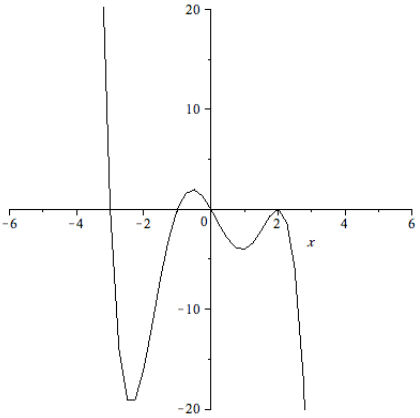
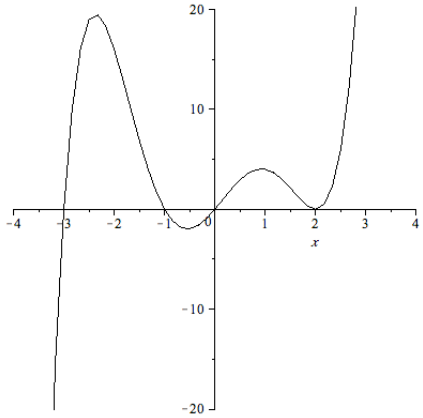
1. For each of the four graphs given below , choose the equation from the given list. Choose ONLY one for each graph.

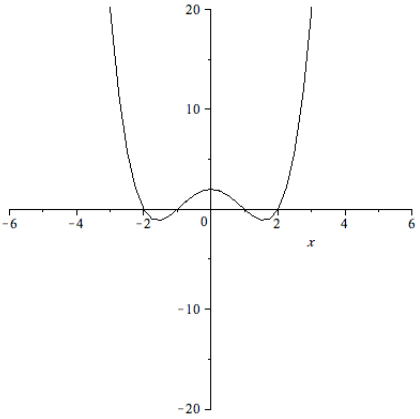
A



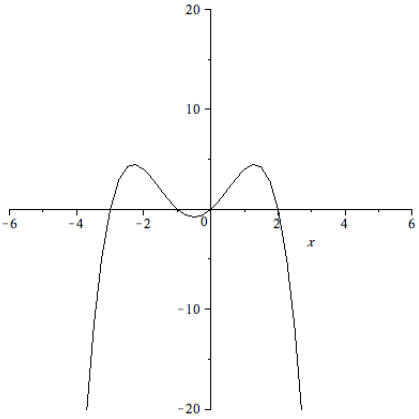
B



C



D



$(i)\ y = f(x) = \frac{x^4}{2} - \frac{5}{2}x^2 + 2$

$(ii)\ y = f(x) = \frac{x^5}{2} - \frac{5}{2}x^3 + 2x$

$(iii)\ y = f(x) = -\frac{x^4}{2} - x^3 + \frac{5}{2}x^2 + 3x$

$(iv)\ y = f(x) = \frac{x^4}{2} + x^3 - \frac{5}{2}x^2 - 3x$

$(v)\ y = f(x) = -\frac{x^5}{2} + \frac{9}{2}x^3 - 2x^2 - 6x$

2. Compute the limits

(*i*) $\lim_{x \to -1} \dfrac{x^4 - 1}{x - 1}$

(*ii*) $\lim_{x \to 0} \dfrac{1}{x\left(\sqrt{1+x}\right)} - \dfrac{1}{x}$

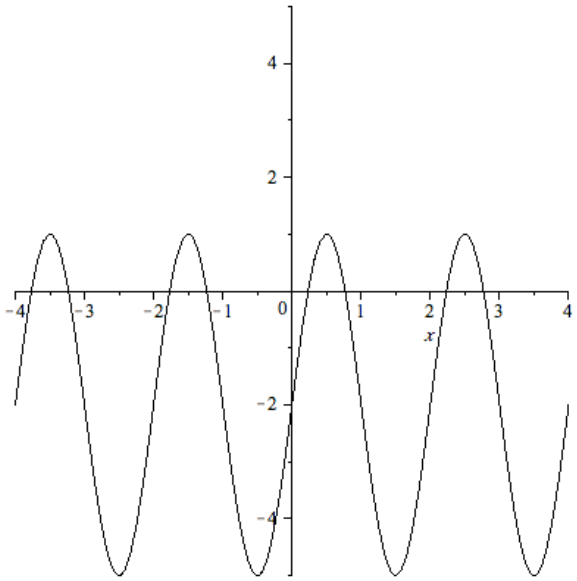
3. (i) Use the definition of derivative (nothing else) to prove that if

$y = f(x) = \dfrac{1}{\sqrt{x}}$ then $\dfrac{dy}{dx} = f'(x) = \dfrac{-1}{2\sqrt{x^3}}$

(ii) Find the equation of the line that is tangent to the graph of

$y = f(x) = \dfrac{1}{\sqrt{x}}$ at the graph point where $x = 4$.

4. Find an equation for the wave function whose graph is given below.



5. Compute the limits:

$(i)\ \lim_{x\to 0} \dfrac{\sin 7x}{\sin 9x}$

$(ii)\ \lim_{x\to 0} \dfrac{x^2}{1-\cos x}$

6. Find the inverse of each function:

$(i)\ y = f(x) = \dfrac{3x-4}{x-3}$

$(ii)\ y = f(x) = \log_{10}\sqrt{\dfrac{x}{x+50}} \qquad x > 0$

7. Compute the limits:

$(i)\ \lim_{x\to\infty} \dfrac{\sqrt[3]{27x^3+7x^2+13x-5}}{\sqrt{4x^2+19x-12}}$

$(ii)\ \lim_{x\to\infty} \left(\sqrt{x^2+5x}-x\right)$