

# Euler's Method - Worksheet

1. Estimate  $y(1.3)$  if  $y(1) = 9$  and  $y'(1) = -0.5$   $x = 1.5$ .
2. Use tangent line approximation to estimate  $f(2.8)$ , where  $f(x) = x^3 - 2x^2 - 4$ .
3. Use tangent line approximation to estimate  $g(3.2)$ , where  $g(y) = e^{\sin(2y)}$ .
4. If  $f'(1) = \frac{-1}{2}$  and  $f(0.8) = 5$ , estimate  $f(1)$ .
5. Tangent approximation of  $g(\hat{a})$  is  $\hat{b}$  using the information  $g(a) = b$ . Find  $g'(a)$  in terms of  $a$ ,  $b$ ,  $\hat{a}$  and  $\hat{b}$ .
6. Use the tangent line at  $x = 2$  to estimate the value of  $f(x) = 2^{x^2-2x}$  at
7. Estimate the slope of the tangent to  $g(x)$  at  $x = 5.7$ , if  $g''(5) = 3.1$  and  $g'(5) = -19$ .
8. If  $f(x)$  is the solution of  $\frac{dy}{dx} = \sqrt{x^3 + 3x}$ ,  $f(1) = 6$ , estimate  $f(1.5)$  using Euler's method.
9. If  $g(x)$  is the solution of  $\frac{dy}{dx} = \frac{y}{x^2+y^2}$ ,  $g(0) = -3$ , estimate  $g(-0.3)$  using Euler's method.
10. Estimate  $y(2.5)$ , where  $\frac{dy}{dx} = xy + \frac{y}{x}$ ,  $y(2) = 6$ , using Euler's method with  $\Delta x = 0.25$ .