

## Numerical Methods Question and Fill in the Blanks

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In which of the following method, we approximate the curve of solution by the tangent in each interval.

- a. Picard's method
- b. Euler's method
- c. Newton's method
- d. Runge Kutta method

Ans- B

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The convergence of which of the following method is sensitive to starting value?

- A.False position
- B.Gauss seidal method
- C.Newton-Raphson method
- D.All of these

Ans – C

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Newton-Raphson method is used to find the root of the equation  $x^2 - 2 = 0$ .  
If iterations are started from - 1, then iterations will be

- A.converge to -1
- B.converge to  $\sqrt{2}$
- C.converge to  $-\sqrt{2}$  (Ans)
- D.no coverage

Ans – C

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Which of the following statements applies to the bisection method used for finding roots of functions?

- A. Converges within a few iterations
- B. Guaranteed to work for all continuous functions (Ans)
- C. Is faster than the Newton-Raphson method
- D. Requires that there be no error in determining the sign of the function

Ans - B

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We wish to solve  $x^2 - 2 = 0$  by Newton Raphson technique. If initial guess is  $x_0 = 1.0$ , subsequent estimate of  $x$  (i.e.  $x_1$ ) will be

- A. 1.414
- B. 1.5 (Ans)
- C. 2.0
- D. None of these

Ans - B

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Using Newton-Raphson method, find a root correct to three decimal places of the equation  $x^3 - 3x - 5 = 0$

- A. 2.275
- B. 2.279
- C. 2.222
- D. None of these

Ans - B

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In the Gauss elimination method for solving a system of linear algebraic equations, triangularization leads to

- A. Diagonal matrix
- B. Lower triangular matrix
- C. Upper triangular matrix

D.Singular matrix

Ans - B

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If  $\Delta f(x) = f(x+h) - f(x)$ , then a constant  $k$ ,  $\Delta k$  equals

A.1

B.0

C. $f(k) - f(0)$

D. $f(x + k) - f(x)$

Ans - B

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Double (Repeated) root of  $4x^3 - 8x^2 - 3x + 9 = 0$  by Newton-Raphson method is

A.1.4

B.1.5

C.1.6

D.1.55

Ans - B

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Using Bisection method, negative root of  $x^3 - 4x + 9 = 0$  correct to three decimal places is

A.-2.506

B.-2.706

C.- 2.406

D.None of these

Ans - B

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Four arbitrary points  $(x_1, y_1)$ ,  $(x_2, y_2)$ ,  $(x_3, y_3)$ ,  $(x_4, y_4)$  are given in the  $x, y$ -plane. Using the method of least squares, if regressing  $y$  upon  $x$  gives the fitted line  $y = ax + b$ ; and regressing  $y$  upon  $x$  gives the fitted line  $y = ax + b$ ; and regressing  $x$  upon  $y$  gives the fitted line  $x = cy + d$ , then

A.Two fitted lines must coincide

B.Two fitted lines need not coincide

**C.**It is possible that  $ac = 0$

**D.**A must be  $1/c$  (Ans)

Ans - D

**The root of  $x^3 - 2x - 5 = 0$  correct to three decimal places by using Newton-Raphson method is**

**A.**2.0946

**B.**1.0404

**C.**1.7321

**D.**0.7011

Ans - A

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**Newton-Raphson method of solution of numerical equation is not preferred when**

**A.**Graph of  $A(B)$  is vertical

**B.**Graph of  $x(y)$  is not parallel

**C.**The graph of  $f(x)$  is nearly horizontal-where it crosses the x-axis.

**D.**None of these

Ans - C

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**Following are the values of a function  $y(x)$  :  $y(-1) = 5$ ,  $y(0)$ ,  $y(1) = 8$**

**$dy/dx$  at  $x = 0$  as per Newton's central difference scheme is**

**A.**0

**B.**1.5

**C.**2.0

**D.**3.0

Ans - B

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**A root of the equation  $x^3 - x - 11 = 0$  correct to four decimals using bisection method is**

**A.**2.3737

**B.**2.3838

**C.**2.3736

**D.**None of these

Ans - C

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**Newton-Raphson method is applicable to the solution of**

**A.**Both algebraic and transcendental Equations

**B.**Both algebraic and transcendental and also used when the roots are complex

**C.**Algebraic equations only

**D.**Transcendental equations only

Ans - A

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**The order of error s the Simpson's rule for numerical integration with a step size h is**

**A.**h

**B.** $h^2$

**C.** $h^3$

**D.** $h^4$

Ans - B

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**In which of the following methods proper choice of initial value is very important?**

**A.**Bisection method

**B.**False position

**C.**Newton-Raphson

**D.**Bairsto method

Ans - C

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**Using Newton-Raphson method, find a root correct to three decimal places of the equation  $\sin x = 1 - x$**

- A.**0.511
- B.**0.500
- C.**0.555
- D.**None of these

Ans - A

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**Errors may occur in performing numerical computation on the computer due to**

- A.**Rounding errors
- B.**Power fluctuation
- C.**Operator fatigue
- D.**All of these

Ans - A

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**Match the following:**

- A.** Newton-Raphson
- B.** Runge-kutta
- C.** Gauss-seidel
- D.** Simpson's Rule

- 1.** Integration
- 2.** Root finding
- 3.** Ordinary Diferential Equations
- 4.** Solution of system of Linear Equations

**Codes:**  
**ABCD**

- A.**2341
- B.**3214
- C.**1423
- D.**None of these

Ans - A

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