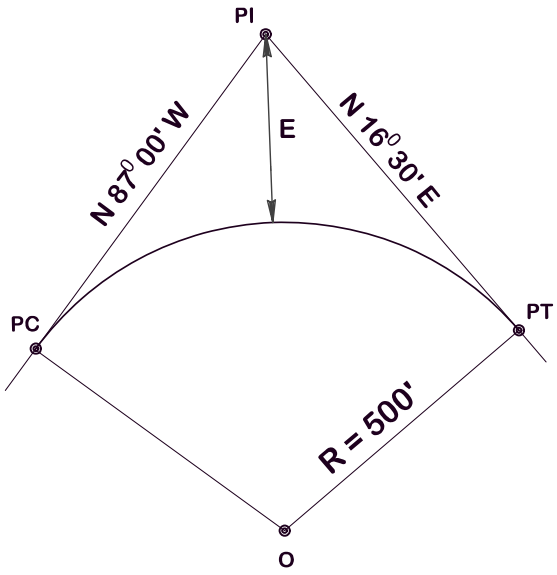
The Horizontal Curves Primer

Preparing for the Civil P.E. Exam

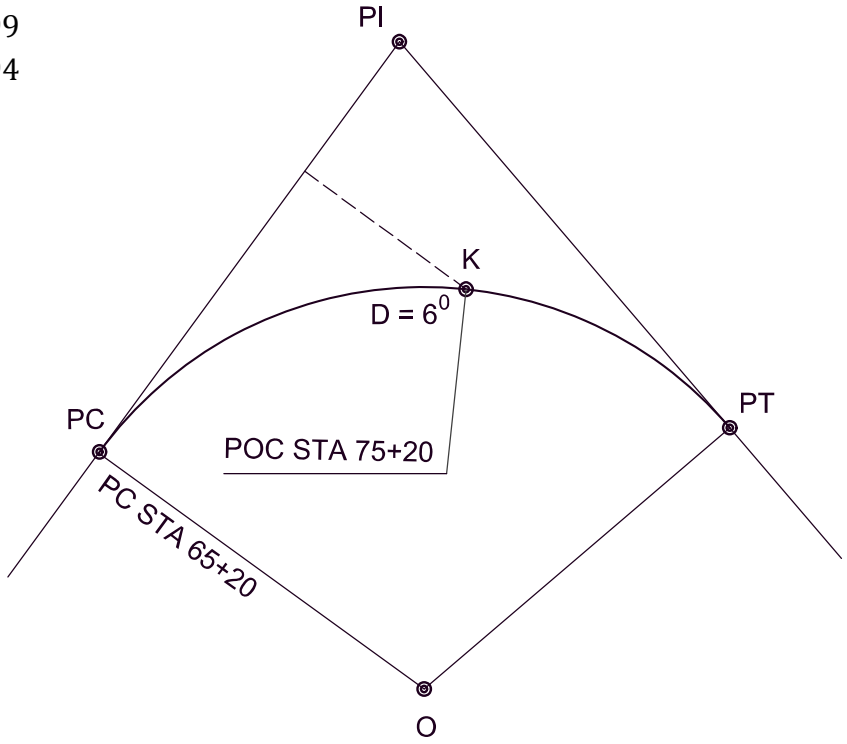
1. Horizontal Curve – Find Curve Length. In the horizontal curve shown below, the radius, back tangent bearing and ahead tangent bearings are as shown. The length (ft) of the external, E, is most nearly:

(A) 785.32
(B) 190.45
(C) 634.25
(D) 307.61



2. Horizontal Curve – Find Tangent Offset. For the horizontal curve shown below, the tangent offset (ft) from back tangent to Point K is most nearly:

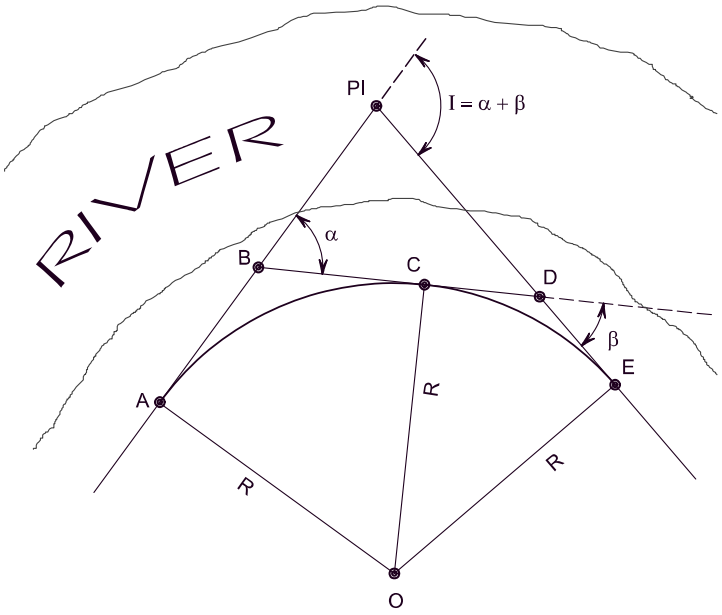
(A) 954.93
(B) 477.46
(C) 826.99
(D) 127.94



