## Worksheet \# 23: Antiderivatives

1. Find the most general antiderivative for each of the following functions.
(a) $x-3$
(b) $\frac{1}{4} x^{6}-5 x^{3}+9 x$
(c) $(x+1)(9 x-8)$
(d) $\sqrt{x}-\frac{2}{\sqrt{x}}$
(e) $\frac{5}{x}$
(f) $\sqrt{x^{5}}-40$
(g) $\frac{x^{3}-8 x^{2}+5}{x^{2}}$
(h) $\frac{5}{x^{6}}$
(i) $\frac{\sqrt{x}}{x^{2}}+\frac{3}{4} x^{3}$
(j) $\frac{2}{5} x^{e}$
(k) $\frac{1}{x-3}$
(l) $\sin (\theta)-\sec ^{2}(\theta)$
2. Find the values of the parameter $A$ and $B$ so that
(a) $F(x)=(A x+B) e^{x}$ is an antiderivative of $f(x)=x e^{x}$.
(b) $H(x)=e^{2 x}(A \cos x+B \sin x)$ is an antiderivative of $h(x)=e^{2 x} \sin x$.
3. A particle moves along a straight line so that its velocity is given by $v(t)=t^{2}$. What is the net change in the particle's position between $t=1$ and $t=3$ ?
4. Suppose an object travels in a straight line with constant acceleration $a$, initial velocity $v_{0}$, and initial displacement $x_{0}$. Find a formula for the position function of the object.
5. A car brakes with constant deceleration of $5 \mathrm{~m} / s^{2}$ produceing skid marks measuring 75 meters long before coming to a stop. How fast was the car traveling when the brakes were first applied?
6. True or false?
(a) The antiderivative of function is unique.
(b) If $F$ is the antiderivative of $f$ then $f$ is differentiable.
(c) If $F$ is the antiderivative of $f$ then $F+c$ where $c$ is a constant is also an antiderivative.
