

Math 172 - Quiz 8

October 26, 2016

Name key

Score _____

Show all work to receive full credit. Supply explanations when necessary.

1. (5 points) Integrate: $\int \frac{x^4 + 6x^3 - 8x^2 + 7x + 8}{x^2 + 4} dx$

$$\begin{array}{r}
 \overline{) x^4 + 6x^3 - 8x^2 + 7x + 8} \\
 \underline{-(x^4 + 4x^2)} \\
 6x^3 - 12x^2 + 7x + 8 \\
 \underline{-(6x^3 + 24x)} \\
 -12x^2 - 17x + 8 \\
 \underline{-(-12x^2 - 48)} \\
 -17x + 56
 \end{array}$$

$$\int (x^2 + 6x - 12) dx - \frac{17}{2} \int \frac{2x}{x^2 + 4} dx + \int \frac{56}{x^2 + 4} dx$$

$u = x^2 + 4$
 $du = 2x dx$
 $\int \frac{1}{u} du = \ln |u|$

$$= \frac{1}{3}x^3 + 3x^2 - 12x - \frac{17}{2} \ln(x^2 + 4) + 28 \tan^{-1} \frac{x}{2} + C$$

2. (5 points) Integrate: $\int (2x^2 + 3x) e^{5x} dx$

	u	dv
+	$2x^2 + 3x$	e^{5x}
-	$4x + 3$	$\frac{1}{5} e^{5x}$
+	4	$\frac{1}{25} e^{5x}$
-	0	$\frac{1}{125} e^{5x}$

$$= (2x^2 + 3x) \left(\frac{1}{5} e^{5x} \right) - (4x + 3) \left(\frac{1}{25} e^{5x} \right) + \frac{4}{125} e^{5x} + C$$

$$= \frac{1}{125} e^{5x} (50x^2 + 55x - 11) + C$$