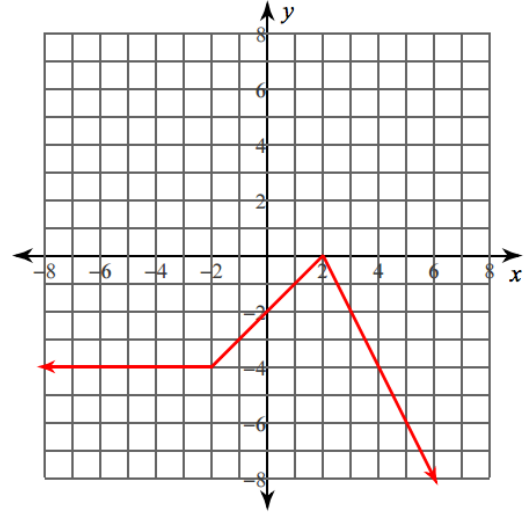
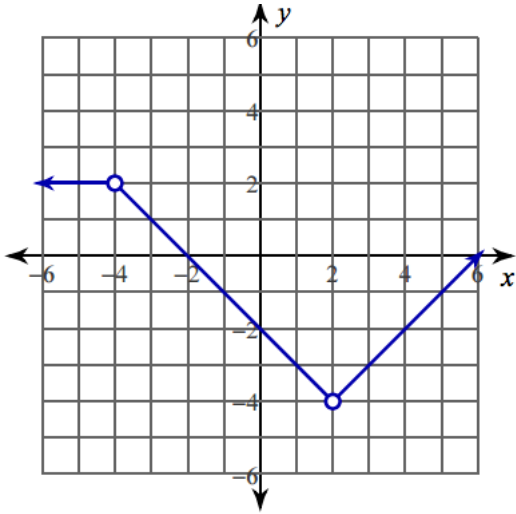


Let's Get Test Preppy! Whoo Hoo!

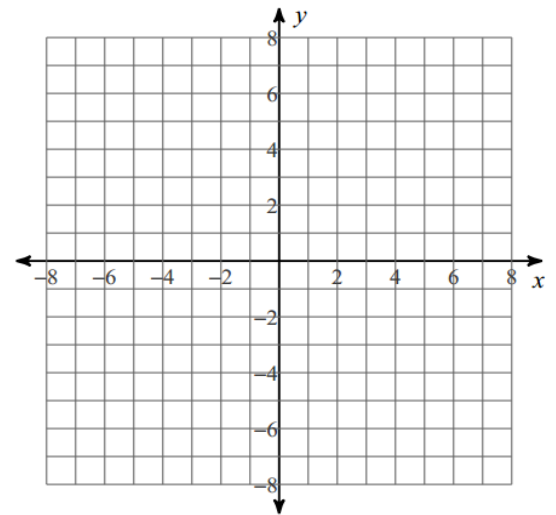
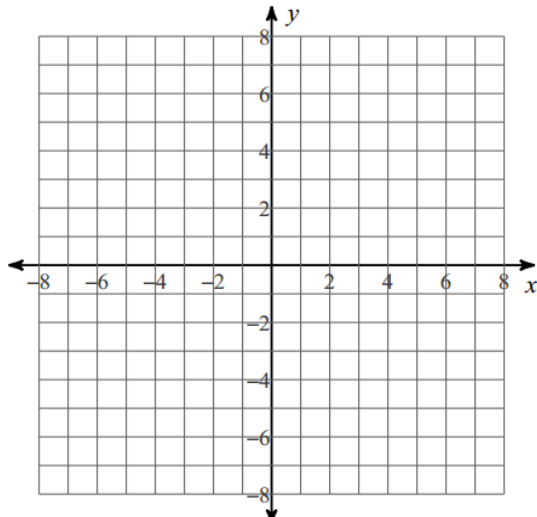
- *Piecewise Functions*
 - *From graph to function*



- *From function to graph*

$$g(x) = \begin{cases} x, & x \leq -1 \\ x - 2, & -1 < x \leq 4 \\ -3, & x > 4 \end{cases}$$

