

Astronomy  
PAPER 1: Naked-eye Astronomy

Wednesday 14 June 2023 – Afternoon

Diagram Booklet

THIS DIAGRAM BOOKLET MUST BE RETURNED WITH THE QUESTION PAPER AT THE END OF THE EXAMINATION.

In the boxes below, write your name, centre number and candidate number.

Surname					
Other names					
Centre Number					
Candidate Number					

## INSTRUCTIONS

**There may be spare copies of some diagrams in case you need them.**

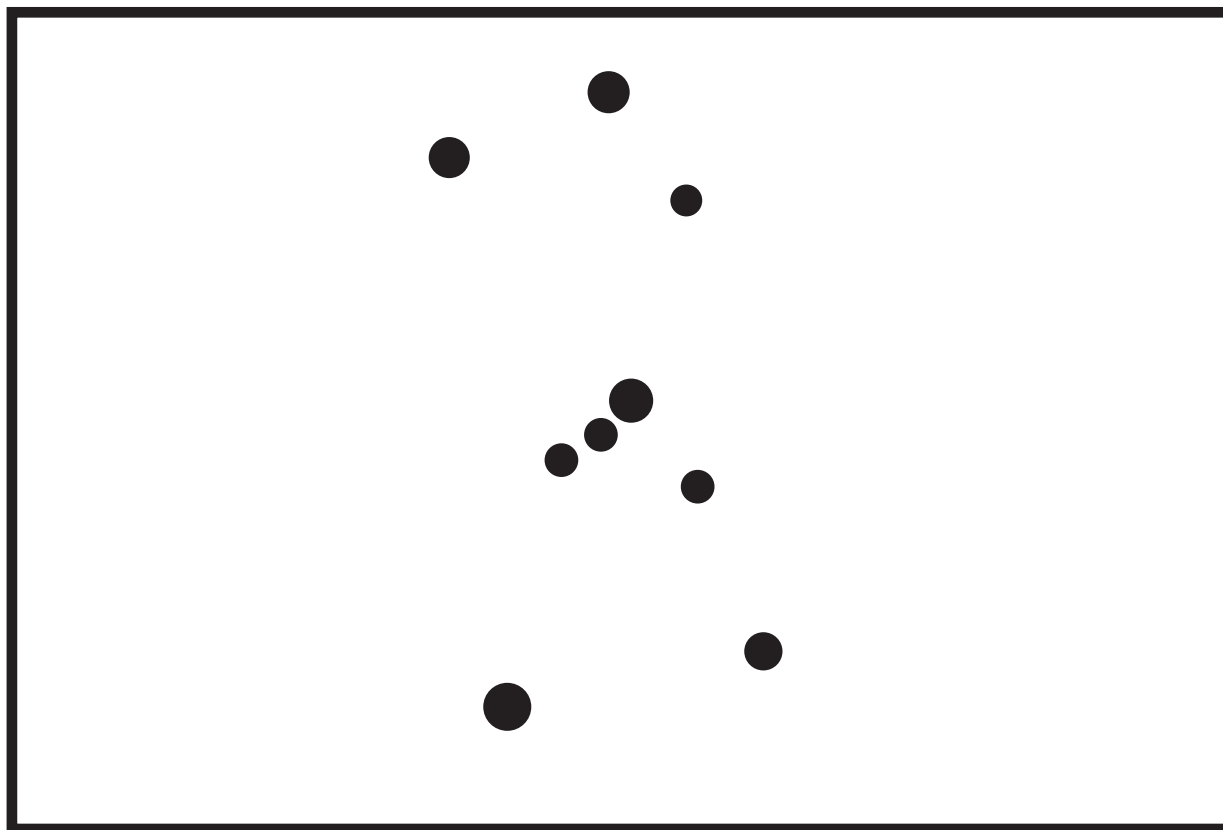
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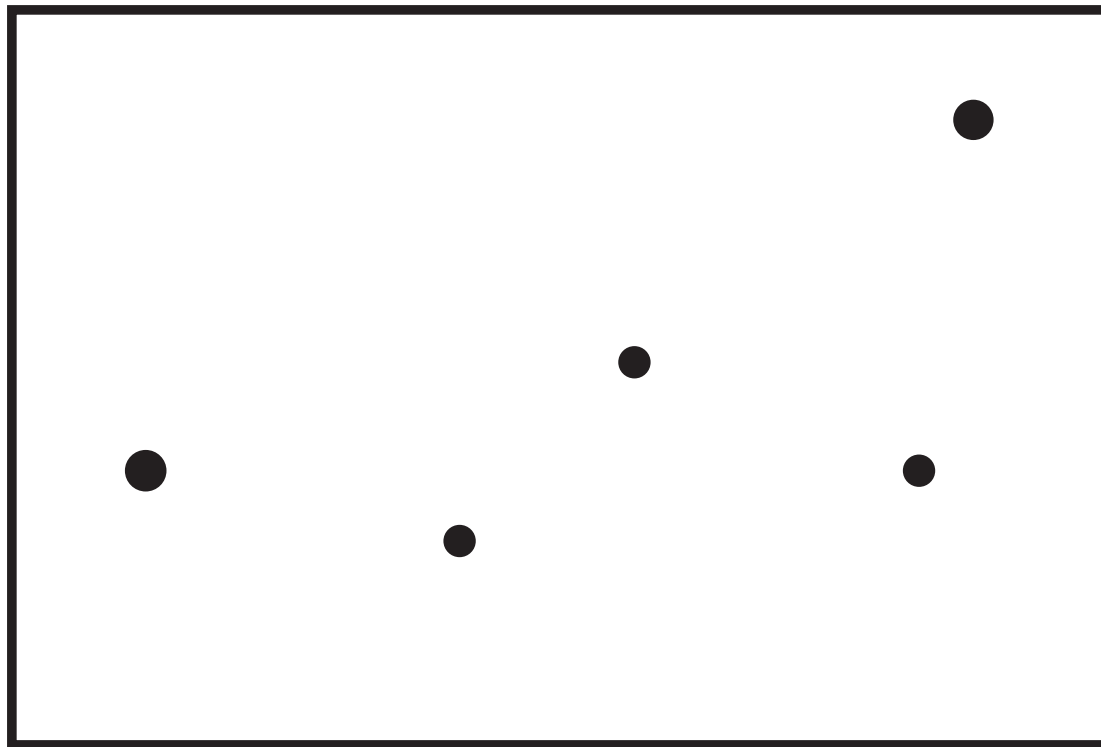
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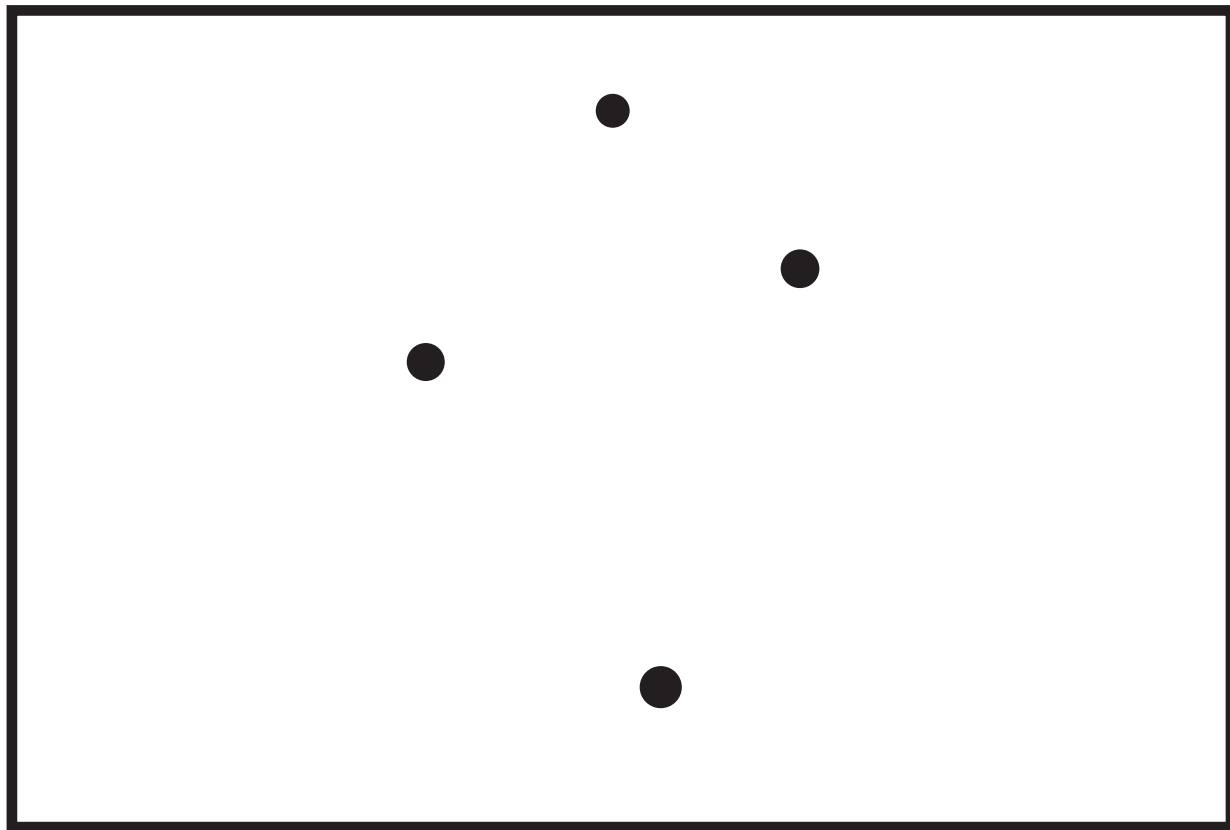
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**Question 1(a)(i)****FIGURE 1**

