Multiple choice questions - Numerical methods

Year: Year 13 · 10

Question 1 A change of sign of a continuous function in $[a, b]$ shows

- ◯ **A.** a root in the interval
- ◯ **B.** the root is exact
- ◯ **C.** no roots
- ◯ **D.** two roots

Question 2 Newton-Raphson formula is

- ◯ **A.** $x_{n+1} = x_n + \dfrac{f(x_n)}{f'(x_n)}$
- ◯ **B.** $x_{n+1} = x_n - \dfrac{f(x_n)}{f'(x_n)}$
- ◯ **C.** $x_{n+1} = x_n - f(x_n)f'(x_n)$
- ◯ **D.** $x_{n+1} = \dfrac{f(x_n)}{f'(x_n)}$

Question 3 A cobweb diagram occurs when

- ◯ **A.** 0
- ◯ **B.** $g' > 1$
- ◯ **C.** -1
- ◯ **D.** $g' = 0$

Question 4 The trapezium rule underestimates when the curve is

- ◯ **A.** convex (curving up)
- ◯ **B.** a straight line
- ◯ **C.** increasing
- ◯ **D.** concave (curving down)

Question 5 With 4 strips between 1 and 3, the strip width is

- ◯ **A.** 0.5
- ◯ **B.** 0.25
- ◯ **C.** 1
- ◯ **D.** 2

Question 6 Which function can change sign without a root?

- **A.** x^2
- **B.** $\frac{1}{x}$
- **C.** x^3
- **D.** e^x

Question 7 If $f(1.2125)$, the root is

- **A.** 1.212 to 3 d.p.
- **B.** 1.214 to 3 d.p.
- **C.** 1.213 to 3 d.p.
- **D.** exactly 1.2130

Question 8 Newton-Raphson can fail when

- **A.** $f(x)$ is a quadratic
- **B.** x is positive
- **C.** f' is large
- **D.** $f'(x_n)$ is close to 0

Question 9 For h and ordinates y_0 to y_4, the trapezium rule is

- **A.** $\frac{h}{2}[y_0 + y_4 + 2(y_1 + y_2 + y_3)]$
- **B.** $h[y_0 + y_1 + y_2 + y_3 + y_4]$
- **C.** $\frac{h}{2}[y_0 + y_4 + y_1 + y_2 + y_3]$
- **D.** $\frac{h}{2}[2y_0 + 2y_4 + y_1 + y_2 + y_3]$

Question 10 To use ANS on a calculator for iteration you

- **A.** change to degrees
- **B.** enter the formula with ANS replacing x(n)
- **C.** use the table mode
- **D.** square the answer

Answer grid - Numerical methods

Year: Year 13

Question	Answer	Explanation
1	**A**	Intermediate value theorem.
2	**B**	Standard form.
3	**C**	Negative gradient alternates.
4	**D**	Chords lie below.
5	**A**	(3-1)/4.
6	**B**	Discontinuous.
7	**C**	Between the bounds.
8	**D**	Horizontal tangent.
9	**A**	Middle ordinates doubled.
10	**B**	Repeated equals.