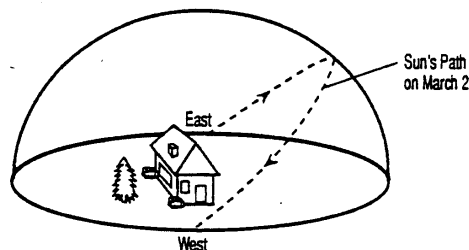


Earth Motions Review #3 – ANSWERS AND EXPLANATIONS

1. (3) An observer's shadow always points in the opposite direction that the light source is located.
 Since the sun is in the southeast sky, the observer's shadow would point in the exact opposite direction: northwest.

2. (1) north – The highest point on the arc is in the southern sky. Since shadows point in the opposite direction of the Sun, the shadow will point north.

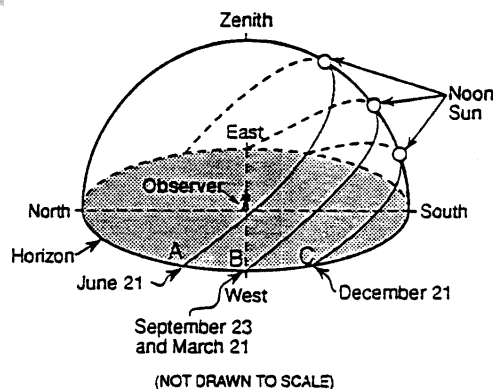


3. (1) 23.5° N – This is the Tropic of Cancer. The Sun will be directly overhead of 23.5° N on June 21st.
 In order for the Sun to be directly overhead, of a location, that location has to be on the Earth between 23.5° N and 23.5° S (the tropic zone). Since the other 3 locations are not located in this zone, the Sun will can never be directly overhead at those latitudes.

4. (1) June 21 – When Sun is highest in the sky, shadows will be the shortest.

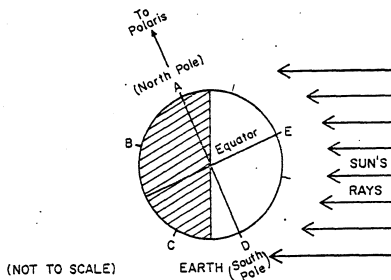
5. (2) southeast – The Sun has to rise in the east, but in the winter, the Sun rises south of east as shown in the diagram

6. (1) Earth's rotation – Key words: DAILY path ... The Sun appears to move across the sky every day because the Earth rotates.



7. (4) December – Earth's North Pole is tilted away from the Sun

8. (1) A – Anywhere inside the Arctic Circle in December will get 0 hours of daylight. If you think of the diagram of the Earth actually spinning, point A will never rotate into the light.



9. (1) March 1 to May 1 – As the date approaches June 21st, daylight hours continually increase.
 During the time span between September and November the daylight hours decrease.
 (Just think of what you notice from the beginning of school till now.) From December 1 to February 1 the hours decrease till December 21st and then increase thereafter. From June 1 to August 1 the daylight hours increase till June 21st, but then decrease thereafter.

10. What is the altitude of star 1? 20°
11. What is the azimuth of star 1? North (its on the north line)
12. What is the azimuth of sunrise? NE
13. What time of day is represented by this diagram? solar noon (or 12:00pm)
14. If the total degrees of arc for this day is 210 degrees, how many daylight hours would be experienced on this day? 14 hours (210° / 15°/hr)
15. What is the altitude Sun at position 2? 60°
16. What direction would the elephant's shadow point at the time shown in the diagram? north (the Sun is in the south)
17. If the Sun was located at position X, what time of day would it be? 11:00am
18. What would the azimuth of the Sun be if it was located at position X? southeast