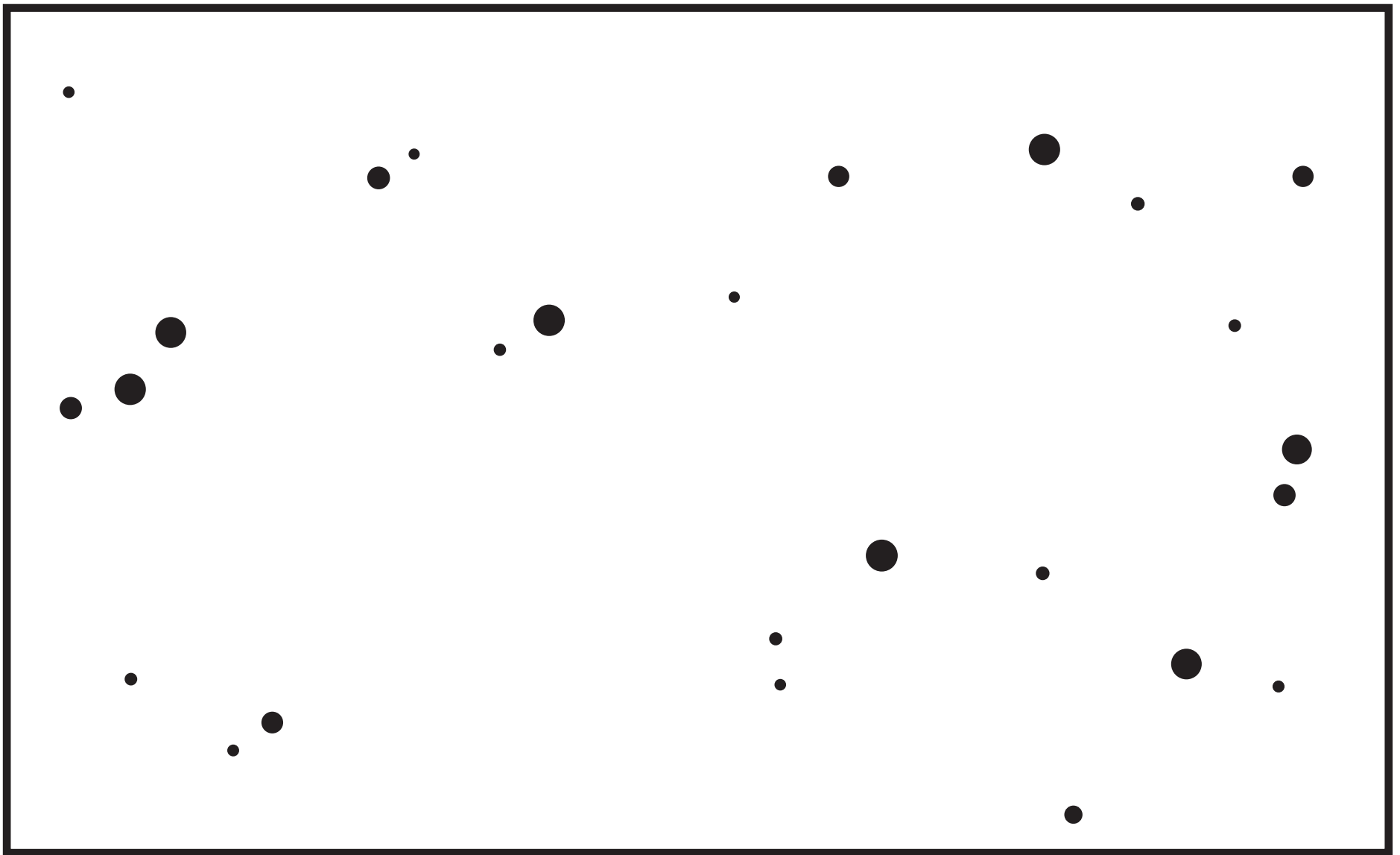


**Question 1(a)(ii)****FIGURE 2**

**Question 1(a)(iii)****FIGURE 3**

## Question 1(b)

FIGURE 4



**FIGURE 5**



### Question 3(a)(i) – Blank

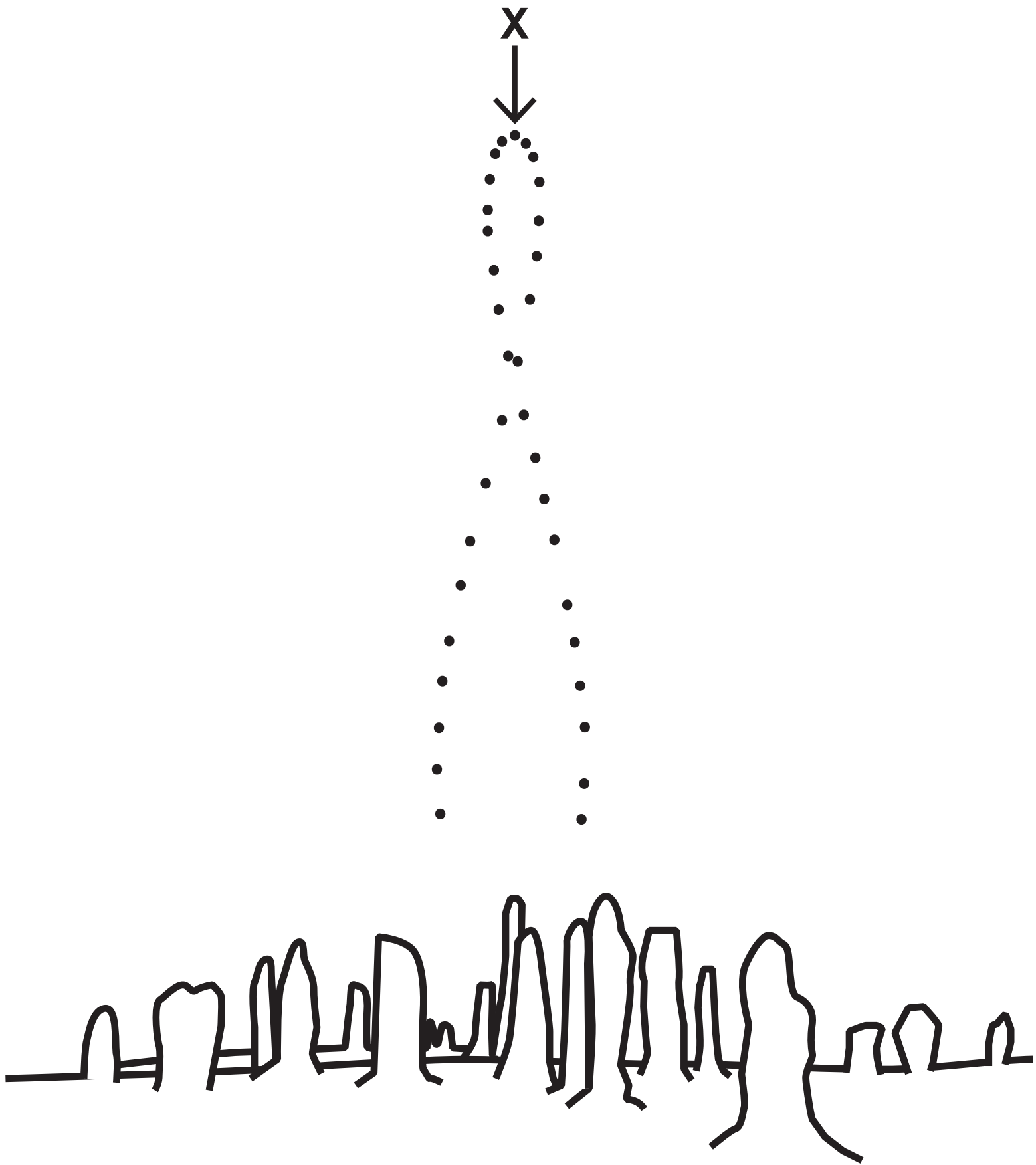
