MTHU131 Quiz 7 Review

In problems 1–6, find the indicated general antiderivative, i.e., evaluate the given integral.

1. $\int (15x^4 - 9x^2)\, dx$

$3x^5 - 3x^3 + C$

2. $\int \frac{1765}{x}\, dx$

$1765 \ln|x| + c$

3. $\int \left(\frac{3}{2x^4} + 2\sqrt{x}\right) dx = \int \frac{3}{2} x^{-4} + 2x^{1/2}\, dx = \frac{3}{2} x^{-3}(-\frac{1}{3}) + 2x^{3/2} \cdot \frac{2}{3} + C$

$-\frac{1}{2} x^{-3} + \frac{4}{3} x^{3/2} + c$

4. $\int (5e^{-1.2t} + 31.4)\, dt = \frac{5e^{-1.2t}}{-1.2} + 31.4t + C = -4.1\bar{6}\, e^{-1.2t} + 31.4t + c$

OR $-\frac{25}{6} e^{-\frac{6}{5}t} + 31.4t + c$

5. $\int \frac{2}{3x+5}\, dx = \frac{2}{3} \ln|3x+5| + c$

6. $\int \frac{d(\sqrt{4x+3}\,)}{dx}\, dx = \sqrt{4x+3} + c$

7. Find $F$, the specific antiderivative of the function $f$, when $f(x) = 6x^2 - 12x$, and $F(2) = 12$.

$F(x) = 2x^3 - 6x^2 + c$

$12 = 2(2)^3 - 6(2)^2 + c$

$12 - 16 + 24 = c$

$c = 20$

$F(x) = 2x^3 - 6x^2 + 20$

8. During the nineteen nineties the rate of change of the number of people employed by a certain airline can be modeled by $n(t) = 0.58t - 1.78$ thousand people per year $t$ years after 1990. The airline employed 45,000 people in 1995. Find a function giving the total number of people employed by the airline $t$ years after 1990.

$$N(t) = 0.29t^2 - 1.78t + C$$

$$45 = 0.29(5)^2 - 1.78(5) + C$$

$$C = 46.65$$

$$N(t) = 0.29t^2 - 1.78t + 46.65$$