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Calculus Chapter 3 Test Sample Questions

Watch the matching video: <https://www.youtube.com/watch?v=Mcc9SL9105k>

Practice focus: Product and quotient rules

Related course review; confirm topics with your teacher.

Name: _____ Date: _____ Show your reasoning and check units.

01 Differentiate $y=(x^2+1)e^x$.

02 Differentiate $y=(x+1)/(x-1)$.

03 Differentiate $y=x^2 \sin x$.

04 A student writes $(fg)'=f'g'$. Correct the rule.

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Practice focus: Chain rule

Related course review; confirm topics with your teacher.

Name: _____ Date: _____ Show your reasoning and check units.

05 Differentiate $y=(3x^2+1)^4$.

06 Differentiate $y=\sin(5x)$.

07 Differentiate $y=e^{(x^2)}$.

08 Differentiate $y=\sqrt{1+x^2}$.

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Calculus Chapter 3 Test Sample Questions

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Practice focus: Implicit differentiation

Related course review; confirm topics with your teacher.

Name: _____ Date: _____ Show your reasoning and check units.

09 For $x^2 + y^2 = 25$, find dy/dx .

10 Find the tangent line to $x^2 + y^2 = 25$ at $(3,4)$.

11 For $xy = 6$, find dy/dx .

12 For $x^3 + y^3 = 6xy$, find dy/dx .

Worked answers | Lesson 288

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Practice focus: Product and quotient rules

Related course review; confirm topics with your teacher.

01 Differentiate $y=(x^2+1)e^x$.

Product rule: $y'=2xe^x+(x^2+1)e^x=e^x(x^2+2x+1)$.

02 Differentiate $y=(x+1)/(x-1)$.

Quotient rule gives $[(x-1)-(x+1)]/(x-1)^2 = -2/(x-1)^2$, $x \neq 1$.

03 Differentiate $y=x^2 \sin x$.

$y'=2x \sin x + x^2 \cos x$ by the product rule.

04 A student writes $(fg)'=f'g'$. Correct the rule.

The correct rule is $(fg)'=f'g+fg'$. Both factors contribute a term.

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Practice focus: Chain rule

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05 Differentiate $y=(3x^2+1)^4$.

Outer derivative times inner: $y'=4(3x^2+1)^3(6x)=24x(3x^2+1)^3$.

06 Differentiate $y=\sin(5x)$.

$y'=5\cos(5x)$.

07 Differentiate $y=e^{(x^2)}$.

$y'=2xe^{(x^2)}$.

08 Differentiate $y=\sqrt{1+x^2}$.

$y'=(1/2)(1+x^2)^{-1/2}(2x)=x/\sqrt{1+x^2}$.

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Practice focus: Implicit differentiation

Related course review; confirm topics with your teacher.

09 For $x^2 + y^2 = 25$, find dy/dx .

$2x + 2y y' = 0$, so $y' = -x/y$ where $y \neq 0$.

10 Find the tangent line to $x^2 + y^2 = 25$ at $(3, 4)$.

Slope $-3/4$. Tangent: $y - 4 = -(3/4)(x - 3)$.

11 For $xy = 6$, find dy/dx .

Product rule: $y + xy' = 0$, so $y' = -y/x$, $x \neq 0$.

12 For $x^3 + y^3 = 6xy$, find dy/dx .

$3x^2 + 3y^2 y' = 6y + 6xy'$. Thus $y' = (6y - 3x^2)/(3y^2 - 6x)$ where denominator is nonzero.