A2 Maths Test zeta version O

1) Integrate $\frac{1}{2x}$ with respect to x:

2) Differentiate $e^{-3x}\cot x$ with respect to x

3) Find the inverse of $f(x) = (x-1)^2 + 4, \quad x \geq 1$

4) Solve $\tan^2\theta + 2\sec\theta = 7 \quad 0 \leq \theta \leq 2\pi$

5) The curve with equation $y = x^2 \ln x$ is defined for positive values of x.
a) Determine the coordinates of the stationary point and
b) find the equation of the tangent at the point $\left(e, e^2\right)$

6) Given that f(x) = $\frac{2}{x-1} - \frac{6}{(x-1)(2x+1)}$, $x > 1$,

(a) Prove that f(x) = $\frac{4}{2x+1}$

(b) Find the range of f.

(c) Find $f^{-1}(x)$ and state its domain.

(d) State the range of $f^{-1}(x)$.

A2 Maths Test zeta version P

1) Integrate $\frac{1}{3x}$ with respect to x:

2) Differentiate $e^{-2x}\cot x$ with respect to x

3) Find the inverse of $f(x) = (x-2)^2 + 3, \quad x \geq 1$

4) Solve $\tan^2\theta + \sec\theta = 1 \quad 0 \leq \theta \leq 2\pi$

5) The curve with equation $y = x^2 \ln x$ is defined for positive values of x.
a) Determine the coordinates of the stationary point and
b) find the equation of the tangent at the point $\left(e, e^2\right)$

6) Given that f(x) = $\frac{2}{x-1} - \frac{6}{(x-1)(2x+1)}$, $x > 1$,

(a) Prove that f(x) = $\frac{4}{2x+1}$

(b) Find the range of f.

(c) Find $f^{-1}(x)$ and state its domain.

(d) State the range of $f^{-1}(x)$.

A2 Maths Test zeta version Q

1) Integrate $\frac{1}{4x}$ with respect to x:

2) Differentiate $e^{-11x}\cot x$ with respect to x

3) Find the inverse of $f(x) = (x-11)^2 + 14, \quad x \geq 1$

4) Solve $\tan^2\theta + 4\sec\theta = 11 \qquad 0 \leq \theta \leq 2\pi$

5) The curve with equation $y = x^2 \ln x$ is defined for positive values of x.
a) Determine the coordinates of the stationary point and
b) find the equation of the tangent at the point $\left(e, e^2\right)$

6) Given that f(x) = $\dfrac{2}{x-1} - \dfrac{6}{(x-1)(2x+1)}$, $x > 1$,

(a) Prove that f(x) = $\dfrac{4}{2x+1}$

(b) Find the range of f.

(c) Find $f^{-1}(x)$ and state its domain.

(d) State the range of $f^{-1}(x)$.

A2 Maths Test zeta version R

1) Integrate $\frac{1}{ax}$ with respect to x:

2) Differentiate $e^{-ax}\cot x$ with respect to x

3) Find the inverse of $f(x) = (x-a)^2 + b, \quad x \geq 1$

4) Solve $\tan^2\theta + 2\sec\theta = 3 \qquad 0 \leq \theta \leq 2\pi$

5) The curve with equation $y = x^2 \ln x$ is defined for positive values of x.
a) Determine the coordinates of the stationary point and
b) find the equation of the tangent at the point $\left(e, e^2\right)$

6) Given that f(x) = $\dfrac{2}{x-1} - \dfrac{6}{(x-1)(2x+1)}$, $x > 1$,

(a) Prove that f(x) = $\dfrac{4}{2x+1}$

(b) Find the range of f.

(c) Find $f^{-1}(x)$ and state its domain.

(d) State the range of $f^{-1}(x)$.

Answers O

1) $\frac{1}{2}\ln x + c$
2) $-e^{-3x}(3\cot x + \text{cosec}^2 x)$
3) $1 + \sqrt{x-4}$
4) $\frac{\pi}{3}, \frac{5\pi}{3}, 1.82, \ 4.46$
5) $\left(e^{-1/2}, -0.5e^{-1}\right)$ y =3ex – 2e^2
6) a) Proof
   b) $0<f(x)<\frac{4}{3}$
   c) $f^{-1}x = \frac{4-x}{2x}, \ 0<x<\frac{4}{3}$
   d) $f^{-1}(x) > 1$

Answers P

1) $\frac{1}{3}\ln x + c$
2) $-e^{-2x}(2\cot x + \text{cosec}^2 x)$
3) $2 + \sqrt{x-3}$
4) $\frac{2\pi}{3}, \frac{4\pi}{3}, 0, \ 2\pi$
5) $\left(e^{-1/2}, -0.5e^{-1}\right)$ y =3ex – 2e^2
6)
   a. Proof
   b. $0<f(x)<\frac{4}{3}$
   c. $f^{-1}x = \frac{4-x}{2x}, \ 0<x<\frac{4}{3}$
   d. $f^{-1}(x) > 1$

Answers Q

1) $\frac{1}{4}\ln x + c$
2) $-e^{-11x}(11\cot x + \mathrm{cosec}^2 x)$
3) $11 + \sqrt{x - 14}$
4) $\frac{\pi}{3}, \frac{5\pi}{3}, 1.74,\ 4.54$
5) $\left(e^{-1/2}, -0.5e^{-1}\right)$ y =3ex – 2e^2
6)
   a. Proof
   b. $0<f(x)<\frac{4}{3}$
   c. $f^{-1}x = \frac{4-x}{2x},\ 0<x<\frac{4}{3}$
   d. $f^{-1}(x) > 1$

Answers R

1) $\frac{1}{a}\ln x + c$
2) $-e^{-ax}(a\cot x + \mathrm{cosec}^2 x)$
3) $a + \sqrt{x - b}$
4) $\frac{\pi}{5}, \frac{9\pi}{5}, \frac{3\pi}{5}, \frac{7\pi}{5}$
5) $\left(e^{-1/2}, -0.5e^{-1}\right)$ y =3ex – 2e^2
6)
   a. Proof
   b. $0<f(x)<\frac{4}{3}$
   c. $f^{-1}x = \frac{4-x}{2x},\ 0<x<\frac{4}{3}$
   d. $f^{-1}(x) > 1$