

<u>Home</u>

Maths

Calculus

Differentiation

Differentiating Powers 1

Differentiating Powers 1

Part A Differentiate $y=x^4$

Find
$$\frac{\mathrm{d}y}{\mathrm{d}x}$$
 if $y=x^4$.

The following symbols may be useful: $\boldsymbol{\boldsymbol{x}}$

Part B Differentiate $x=t^2$

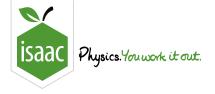
Find the gradient of the curve $x=t^2$ at the points t=0, t=3 and t=-3.

Find the gradient at t = 0.

Find the gradient at t = 3.

Find the gradient at t = -3.

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Differentiating Powers 2

Part A Gradient of $v=\frac{1}{u}$

Find
$$\frac{\mathrm{d}v}{\mathrm{d}u}$$
 if $v=\frac{1}{u}$.

The following symbols may be useful: \boldsymbol{u}

Part B Tangent to $v = \frac{1}{u}$

Find the equation of the tangent to this curve (i.e. $v=\frac{1}{u}$) at the point u=2.

The following symbols may be useful: u, $\ v$

Part C Derivative of $F=Ar^3$

Find $rac{\mathrm{d}F}{\mathrm{d}r}$ if $F=Ar^3$ where A is a constant.

The following symbols may be useful: A, r

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Differentiating Powers 3



Part A Derivative of $v=Bu^{-3}$

Find
$$\frac{\mathrm{d}v}{\mathrm{d}u}$$
 if $v=Bu^{-3}$.

The following symbols may be useful: B, u

Part B \qquad Force if potential $V=rac{q^2}{(4\pi\epsilon_0 r)}$

The electrostatic potential energy V of two equal charges q a distance r apart is given by $V=\frac{q^2}{(4\pi\epsilon_0 r)}$. The force between the two charges is given by $-\frac{\mathrm{d}V}{\mathrm{d}r}$; find an expression for this force.

The following symbols may be useful: epsilon_0, pi, q, r

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Differentiating Powers 4

Part A Gradient of curve $t=4s^{-3/4}$

Find the gradient of the curve $t=4s^{-3/4}$ at the point s=16.

Part B First derivative of $x=bt^{3/2}$

Find
$$\frac{\mathrm{d}x}{\mathrm{d}t}$$
 if $x=bt^{3/2}$.

The following symbols may be useful: b, t

Part C Second derivative of $x=bt^{3/2}$

Find
$$rac{\mathrm{d}^2x}{\mathrm{d}t^2}$$
 if $x=bt^{3/2}.$

The following symbols may be useful: b, $\ \ t$

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<u>Home</u>

Maths

Differentiation (powers of x) 4i

Differentiation (powers of x) 4i



Given that $f(x) = 8x^3 + rac{1}{x^3}$,

Part A f''(x)

Find f''(x).

The following symbols may be useful: x

Part B
$$f(x) = -9$$

Give any of the solutions of the equation f(x) = -9.

The following symbols may be useful: x



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Maths

Differentiation (powers of x) 1ii

Differentiation (powers of x) 1ii



It is given that $y = 6x^3 + \frac{4}{\sqrt{x}} + 5x$.

Part A Find differential

Find
$$\frac{\mathrm{d}y}{\mathrm{d}x}$$
.

The following symbols may be useful: x

Part B Find second differential

Find
$$\frac{\mathrm{d}^2 y}{\mathrm{d} x^2}$$
.

The following symbols may be useful: x

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