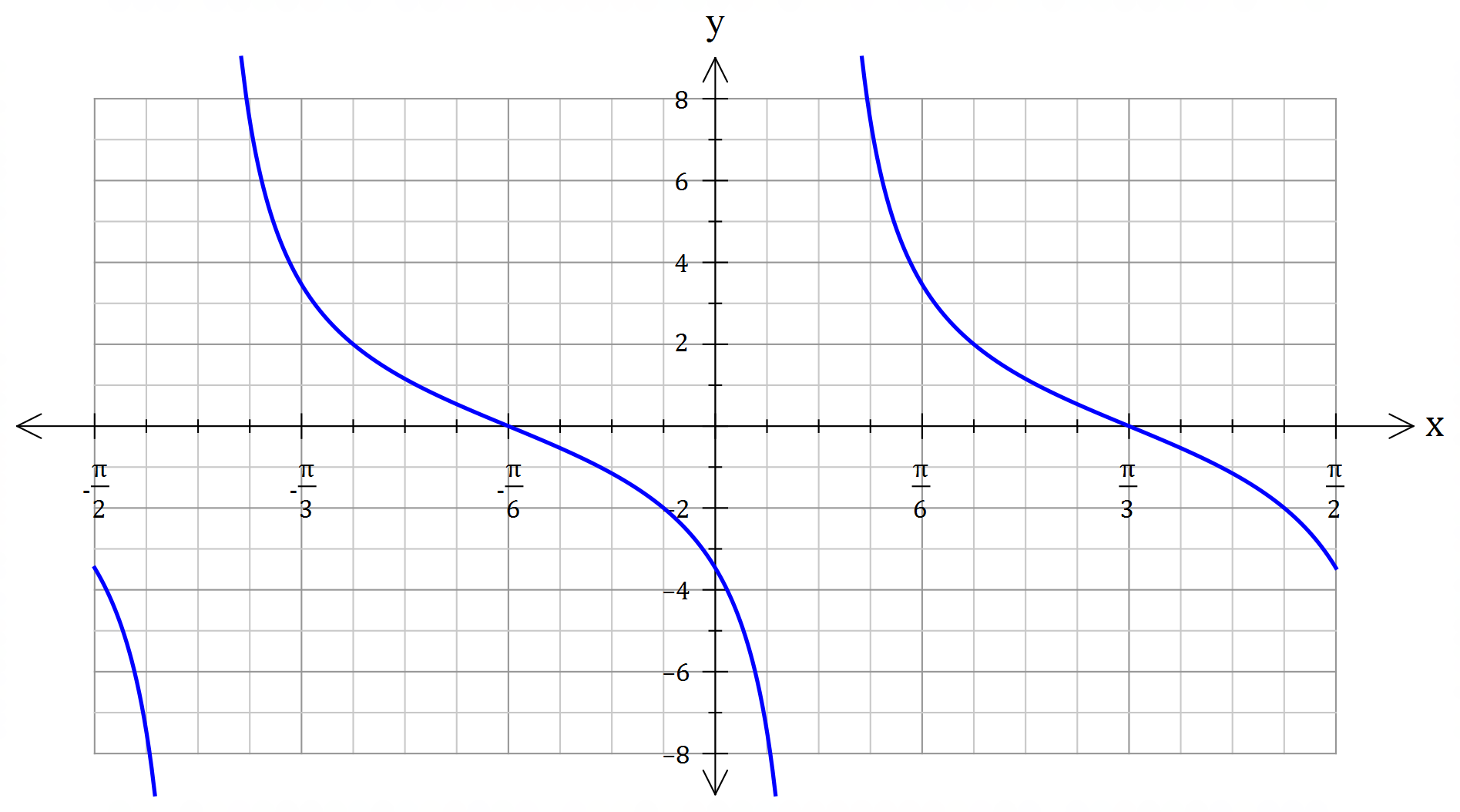
(iii) New Area ✓✓ [12]

5. (a) (i)

✓✓✓

(ii) ✓✓

(b)



✓ Scale factor

( at )

✓ Period of

✓ Vertical Asymptote

at

[8]

6. (a) (i) ✓

(ii) “If is irrational, then both and must be irrational” ✓

(b) A ⇒ B: If the triangle has two equal sides, then it is isosceles,

and therefore it has two congruent sides.