3. Horizontal Curve along River - PI Inaccessible.

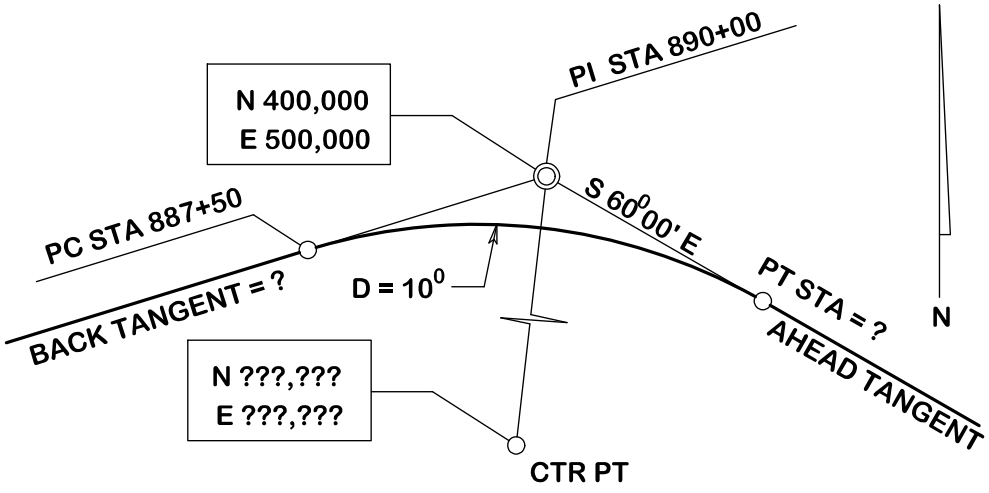
You are staking out a horizontal curve on a cliff high above a swift flowing river. Subtangent BD is 1,168.54 ft long, Angle alpha is 59.8^0, and angle Beta is 43.48^0. The radius (ft) of the curve that will be tangent to lines AB, BD, and DE is most nearly:

(A) 750
(B) 890
(C) 1020
(D) 1200



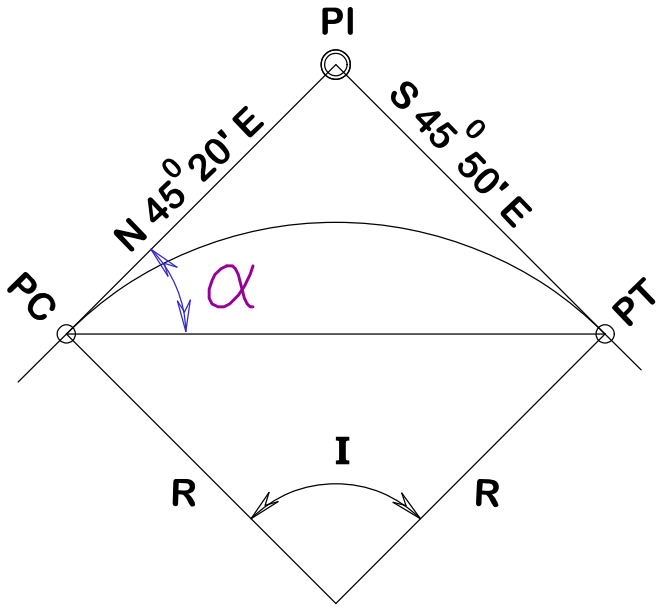
4. Horizontal Curve - Find Coordinates. Use the information provided to determine the coordinates (N, E) of the center point of the horizontal curve in the figure below.

(A) N 399,875, E 500,217
(B) N 499,930, E 399,375
(C) N 399,378, E 499,930
(D) N 499,930, E 500,503



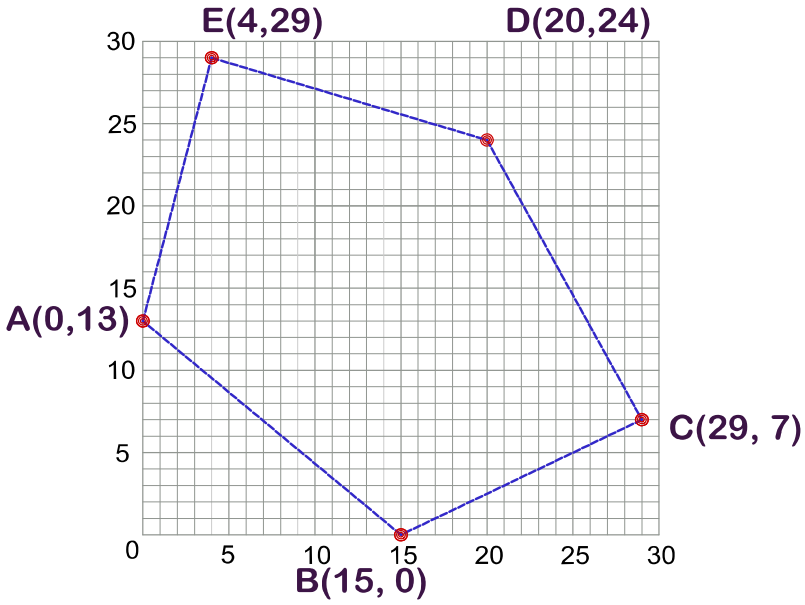
5. Horizontal Curve - Find Angle Alpha. For the horizontal curve shown, the angle alpha is most nearly:

