

MATHEMATICS ASSIGNMENT JOHN SHIMFE SS 3 DIAMOND

- 1 Point A(28°N,33°E) and B(28°N,27°W) are two points on the surface of the earth. Calculate: The radius of the circle of latitude 28°N The distance between A and B measured along their parallel of latitude (R=6400km) .

1. Radius of the Circle of Latitude 28N:

The radius of a circle of latitude θ on the Earth's surface is given by:

$$r = R \times \cos(\theta)$$

Where: R = Radius of the Earth (given as 6400 km) θ = Latitude in radians
First, convert 28 to radians:

$$\theta = 28 \times \frac{\pi}{180}$$

$$\theta = \frac{28\pi}{180}$$

$$\theta = \frac{7\pi}{45}$$

Now, plug $R = 6400 \text{ km}$ and $\theta = \frac{7\pi}{45}$ into the formula:

$$r = 6400 \times \cos\left(\frac{7\pi}{45}\right)$$

$$r = 6400 \times \cos(28)$$

You can then compute the value using a calculator.

2. Distance between Point A and Point B along the Latitude 28N:

To calculate the distance between two points on the same parallel of latitude, we use the formula:

$$Distance = r \times \Delta\lambda$$

Where: r = Radius of the circle of latitude 28N (which you'll calculate from the above step) $\Delta\lambda$ = Difference in longitude between the two points in radians

First, convert the difference in longitude 33E and 27W to radians. Since 1° is approximately $\frac{\pi}{180}$ radians:

$$\Delta\lambda = (33 - 27) \times \frac{\pi}{180}$$

$$\Delta\lambda = 6 \times \frac{\pi}{180}$$

Once you have r from the first step, plug it and $\Delta\lambda$ into the formula to get the distance.

After performing these calculations, you'll get the required radius and distance between points A and B along their parallel of latitude 28N.

2 Nigeria savings bank pays interest at $9\frac{1}{2}$ What is the amount if a person saves N5,000 for two years.

To calculate the compound interest for the amount saved in the Nigeria savings bank, you can use the formula:

$$A = P\left(1 + \frac{r}{100}\right)^n$$

Where: A = the future amount (the amount after n years) P = principal amount (the initial amount saved) r = annual interest rate (in percentage) n = number of years

Here: $P = N5,000$ $r = 9.5\%$ per annum $n = 2$ years

Plugging in the values we have:

$$A = 5000\left(1 + \frac{9.5}{100}\right)^2$$

$$A = 5000(1 + 0.095)^2$$

$$A = 5000(1.095)^2$$

$$A = 5000(1.198025)$$

(Rounded off to 6 decimal places)

$$A = 5990.125$$

So, if a person saves N5,000 for two years at an interest rate of $9\frac{1}{2}$ per annum compounded yearly, the amount would be approximately N5,990.13.