A ⇒ B is valid and True. ✓

B ⇒ A: If the triangle has two congruent sides, then it is isosceles,

and therefore it has two equal sides.

B ⇒ A is valid and True. ✓

A ⇔ B

(c) ✓✓ [6]

7. Assume is even and that is odd. ✓

Let is even. ✓

✓

Since cannot be both even and odd simultaneously, then this

is a contradiction. And therefore must be odd. ✓ [4]

***Calculator−assumed Solutions***

8. (a) ✓

✓

(b) Since then is also a solution ✓

✓

✓ [5]

9. LHS ✓

✓

✓

✓

✓

✓

✓

RHS ✓ [8]

10. (a) (i) ✓✓

(ii) ✓✓

(b) ✓

✓

✓

✓ [8]

11. (a) ✓

✓

(b) ✓

✓

(c) ✓

(d) For : and True for ✓

Assume true for :

✓

For :

✓

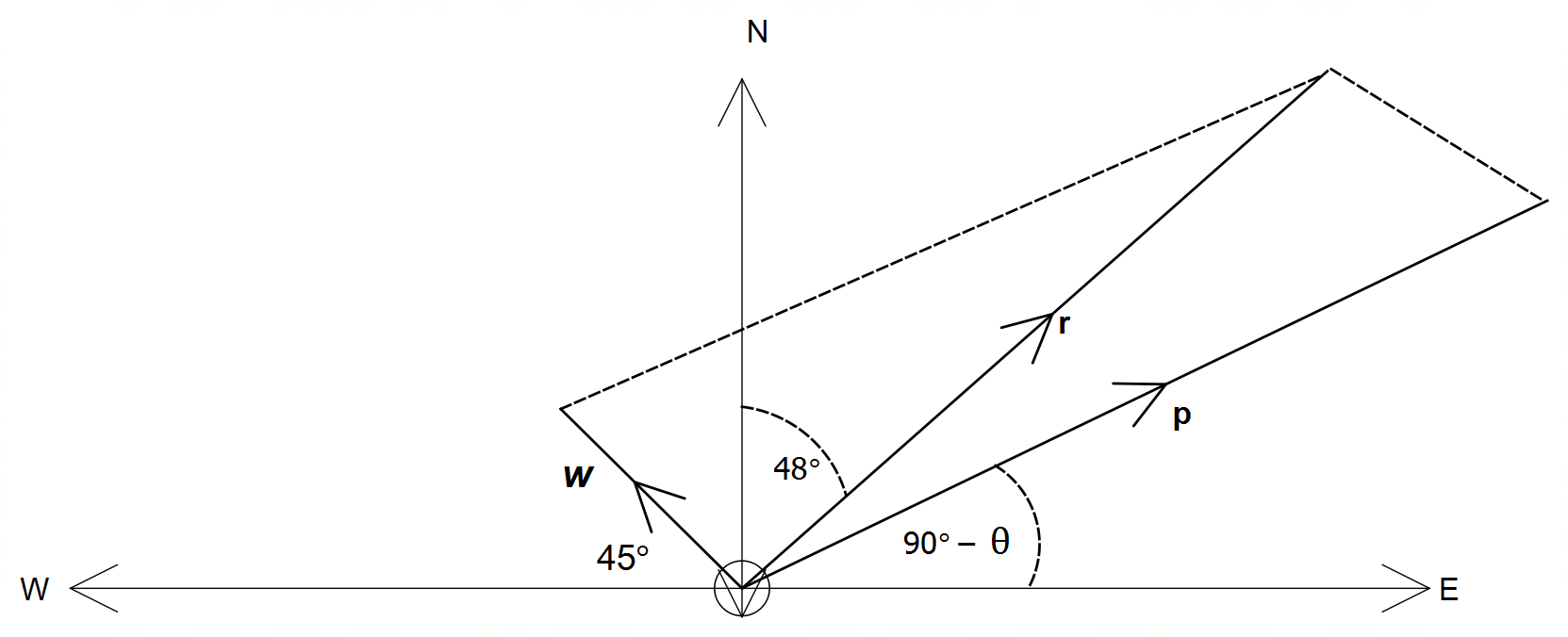
✓

✓

as required

Therefore, True for *n* = *k* + 1, and since true for *n* =2,

by induction the conjecture is true for all whole numbers. [10]

12. (a)

✓ resultant

✓ wind

✓ plane

(b) ✓

✓

✓

(c)

