**Calculus 12** **Intro to Anti-derivatives** **Name:** Answers

**1. Find y, given y':**

(a) $y' = 2x + 1$

$y = x^2 + x + C$

(b) $y' = (4x)^9$

$y = \frac{1}{40}(4x)^{10} + C$

(c) $y' = (\sin^5 x)(\cos x)$

$y = \frac{1}{6}\sin^6 x + C$

(d) $y' = e^{7x}$

$y = \frac{1}{7}e^{7x} + C$

(e) $y' = 2/x$

$y = 2\ln x + C = \ln x^2 + C$

(f) $y' = (\cos 3x)^4 \sin 3x$

$y = -\frac{1}{15}\cos^5(3x) + C$

**2.** Find f(x) such that $f(1) = -4$ and $f'(x) = 6x^2 - 6x + 4$

$f(x) = 2x^3 - 3x^2 + 4x + C$

$f(1) = 2(1)^3 - 3(1)^2 + 4(1) + C$

$-4 = 2 - 3 + 4 + C$

$C = -7$

$f(x) = 2x^3 - 3x^2 + 4x - 7$

**3.** An object is moving along a path over a certain period of time. Given the following:
(d = distance, v = velocity, a = acceleration, t = time).

$a = 2t + 15$ $v(2) = 12$ $d(0) = 5$

(a) Find the formulas for **d** and **v**.

$a = d''$

$v = d'$

$a = v'$

$v = t^2 + 15t + C$

$12 = 2^2 + 15(2) + C$

$12 = 34 + C$

$C = -22$

$v = t^2 + 15t - 22$

$d = \frac{1}{3}t^3 + 7.5t^2 - 22t + C$

$5 = 0 + 0 - 0 + C$

$C = 5$

$d = \frac{1}{3}t^3 + 7.5t^2 - 22t + 5$

(b) Find d(3) and v(5).

$d(3) = \frac{1}{3}(3)^3 + 7.5(3)^2 - 22(3) + 5 = 15.5$

$v(5) = 5^2 + 15(5) - 22 = 78$