

Watch. Practice. Understand. | Lesson 319

7.5 Strategies for Integration

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

Practice focus: Integration by substitution

Related course review; confirm topics with your teacher.

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

01 Integrate $2x(x^2+1)^3 dx$.

02 Integrate $\cos(3x) dx$.

03 Evaluate the integral of $2x e^{(x^2)}$ from 0 to 1.

04 Integrate $x/(x^2+4) dx$.

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

Practice focus: Integration by parts

Related course review; confirm topics with your teacher.

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

05 Integrate $x e^x dx$.

06 Integrate $\ln x dx$ for $x > 0$.

07 Integrate $x \cos x dx$.

08 Evaluate the integral of $x e^x$ from 0 to 1.

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7.5 Strategies for Integration

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

Practice focus: Integrating partial fractions

Related course review; confirm topics with your teacher.

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

09 Integrate $1/((x+1)(x+2)) \, dx$.

10 Integrate $(3x+5)/((x+1)(x+2)) \, dx$.

11 Integrate $1/(x^2-1) \, dx$.

12 Integrate $(x^2+1)/x \, dx$ for $x \neq 0$.

Worked answers | Lesson 319

7.5 Strategies for Integration

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

Practice focus: Integration by substitution

Related course review; confirm topics with your teacher.

01 Integrate $2x(x^2+1)^3 dx$.

Let $u=x^2+1$, $du=2x dx$. Integral $u^3 du = u^4/4+C = (x^2+1)^4/4+C$.

02 Integrate $\cos(3x) dx$.

Let $u=3x$. Result $(1/3)\sin(3x)+C$.

03 Evaluate the integral of $2x e^{(x^2)}$ from 0 to 1.

$u=x^2$ changes bounds to 0 and 1. Integral $e^u du = e-1$.

04 Integrate $x/(x^2+4) dx$.

Let $u=x^2+4$, $du=2x dx$. Result $(1/2)\ln(x^2+4)+C$.

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Practice focus: Integration by parts

Related course review; confirm topics with your teacher.

05 Integrate $x e^x dx$.

Take $u=x$, $dv=e^x dx$. Result $x e^x - \int e^x dx = e^x(x-1)+C$.

06 Integrate $\ln x dx$ for $x>0$.

$u=\ln x$, $dv=dx$. Result $x \ln x - x + C$.

07 Integrate $x \cos x dx$.

$u=x$, $dv=\cos x dx$ gives $x \sin x + \cos x + C$.

08 Evaluate the integral of $x e^x$ from 0 to 1.

Use $e^x(x-1)$: at 1 gives 0, at 0 gives -1. Integral = 1.

Worked answers | Lesson 319

7 5 Strategies for Integration

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

Practice focus: Integrating partial fractions

Related course review; confirm topics with your teacher.

09 Integrate $1/((x+1)(x+2)) dx$.

Decompose into $1/(x+1)-1/(x+2)$. Result $\ln|x+1|-\ln|x+2|+C$ on intervals avoiding $-1,-2$.

10 Integrate $(3x+5)/((x+1)(x+2)) dx$.

Decomposition $2/(x+1)+1/(x+2)$ gives $2\ln|x+1|+\ln|x+2|+C$.

11 Integrate $1/(x^2-1) dx$.

Decomposition $(1/2)/(x-1)-(1/2)/(x+1)$. Result $(1/2)\ln|(x-1)/(x+1)|+C$.

12 Integrate $(x^2+1)/x dx$ for $x \neq 0$.

Divide first: $x+1/x$. Integral $x^2/2+\ln|x|+C$.