(A) 44^0 25'
(B) 45^0 20'
(C) 45^0 35'
(D) 45^0 10'



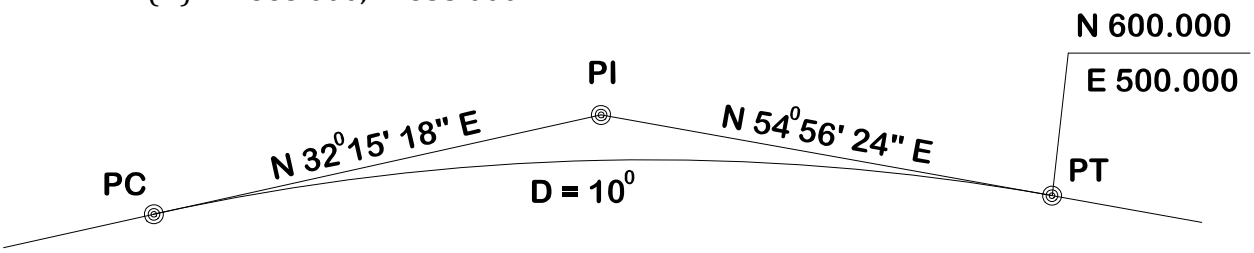
6. Area by Coordinates. Traverse A-B-C-D-E-A is a five-sided closed traverse. The x-y coordinates of the traverse corners are indicated. Determine the enclosed area using the *Area by Coordinates* method.

(A) 500
(B) 724
(C) 752
(D) 880



7. Horizontal Curve - Find Coordinates. Use the information provided to determine the coordinates (N, E) of the PC of the horizontal curve shown below. .

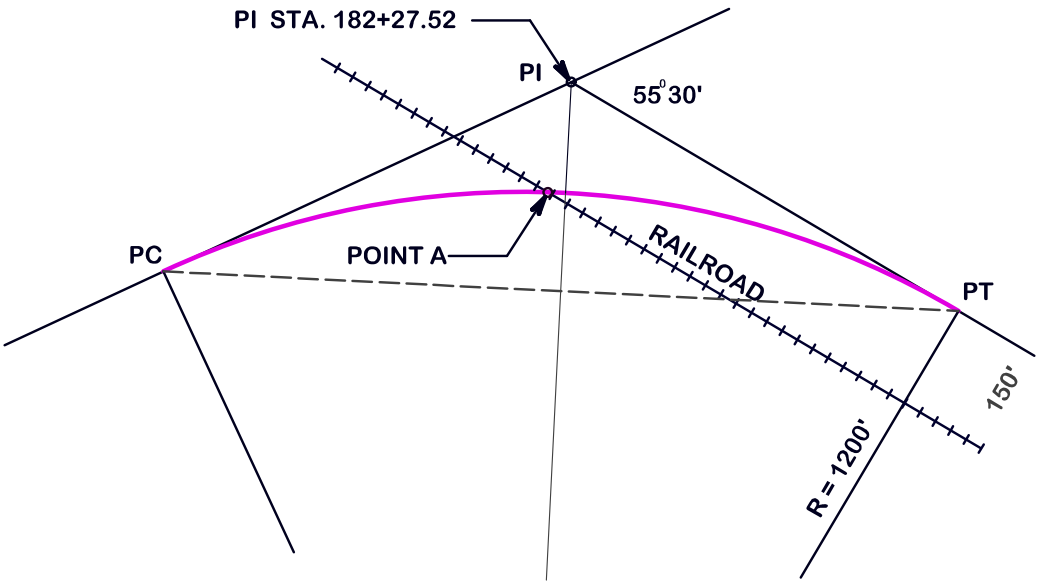
(A) N 755.798, E 337.000
(B) N 436.824, E 344.621
(C) N 336.820, E 444.621
(D) N 663.000, E 655.000



NOT TO SCALE

8. Horizontal Curve on Grade Crossing. Given the figure below, determine the following:

(A) The station of Point A
(B) The Station of PC and PT
(C) The M of the horizontal Curve.
(D) The E of the horizontal Curve.



9. Stopping Distance. Two trucks are traveling down a 5% grade at 40 mph on a two lane highway. Truck A is 250 ahead of Truck B and has new tires. Truck B has worn tires. Suddenly, Driver A slams on his brakes to make a panic stop. It takes Driver B 1.5 seconds to perceive and react to the brake lights. Friction factors: New Tires -0.76, Worn Tires: 0.33. After the two trucks come to a complete stop, the distance between them is most nearly:

(A) 75 ft
(B) 273 ft
(C) 598 ft
(D) 46 ft