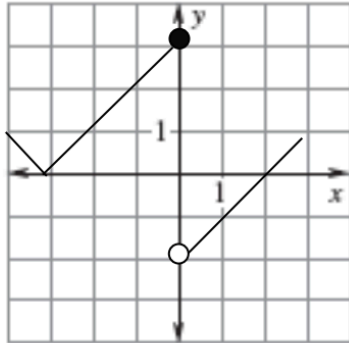
$$g(x) = \begin{cases} x + 1, & x \leq 0 \\ 0, & x > 0 \end{cases}$$



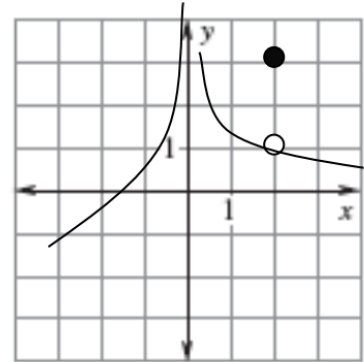
More Piecewise Examples:

<http://www.ranchorams.org/ourpages/auto/2014/9/7/55587856/Day%207%20Piecewise%20HW.pdf>

- **Limits**
 - **From graphs**



- $\lim_{x \rightarrow 0^-} =$ _____
- $\lim_{x \rightarrow 0^+} =$ _____
- $\lim_{x \rightarrow 0} =$ _____
- $f(0) =$ _____



- $\lim_{x \rightarrow 2^-} =$ _____
- $\lim_{x \rightarrow 2^+} =$ _____
- $\lim_{x \rightarrow 2} =$ _____
- $f(2) =$ _____

<http://www.la-citadelle.com/courses/calculus/lim08.pdf>

(Solutions at the bottom)

- **Evaluating**

$$\lim_{x \rightarrow 1} 5$$

$$\lim_{x \rightarrow \frac{5}{2}} (-x + 2)$$

$$\lim_{x \rightarrow 2} (x^3 - x^2 - 4)$$

$$\lim_{x \rightarrow 3} -\sqrt{x + 3}$$

Give an example of a limit that evaluate to 4.

Give an example of a limit of a quadratic function where the limit evaluates to 9.

○ *Requiring factoring*

$$\lim_{x \rightarrow 1} \frac{x^2 - 1}{x - 1}$$

$$\lim_{x \rightarrow 2} \frac{x^2 - x - 2}{x - 2}$$

$$\lim_{x \rightarrow 5} \frac{x^2 - 5x}{x - 5}$$

$$\lim_{x \rightarrow 5} \frac{x^2 + 3x - 10}{x + 5}$$

○ *At infinity*

$$\lim_{x \rightarrow -\infty} (x^3 - 4x^2 + 5)$$

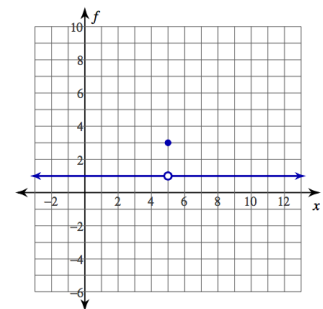
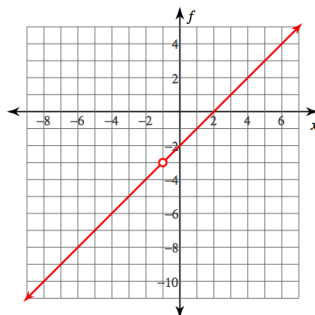
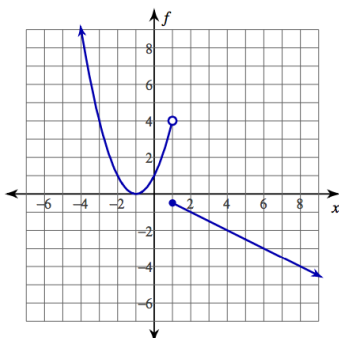
$$\lim_{x \rightarrow \infty} \frac{2x^3}{3x^2 - 4}$$

