

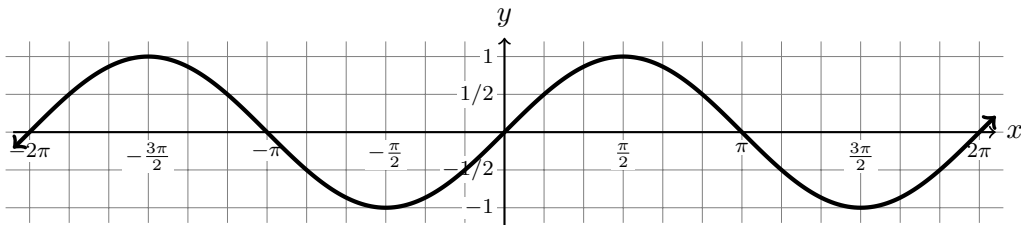
SECTION 3-3: DERIVATIVE RULES

1. Review from Section 3.2.

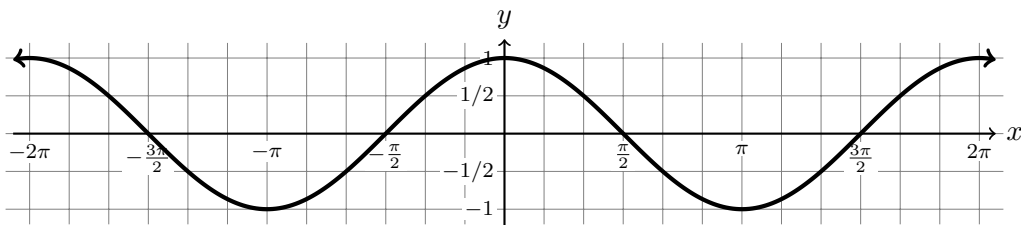
- (a) State the definition of $f'(x)$ using the "h"-notation and use it to find $f'(x)$ for at least one of the functions in the list: $f_1(x) = C$, $f_2(x) = x$, $f_3(x) = x^2$, $f_4(x) = x^3$, $f_5(x) = x^{-1}$, $f_6(x) = x^{1/2}$.

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

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



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



- (c) Use the work from the previous problems to fill in the blanks below:

i. $\frac{d}{dx} [C] =$
 ii. $\frac{d}{dx} [x^n] =$

iii. $\frac{d}{dx} [\sin(x)] =$
 iv. $\frac{d}{dx} [\cos(x)] =$

2. Use your intuition to evaluate the derivatives of the functions below and *ask yourself what assumptions you are making*.

(a) $S(x) = x^5 + \sin(x)$

(b) $M(x) = 20 \cos(x)$

3. Summary Rules

(a) Sum and Difference

(b) Constant Multiple

(c) Product

(d) Quotient

4. Find the derivatives of the functions below.

(a) $K(\theta) = \theta^{1/3} \sin(\theta)$

(b) $j(x) = \frac{\cos(x) + \sqrt{2}}{x+1}$