MTH 152 Quiz 4 – October 31 Fall 2017

Name: Solutions

Please take your time and answer each question clearly and carefully. For this quiz, you will not need a calculator. Do not use one.

Compute each integral (anti-derivative). Your answer must include the unknown constant of integration, $+C$. Take care to use the correct method of the two we have just learned.

One of those methods uses the following formula: $\int udv = uv - \int vdu$.

1. $\int 2x\cos(x^2+2)dx$

$u = x^2 + 2$

$du = 2x\,dx$

Perfect match

$$\int \cos(u)\,du = \sin(u) + C$$

$$= \sin(x^2+2) + C$$

TURN OVER

2. $\int 2x\cos(x+2)\,dx$

$u = x+2$

$du = dx$

Nothing to help with this.

Need to integrate by parts.

$u = x$ or $u = \cos(x+2)$?

whichever one gets better when taking derivative. (Or use "L.A.T.E.")

That means $\boxed{u = x}$ $\xrightarrow{\text{deriv}}$ $du = dx$

What's left $\Rightarrow$ dv:

$dv = 2\cos(x+2)\,dx$

$\downarrow$ Integral

$v = 2\sin(x+2)$

$$\int u\,dv = uv - \int v\,du$$

$$= x\cdot(2\sin(x+2)) - \int 2\sin(x+2)\,dx$$

$$= 2x\sin(x+2) - 2(-\cos(x+2)) + C$$

$$= \boxed{2x\sin(x+2) + 2\cos(x+2) + C}$$