✓

CAS: kmh-1 ✓

✓

(d) ✓✓ [11]

13. (a)

✓

✓

✓

(b)

✓

✓

✓ [6]

14. (a)

✓

✓

✓

✓

(b)

✓

✓ [6]

15. (a) (i) ✓

✓

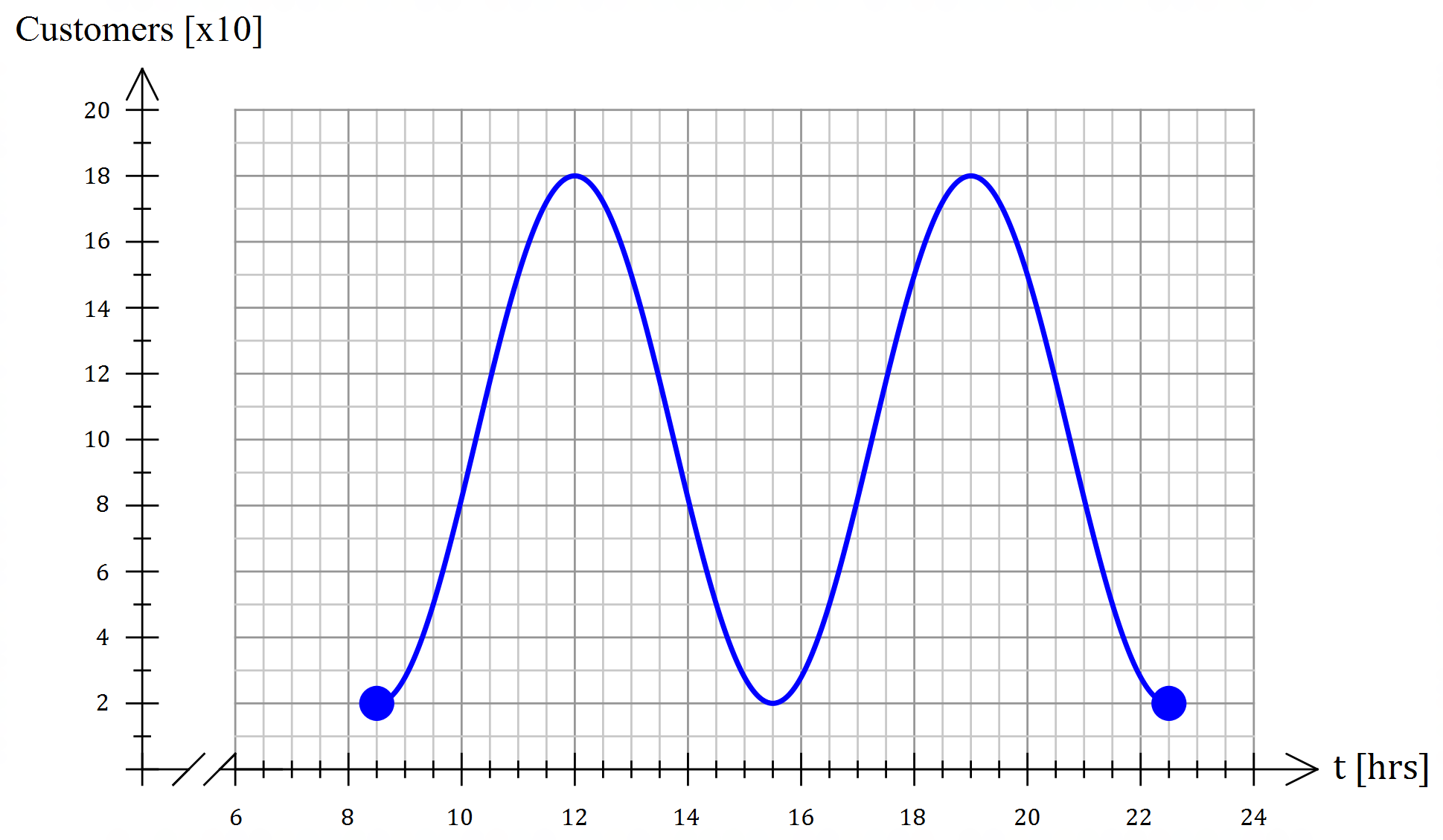
(ii) ✓

✓

(b) (i) ✓

(ii) ✓

(c) ✓✓ [8]