FIGURE 6



**Question 4(a)(i) – Blank**

## Question 5(b)

FIGURE 7

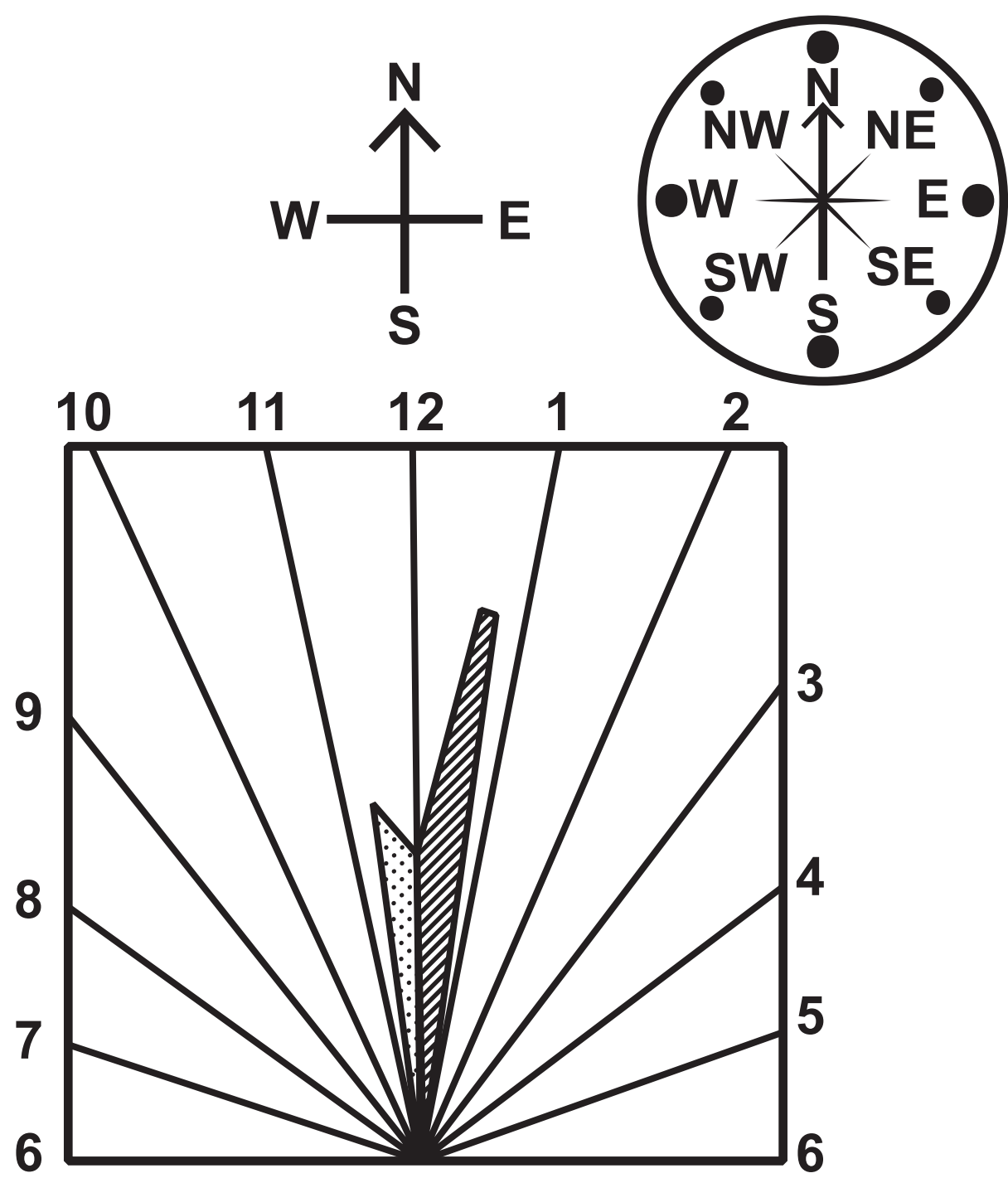




**Question 5(b)(ii) – Blank**

Question 6

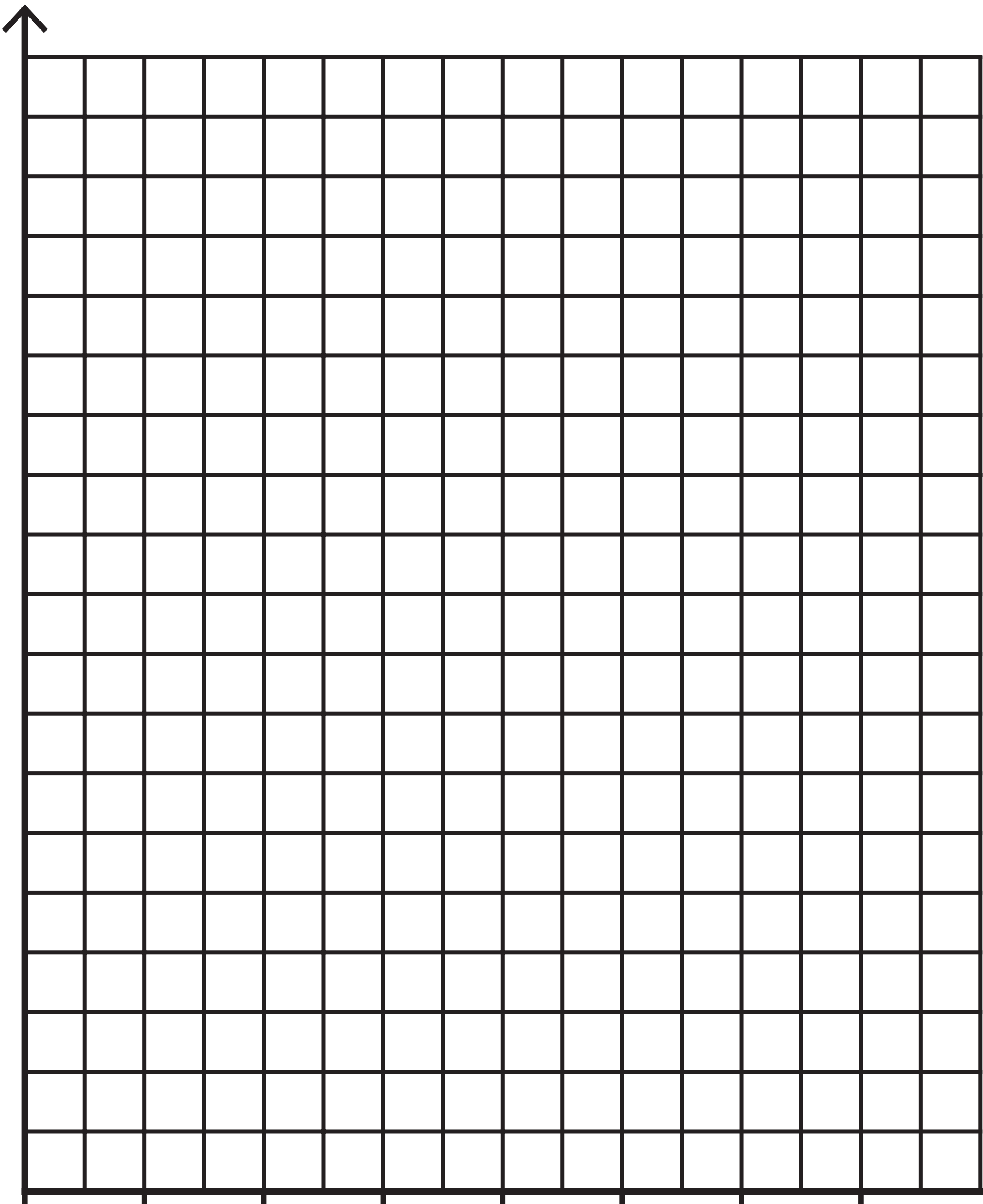
FIGURE 8



Question 6(a)

