# Pre-Calculus: Global Geography and Trigonometry

Pre-Calculus · Answer Key · 10 Questions

**1. The Great Pyramid of Giza, with an approximate original height of 146.6 meters, was built with a base length of approximately 230.3 meters per side. If we model the pyramid's face as a slant height originating from the midpoint of a base side to the apex, what is the approximate angle of inclination of this face with respect to the base?**

**A) Approximately 51.8 degrees**
B) Approximately 38.2 degrees
C) Approximately 45.0 degrees
D) Approximately 62.1 degrees

**2. The distance from the Earth's center to the North Pole is approximately 6,356.8 kilometers. The distance from the Earth's center to a point on the equator is approximately 6,378.1 kilometers. Considering the Earth as a sphere for simplicity, and using the law of cosines, approximately what is the angle (in degrees) subtended at the Earth's center by the arc from the North Pole to a point on the equator along a line of longitude?**

**A) 90 degrees**
B) 45 degrees
C) 180 degrees
D) 30 degrees

**3. The Tropic of Cancer is an imaginary line of latitude located at approximately 23.44 degrees North. If the Earth's radius is approximately 6,371 kilometers, what is the approximate circumference of the circle formed by the Tropic of Cancer?**

**A) Approximately 57,850 kilometers**
B) Approximately 19,070 kilometers
C) Approximately 14,200 kilometers
D) Approximately 40,030 kilometers

**4. Mount Everest, the world's highest peak, has an elevation of approximately 8,848.86 meters above sea level. If an observer stands at sea level at a distance 'd' from the base of the mountain, and the angle of elevation to the summit is 30 degrees, what is the approximate horizontal distance 'd' from the observer to the base of Mount Everest?**

**A) Approximately 15,327 meters**
B) Approximately 8,849 meters
C) Approximately 26,546 meters
D) Approximately 5,110 meters

**5. The Suez Canal connects the Mediterranean Sea to the Red Sea. If we consider a simplified map where the canal is a straight line, and a ship travels 193 kilometers along it, and then turns 90 degrees to travel another 10 kilometers perpendicular to the canal, what is the straight-line distance from the ship's starting point to its final position?**

**A) Approximately 193.3 kilometers**
B) Approximately 203 kilometers
C) Approximately 193.0 kilometers
D) Approximately 193.9 kilometers

**6. The longitude of the Prime Meridian is 0 degrees. The longitude of a point in Sydney, Australia is approximately 151.2 degrees East. If the Earth's circumference is approximately 40,075 kilometers, what is the approximate distance along the equator between the Prime Meridian and Sydney?**

**A) Approximately 16,748 kilometers**
B) Approximately 6,056 kilometers
C) Approximately 13,431 kilometers
D) Approximately 10,019 kilometers

**7. The Aphelion of Earth's orbit (farthest point from the Sun) is approximately 152.1 million kilometers. The Perihelion (closest point to the Sun) is approximately 147.1 million kilometers. If we consider the Sun as the focus of an ellipse, and the distance from the Sun to the center of the ellipse is 'c', and the semi-major axis is 'a', what is the approximate eccentricity of Earth's orbit?**

**A) Approximately 0.0167**
B) Approximately 0.0334
C) Approximately 0.0083
D) Approximately 0.5000

**8. The International Date Line generally follows the 180th meridian. If a traveler crosses the International Date Line from Samoa (west of the line) to American Samoa (east of the line) by moving westward across the line, how does their calendar date change?**

**A) The date advances by one day.**
B) The date moves back by one day.
C) The date remains the same.
D) The date changes based on the time of day.

**9. The Dead Sea is the lowest point on Earth's land surface, with a shore elevation of approximately -430.5 meters relative to sea level. If an airplane flies at an altitude of 10,000 meters directly above the Dead Sea, what is the vertical distance between the airplane and the surface of the Dead Sea?**

**A) Approximately 10,430.5 meters**
B) Approximately 9,569.5 meters
C) Approximately 10,000 meters
D) Approximately 430.5 meters

**10. The approximate circumference of the Earth at the equator is 40,075 kilometers. If a satellite orbits the Earth at an altitude of 500 kilometers above the equator, what is the approximate circumference of its orbital path?**

**A) Approximately 41,075 kilometers**
B) Approximately 40,575 kilometers
C) Approximately 40,075 kilometers
D) Approximately 39,575 kilometers