**More Maths 3 Rates of Change**

1. What is the gradient of a curve?
   1. The slope
   2. The point where it crosses the x axis
   3. The point where it crosses the y axis
   4. The integral
2. Is the gradient of a curve:
   1. always positive
   2. always negative
   3. either positive or negative
   4. only defined near the origin
3. Is the gradient at a point on a curve equal to the gradient of:
   1. the radius
   2. the sector
   3. the tangent
   4. the cosine
4. Is the gradient of a curve conventionally calculated from:
   1. dx/dx
   2. dy/dy
   3. dx/dy
   4. dy/dx
5. If y = what is the derivative?
   1. xn
   2. nxn
   3. nxn-1
   4. (n-1)xn-1
6. What is the derivative of 5x3?
   1. 15x2
   2. 5x2
   3. 15x3
   4. 10x2
7. What is the value of the derivative in the last question when x = 2?
   1. 2
   2. 20
   3. 40
   4. 60
8. What is the derivative of f(x) = x3/4?
   1. f '(x) = (¾)x-1/4
   2. f '(x) = (3/4)x1/4
   3. f '(x) = (4/3)x1/4
   4. f '(x) = (4/3)x-1/4
9. What is the gradient of y = x5 at the point (1,1)?
   1. 1
   2. 0
   3. -1
   4. 5
10. Differentiate y = 3x2 + 6x – 2.
    1. dy/dx = 6x3 + 6x2 -2x
    2. dy/dx = 6x + 6
    3. dy/dx = (3/2)x + 6
    4. dy/dx = 6x2 + 6
11. What is the derivative of loge mx?
    1. m loge x
    2. (m-1) loge x
    3. 1/x
    4. m/x
12. What is the gradient of the curve y = 4x3 + loge2x at x = 1?
    1. 13
    2. 12
    3. 12.5
    4. 14
13. When Q is the demand for an item and R is the revenue, what is measured by dR/dQ?
    1. price elasticity of demand
    2. marginal revenue
    3. propensity to consume
    4. profitability
14. If revenue, R, and demand, Q, are related by R = 20Q – 0.002Q2 what is the marginal revenue when Q = 1000?
    1. 18,000
    2. 18
    3. 16
    4. 0
15. What is the price elasticity of demand?
    1. the percentage change in price for each unit sold
    2. the percentage change in demand for each percentage change in price
    3. the percentage change in price for each percentage change in demand
    4. the percentage change in price for each percentage change in unit cost
16. What is the price elasticity of demand, when a price of P results in a demand of Q?
    1. dQ/dP
    2. -dQ/dP × P/Q
    3. dP/dQ
    4. -dP/dQ × Q/P
17. If the demand for an item is Q = 100 – 2√P, what is the price elasticity of demand?
    1. P1/2
    2. –P(-1/2)
    3. P1/2 /Q
    4. –P(-1/2) / Q
18. What is the price elasticity of demand if the demand for an item is Q = 100 – 2√P and P = 20?
    1. -0.2
    2. -0.02
    3. -0.05
    4. 0.5
19. Which of the following statements is not necessarily true?
    1. A local maximum is a turning point of a curve
    2. At a local maximum, the gradient of the curve is zero
    3. A local maximum is higher than all nearby points
    4. A local maximum is the highest point of the curve
20. Where does the turning point of the curve y = -x2 + 4x + 4 occur?
    1. when x = 4
    2. when x = 2
    3. when x = 0
    4. when x = -2
21. Is the turning point in the last question
    1. a maximum
    2. a minimum
    3. either a maximum or a minimum
    4. a point of inflexion
22. What are the maximum and minimum values of the curve in question 20?
    1. 4 and 0
    2. there is no maximum and 8
    3. there is no minimum and 8
    4. there is no minimum and 4
23. Find the values of x at which the curve y = 3x3 + 2x2 has turning points.
    1. 0 and -4/9
    2. 0 and 3/5
    3. -4 and 0
    4. 0 and 9
24. The curve y = 3x3 + 2x2 has a turning point at x = 0. Is it a local maximum or minimum, and why?
    1. local minimum since second derivative at that point is < 0
    2. local minimum since second derivative at that point is > 0
    3. local maximum since second derivative at that point is < 0
    4. local maximum since second derivative at that point is > 0
25. Which of the following statements is not true?
    1. A point of inflexion is a stationary point
    2. At a point of inflexion, the first derivative is zero
    3. At a point of inflexion, the second derivative is zero
    4. A curve changes direction at a point of inflexion

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| Question | Answer |
| 1 | A |
| 2 | C |
| 3 | C |
| 4 | D |
| 5 | C |
| 6 | A |
| 7 | D |
| 8 | A |
| 9 | D |
| 10 | B |
| 11 | C |
| 12 | B |
| 13 | B |
| 14 | C |
| 15 | B |
| 16 | B |
| 17 | C |
| 18 | C |
| 19 | D |
| 20 | B |
| 21 | A |
| 22 | C |
| 23 | A |
| 24 | B |
| 25 | D |