16. (a)

✓ Amplitude

✓ Period = 7hrs

✓ two full waves

16. (b)

✓✓✓✓

OR

(c) ✓

CAS: ✓✓

Between 10:50am and 1:11pm ✓

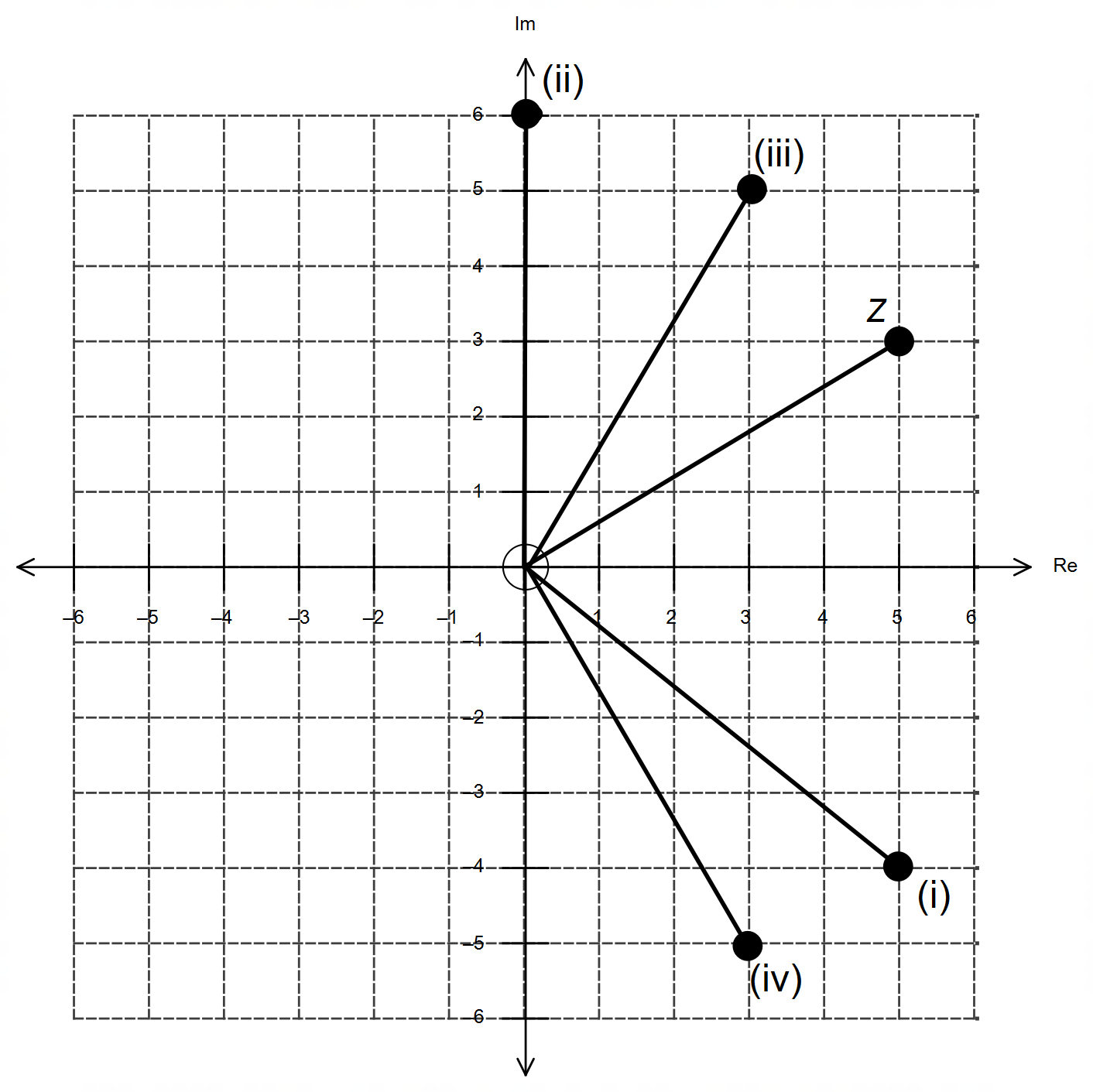
and 5:50pm and 8:11pm ✓ [12]