FIGURE 9

Sundial  
Time

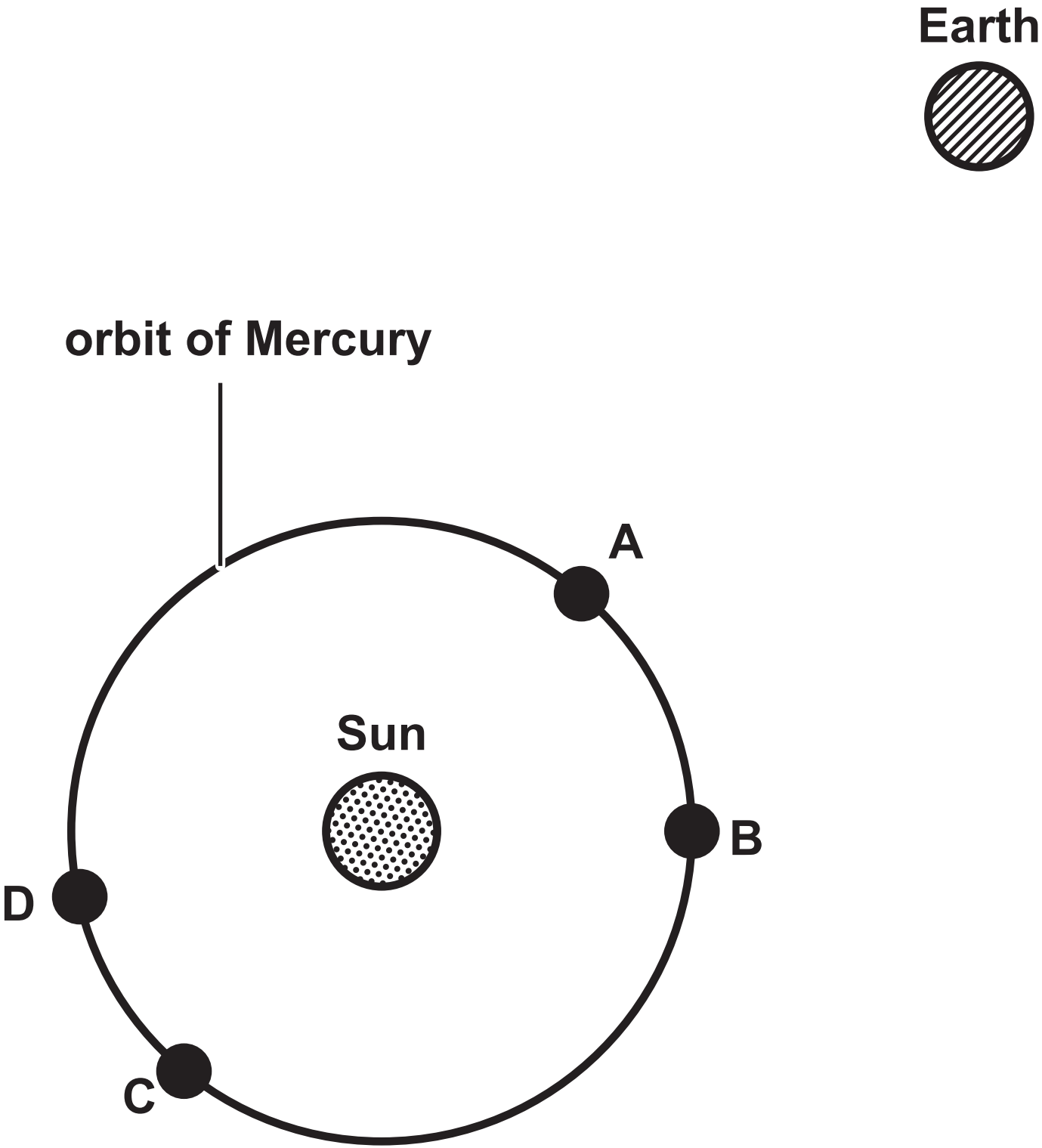


11:30    11:40    11:50    12:00    12:10    12:20    12:30

Clock Time (h:min)

Question 7(b)

