

January 2012.

Test 1

Solutions.

Q1 (a) $\frac{x+10}{x^2-4}$ (b) (i) $a = \frac{1}{n} \left[T - \frac{mn(n-1)}{2} \right]$

(ii) $r = \frac{VR}{E-V}$

(c) $x=2$ $y=4$ and $x=-3.5$ $y=-12.5$

(d) (i) $\frac{4P}{3q}$ (ii) $\frac{3m(m-2n)}{2n(m+2n)}$

Q2 (a) (i) $BC = 5$ (ii) $DC = 4$ (iii) 60°

(b) (i) 1.3 and -3.8 (ii) 2.7 (iii) 2.3 and -0.6
(iv) -2.5 and 4.5 (v) -1.6

Q3 a (i) $\frac{ds}{dt} = -\frac{9}{t^4} + \frac{6}{\sqrt{t^5}} + \frac{3}{5\sqrt[5]{t^2}}$

(ii) $\frac{dp}{dq} = 16q^2 \cos 4q + 8q \sin 4q$

(iii) $\frac{dm}{dn} = \frac{-6n^2 + 4n + 6}{(n^2 + 1)^2}$

(iv) $\frac{da}{db} = \frac{2b-4}{b^2-4b+3}$

(v) $\frac{dd}{df} = (8f+3)e^{(4f^2+3f-1)}$

(vi) $\frac{dz}{dy} = \frac{-48(2y-3)}{(y^2-3y)^{13}}$

(b) $\frac{\partial z}{\partial x} = \frac{5y}{(x+y)^2} \left(-\frac{10}{9} \right)$ $\frac{\partial z}{\partial y} = \frac{-5x}{(x+y)^2} \left(\frac{5}{9} \right)$

Q4 (a) Order 2

(b) $\frac{4}{(x-1)} + \frac{3}{(2x-1)}$

differentiated $-\frac{4}{(x-1)^2} - \frac{6}{(2x-1)^2}$

(c) $(4x+3)(x-1)$ Solutions $45^\circ, 225^\circ, 143.13^\circ, 323.13^\circ$

(d) $x = \frac{2}{3}$