$$\lim_{x \rightarrow \infty} \frac{x^3}{4x^2 + 3}$$

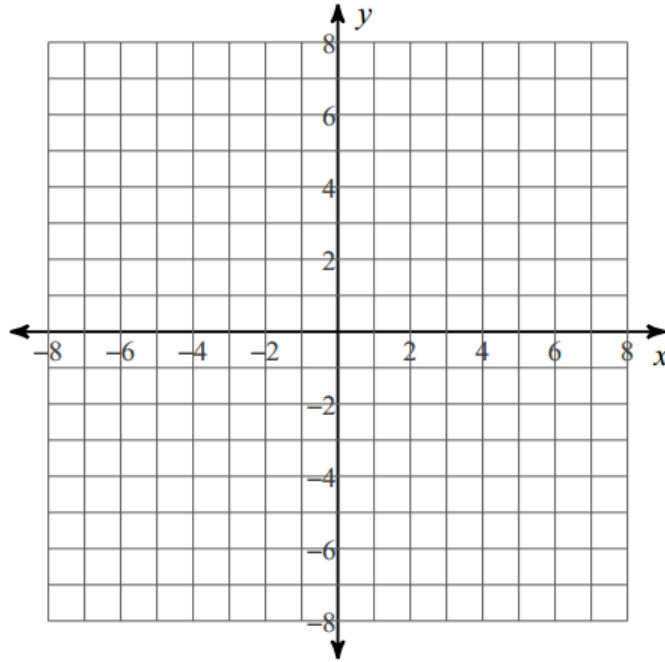
$$\lim_{x \rightarrow \infty} \frac{x + 1}{2x^2 + 2x + 1}$$

○ *Continuity*

- *Identify the type of discontinuity and intervals of continuity*



Give an example of a function with discontinuities at $x = 1, 2,$ and $3.$



- *Derivatives*

- *Power Rule*

- *Find the 2nd and 3rd derivatives*

$$y = 5$$

$$y = 5x^{18}$$

$$y = 4x^4 - 5x - 3$$

$$y = 4x^5 + x$$

Differentiate each function with respect to $x.$ Problems may contain constants $a,$ $b,$ and $c.$

$$y = 5c$$

$$y = 4ax^{3a} - bx^{3c}$$

○ *Fractional or Negative Exponents*

- *Find the 2nd and 3rd derivatives*

$$y = -4x^{-5}$$

$$y = \frac{3}{x^3}$$

$$y = 3x^{\frac{5}{4}}$$

$$y = \frac{5}{4}x^{\frac{2}{3}}$$

$$y = x^{\frac{2}{3}}$$

$$y = -2\sqrt[4]{x}$$

○ *Finding extremas*

- *Find the location and type of the following extremas*

$$y = 10 - 6x + 3x^2$$

$$y = 5x^2 - 15x + 1$$

Give an example function $f(x)$ where $f'(0)=0$ and there is a relative maximum at $x=0$.

○ *Bonus: Tangent Lines*

$$y = 4 - x^2; \quad x = -1$$

$$y = x - 2x^2; \quad x = 1$$

$$y = x^3 + 3x; \quad x = 1$$

- *Integrals*

- *Antiderivatives*

- *Fractional and negative exponents*

$$6x^2$$

$$16x^3$$

$$\frac{1}{x^4}$$

$$\frac{x^5}{3}$$

$$-x^{-2}$$

$$10$$

$$(x - 2)^2$$

$$\sqrt[3]{x}$$

- *Indefinite integrals*

- *Additional examples on Integral Review Page*

$$\int 4x^3 dx$$

$$\int \left(x^{\frac{1}{2}} + 3x^2 \right) dx$$

○ *Definite integrals*

▪ *Additional examples on Integral Review Page*

$$\int_2^3 5x^4 dx$$

$$\int_0^3 (-x^3 + 3x^2 - 2) dx$$

$$\int_0^1 2x dx$$

$$\int_{-1}^0 (x - 2) dx$$