

asked the same question. 56 said yes and 24 said no. Draw up contingency tables for the observed and expected frequencies (Columns: Yes/No; Rows: Before/After campaign). Carry out a test at the 5% level to see if the advertising campaign has had an effect.

INTRODUCTORY DIFFERENTIAL CALCULUS

1. Differentiate the following functions:

$$f(x) = 2x^3 - 3x^2 + 4x - 3; f(x) = x + \frac{6}{x}; f(x) = 4 - \frac{2}{x^3}$$

2. What is the gradient of each of the curves in question 1 at the point where $x = 2$?
3. Find the equation of the tangent to $y = 3x^2 + 3$ at the point where $x = 1$.
4. Find the two points on the graph of $y = x - \frac{2}{x}$ where the gradient = 3.
5. By finding the values of $f(x)$ and $f'(x)$ at the points where $x = 2$ and $x = 3$ on the graph of $y = \frac{1}{2}x^2 - 2x + 1$, sketch the shape of the graph between the two points.
6. Use differentiation to find the turning point on the graph of $y = 6 - x + 3x^2$.
7. Use differentiation to find both turning points on the graph of $2x^3 - 24x$. Draw a sign diagram to decide which point is a maximum and which is a minimum.
8. Use your calculator to find all the turning points on the graph of $f(x) = x^2 \times 2^x$. State which are maxima and which are minima. Give answers to 3 significant figures where appropriate.
9. Find the gradient of the line joining the points (2, 6) and (3, 11) on the graph of $y = x^2 + 2$. Repeat for the line joining the points with x -coordinates 2 and 2.5, and then the line joining points with x -coordinates 2 and 2.1. What do your results suggest about the gradient of the tangent to the graph at the point where $x = 2$?

FINANCIAL MATHEMATICS

1. If $\text{£}3.50 = \text{€}5.39$, convert $\text{£}1$ to € , and $\text{€}1$ to £ .
2. If $\text{\$}1 = 12.8$ crowns, how many dollars would 150 crowns be worth?
3. A bank charges commission when converting currency as follows: the charge is 5% or $\text{\$}3.50$, whichever is larger. Using the conversion rate in question 2, how many crowns would a customer receive when changing $\text{\$}50$? And how many crowns for $\text{\$}500$.
4. I invest $\text{\$}2500$ at 3% compound interest. How much will my investment be worth in 10 years? What would be the equivalent rate of simple interest?
5. How many years will it take for an investment of $\text{£}1500$ to grow to $\text{£}2500$ at a rate of 6%, compounded annually?
6. I buy a car for $\text{€}9000$ and it depreciates at 30% per year for two years and then at 20% per year for another 3 years. How much will it then be worth, to the nearest euro?
7. How much more would a $\text{£}5200$ investment be worth after 4 years if the compound interest rate is 0.5% per month instead of 6% per year?
8. Set up a table on your GDC which shows the annual value of a $\text{\$}200$ investment growing at 4% compound interest per year. Use your table to write down after how many years the investment will be worth more than $\text{\$}300$ and after how many years it will have trebled in value.
9. If my house has increased in value by 2.5% in the last year, and it is now worth $\text{€}150,000$, what was it worth one year ago?
10. Use the table on page 60 to work out how much in total you would pay if you were to take out a $\text{\$}20000$ loan at 8% over 4 years.
11. I put $\text{\$AUS}2000$ into a savings account at the start of *each* year for 5 years. The total investment gains 4% per year. What is it worth at the end of the 5 years?