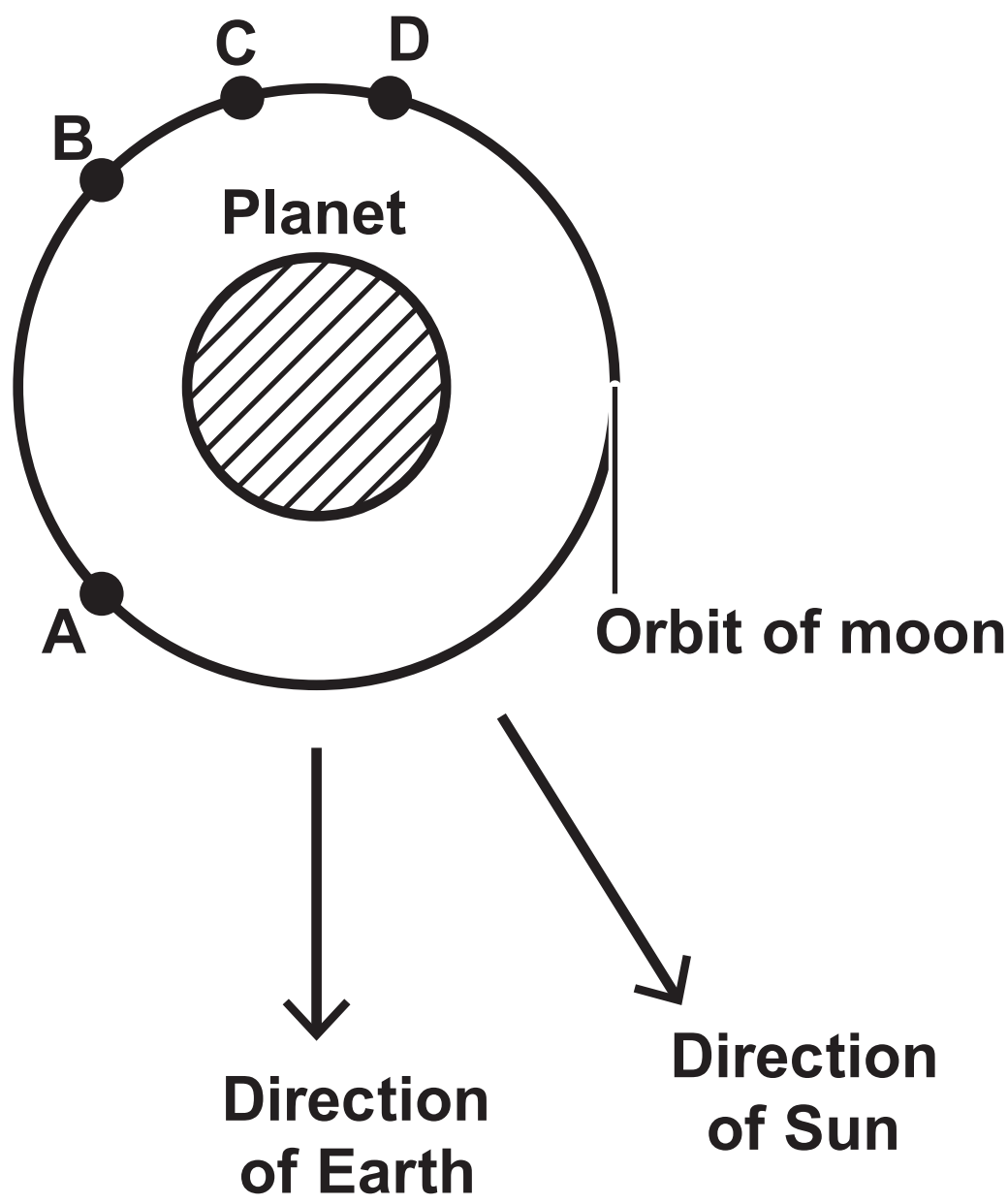
FIGURE 10



Question 7(d)

FIGURE 11

NOT TO SCALE



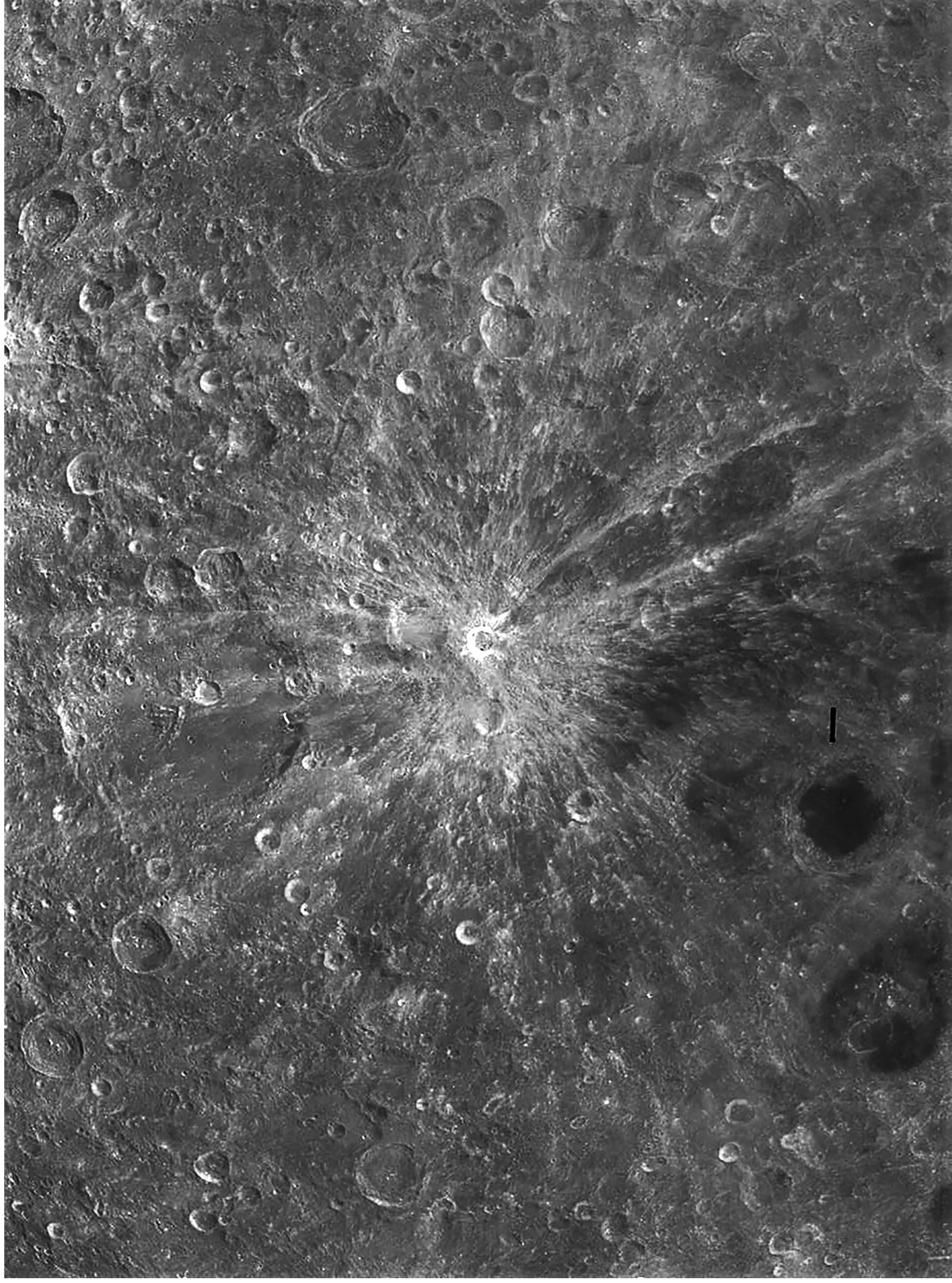
Question 7(d)

TABLE 2

Point in orbit	Visible	Eclipsed	Occulted
A	✓		
B			
C			
D			



FIGURE 12





Question 8(a)(iii)

