

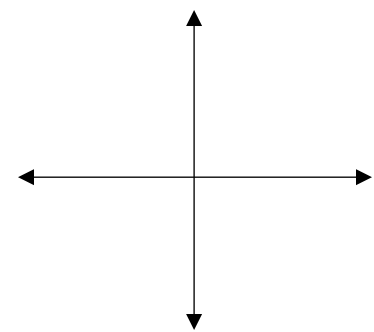
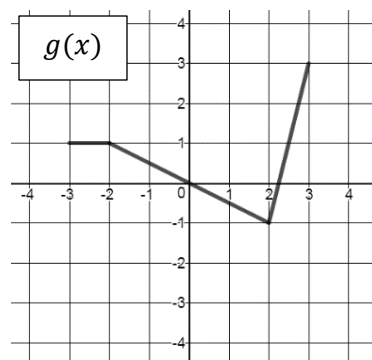
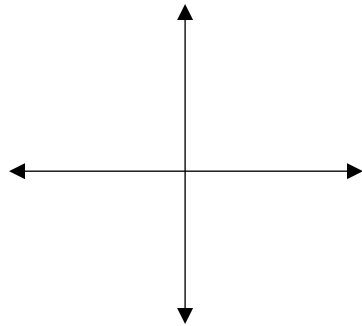
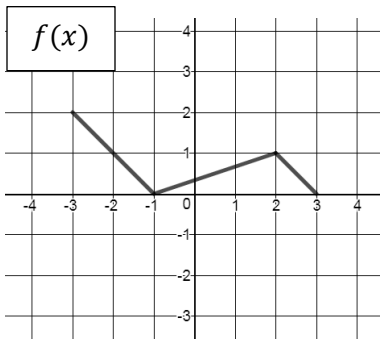
1. Given $f(x) = 5x^3 - 3x^2 + 2x$ find:

a. $f'(x) =$ _____

b. $f''(x) =$ _____

2. Given $y = 2\cos x - y^3$ find y' :

3. The graphs of $f(x)$ and $g(x)$ with the domain $[-3,3]$ are composed of line segments shown below.



a. Sketch the graphs of $f'(x)$ and $g'(x)$.

b. Name the x-coordinate of each point of discontinuity of $f'(x)$ over $(-3,3)$: _____

$g'(x)$ over $(-3,3)$: _____

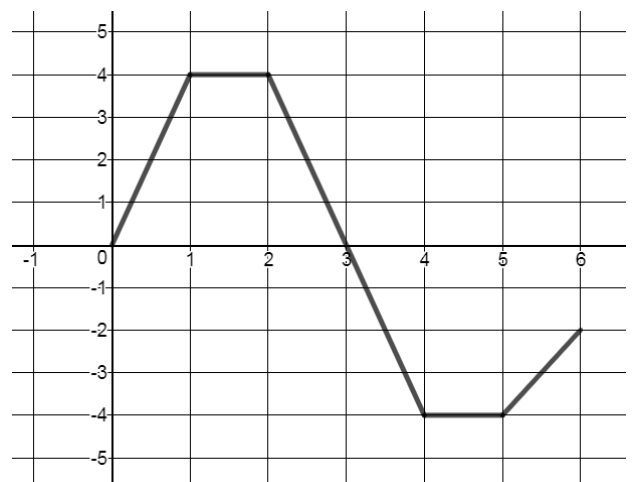
4. The graph show the position of $s(t)$ of a particle moving along a horizontal axis.

a. When does the particle move to the left?

b. When does the particle move to the right?

c. When does the particle stand still?

d. When is the particle moving fastest?



Find the **first** derivative.

5. $y = 5^{(-2x+1)}$

6. $y = 3(5x + 2x^{-2})^4$

7. $y = e^{3x}x^5$

8. $y = \frac{\sin x}{1+\cos x}$

9. $y = \ln(x^2 - 2x)$

10. $y = \csc(3x^2 + 4)$

11. $\sqrt{5 + x^2} \cdot x^2$

12. $y = \frac{x^2 - 6x + 2}{x^2}$

13. $\cos^2(2x - 5)$

14. $y = \tan^2(3x + 1)$

15. Write the equation of the tangent to the function $y = 3x^2 - 2x + 1$ at $x = 2$.

16. Find the equation of the line that is normal to the graph of $3x^2y - 2x + y^2 = 17$ at the point $(-2,1)$.

17. Find the **second** derivative using **implicit differentiation**.

a. $y^2 - x^2 = 5$

b. $y^3 = x^3 - 2$

18. A particle moves along a line so that its position at any time $t \geq 0$ is given by the function:

$$s(t) = t^2 - 7t + 12. \quad (s: \text{meters} \quad t: \text{seconds})$$

a. Find the average velocity during the first 3 seconds.

b. Find the instantaneous velocity when $t = 5$.

c. Find the instantaneous velocity when $t = 5$.

d. Find the acceleration of the particle when $t = 2$.

e. At what values of t does the particle change direction?