

SECTION 3-3: DERIVATIVE RULES

1. Using what you know about the graphs of the functions below, determine their derivatives

$f(x) = 10$

$g(x) = x$

$h(x) = \pi x$

$j(x) = \pi x + 1$

$f'(x) = \underline{\hspace{2cm}}$

$g'(x) = \underline{\hspace{2cm}}$

$h'(x) = \underline{\hspace{2cm}}$

$j'(x) = \underline{\hspace{2cm}}$

2. Use the definition of the derivative to find the derivatives for each of the following functions:

(a) $f(x) = x^2$

(b) $f(x) = x^3$

3. Recall the following results below:

work	$f(x)$	$f'(x)$
(worksheet §3.1)	x^{-1}	$-1x^{-2}$
(§3.1 # 20)	$3x^{-2}$	$-6x^{-3}$
(§3.2 #59)	$(\sqrt{2})x^{1/2}$	$\frac{\sqrt{2}}{2}x^{-1/2}$

4. Use the data above to fill in the rules below. Assume c and n are fixed numbers.

$\frac{d}{dx} [c] = \underline{\hspace{2cm}}$

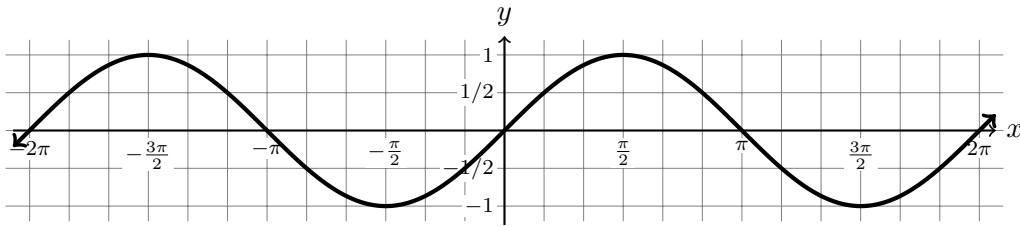
$\frac{d}{dx} [x^n] = \underline{\hspace{2cm}}$

$\frac{d}{dx} [x^n + c] = \underline{\hspace{2cm}}$

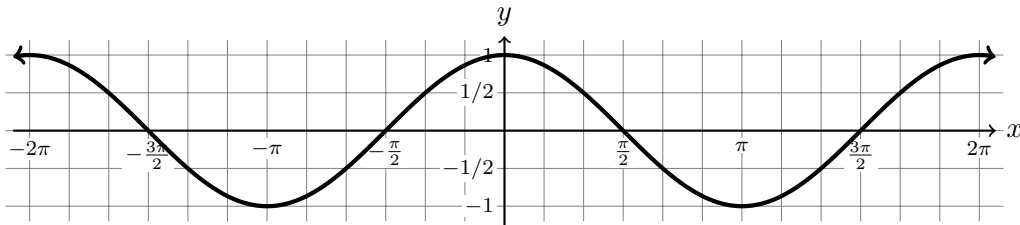
$\frac{d}{dx} [cx^n] = \underline{\hspace{2cm}}$

5. Use the graphs of $f(x) = \sin(x)$ and $g(x) = \cos(x)$ (below) to sketch the graph of their derivatives $f'(x)$ and $g'(x)$.

$$f(x) = \sin(x)$$



$$g(x) = \cos(x)$$



6. Base on the work above, guess answers: $\frac{d}{dx} [\sin(x)] = \underline{\hspace{2cm}}$ $\frac{d}{dx} [\cos(x)] = \underline{\hspace{2cm}}$

7. Four Big Rules

(a) Constant Multiple

(b) Sum (and Difference)

(c) Product

(d) Quotient