FIGURE 13



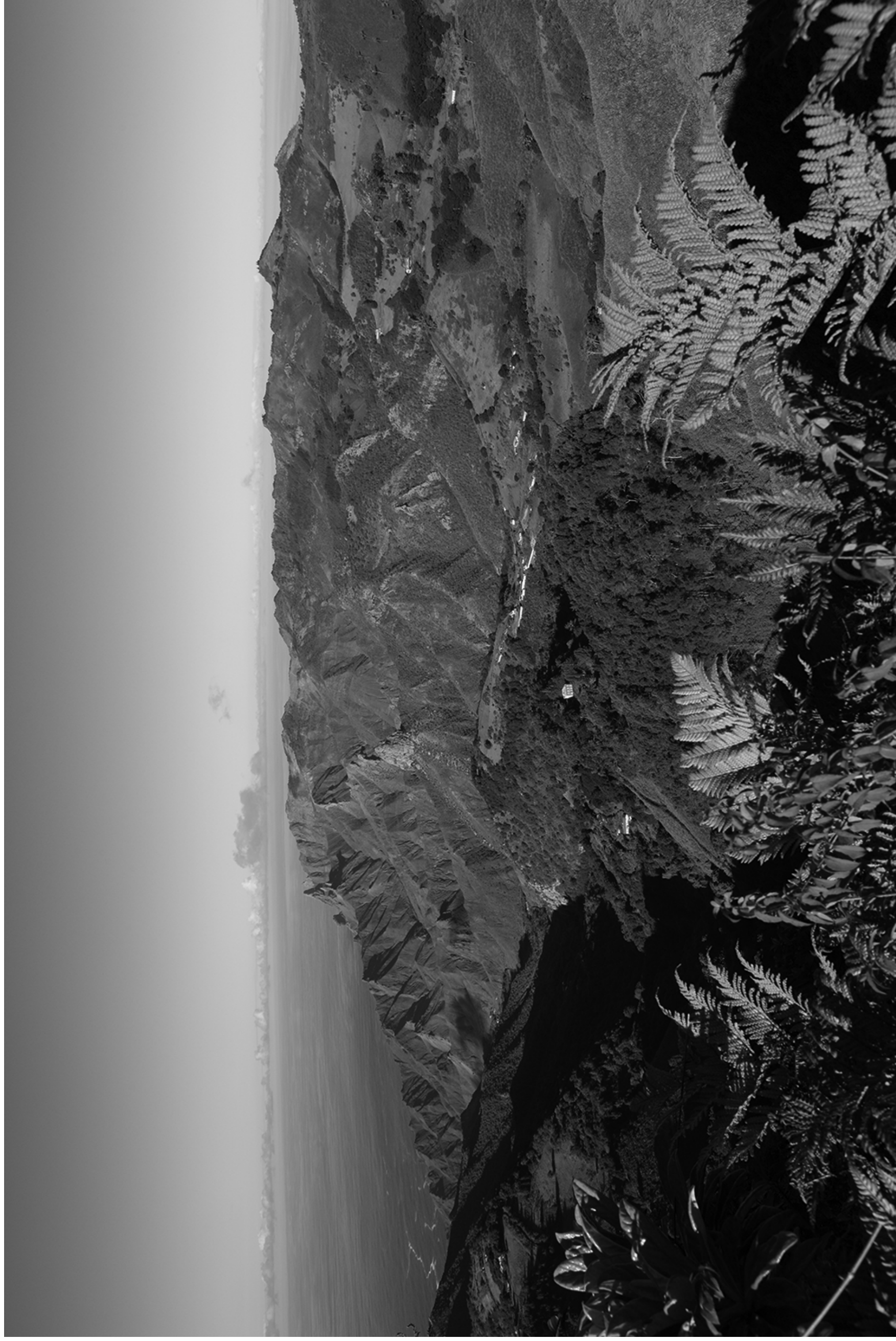


Question 8(b)