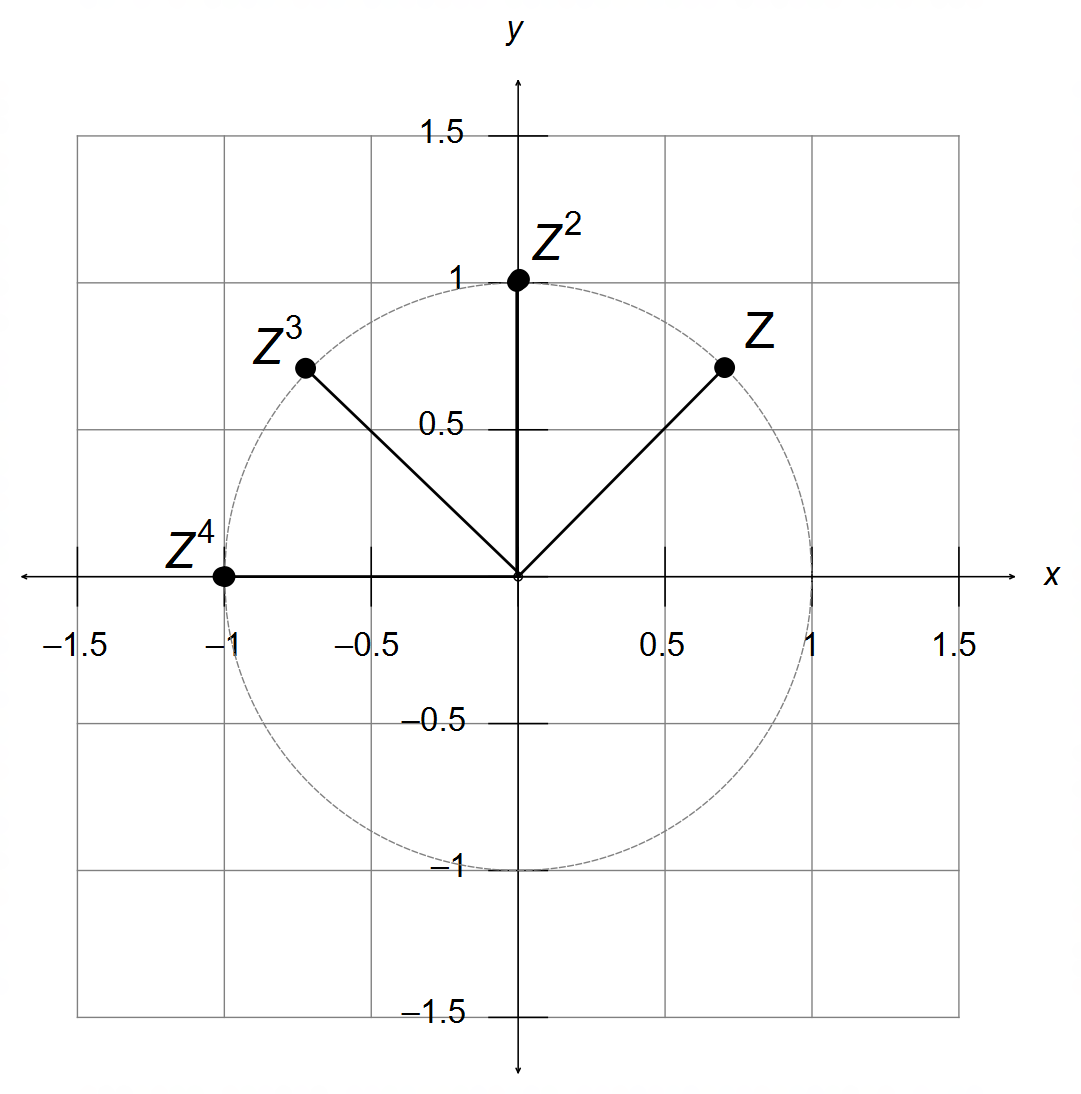
17. (a) (i) ✓✓

(ii) ✓✓

(iii) ✓✓

(iv) ✓✓



17. (b) (i)

✓✓✓

(ii) Rotation ✓ of 45° anticlockwise ✓

(iii) Powers that are multiples of 8 give ✓ [14]

18. (a) ✓

✓

✓

(b) (i)

Rotation of 90° anti-clockwise ✓✓

(ii)

Reflection over the line ✓✓

(c) i.e.

✓

and ✓✓

OR and ✓✓ [12]