TABLE 3

Umbral Contact	Time
1st	20:07
2nd	21:41
3rd	00:45
4th	02:18

FIGURE 14



**Question 9(a)(iii) – Blank**

## Question 9(c) – Blank

**Question 10(b) – Blank**

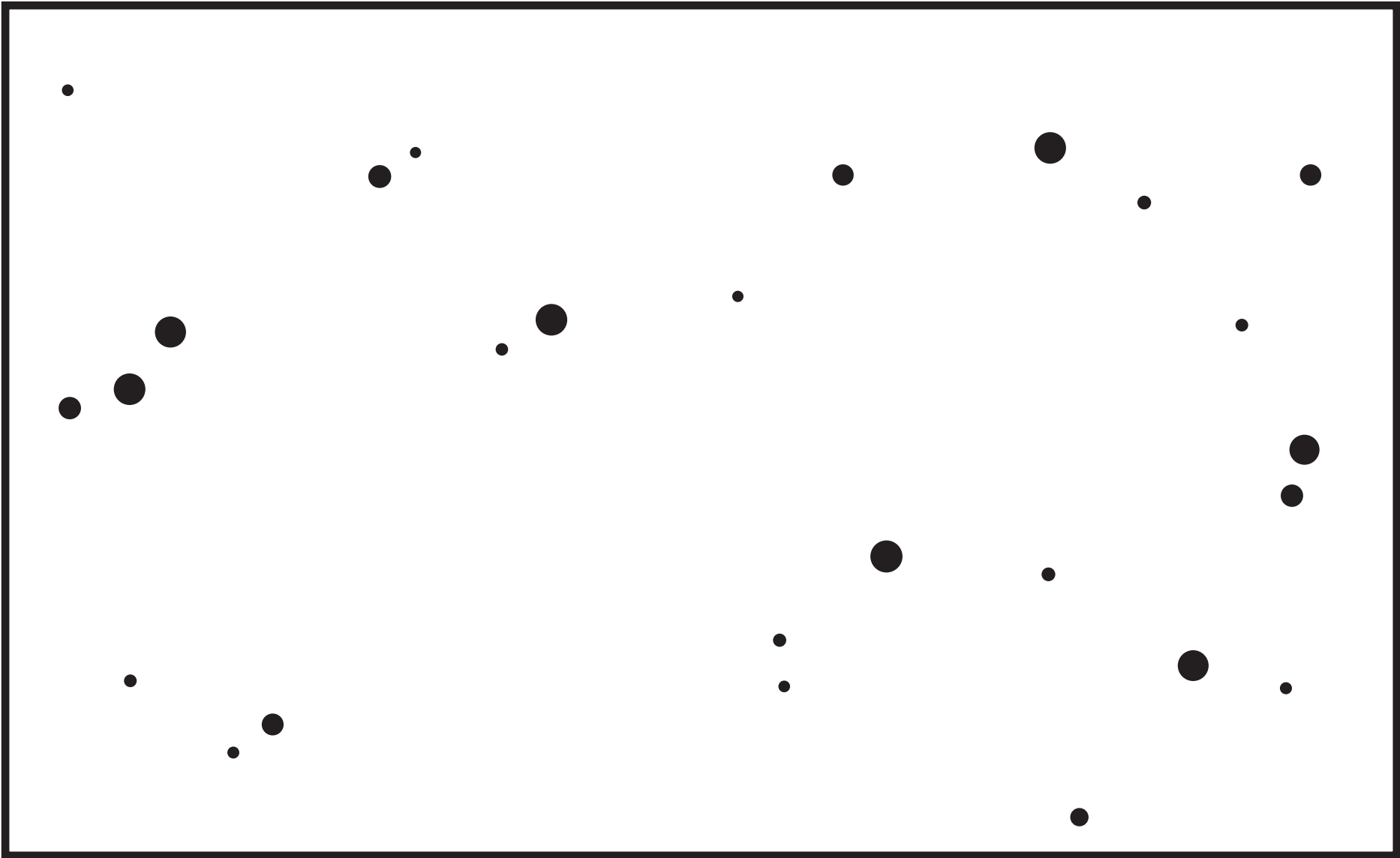


FIGURE 15



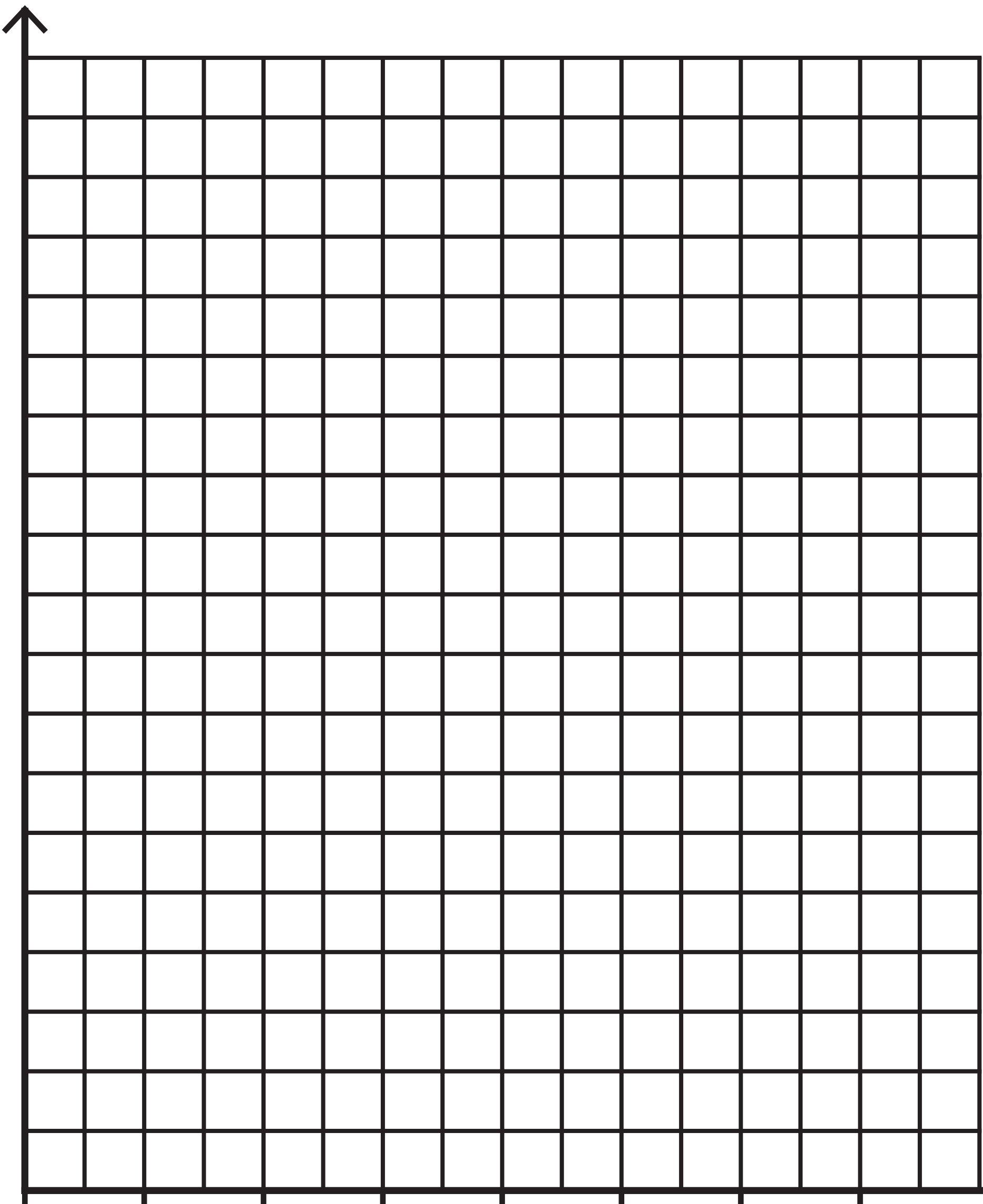
Question 1(b)

FIGURE 4



Question 6(a)

Sundial  
Time



Clock Time (h:min)



Question 7(d)

TABLE 2

Point in orbit	Visible	Eclipsed	Occulted
A	✓		
B			
C			
D			

Question 8(a)(iii)

FIGURE 13



## **IMAGE CREDITS**

### **Figure 5**

**Image Credit & Copyright: Max Alexander, STFC, SPL**

### **Figure 6**

**Image Credit & Copyright: P-M Hedén**

### **Figure 7**

**Image Credit & Copyright adapted from: Giuseppe Petricca**

### **Figure 12**

**Image Credit: NASA/Goddard/Arizona State University**

### **Figure 13**

**Courtesy NASA**

### **Figure 14**

**Darrin Henry/Shutterstock**

### **Figure 15**

**Image Credit & Copyright: Fritz Helmut Hemmerich NASA**