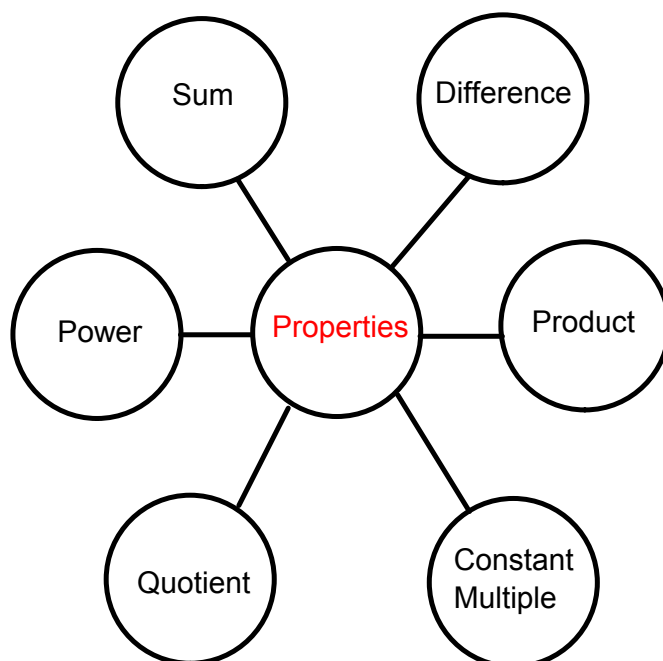


Lesson 2.4: Properties of Limits

↳ Apply the properties of limits to calculate limits.

- « Tables and graphs were used earlier to estimate the value of a limit of a function.
- « Properties will now be introduced to calculate limits precisely.



Lesson 2.4 Properties of Limits and examples

Assume: $\lim_{x \rightarrow a} f(x)$ and $\lim_{x \rightarrow a} g(x)$ exist
 a is a constant

1. Sum Rule/Difference Rule:

↳ the limit of the sum (difference) of two functions is equal to the sum (difference) of their limits.

$$\lim_{x \rightarrow a} [f(x) \pm g(x)]$$

2. Product Rule:

↳ the limit of the product of two functions is the product of their limits.

$$\lim_{x \rightarrow a} [f(x) \cdot g(x)]$$

3. Quotient Rule:

↳ the limit of the quotient of two functions is the quotient of their limits, provided that the limit in the denominator function is not zero.

$$\lim_{x \rightarrow a} \frac{f(x)}{g(x)}$$

4. Power Rule:

↳ the limit of the power of a function is the power of its limit.

$$\lim_{x \rightarrow a} [f(x)]^n$$

5. Constant Rule:

↳ the limit of the constant function is the constant.

$$\lim_{x \rightarrow a} c$$

6. Constant Multiple Rule:

↳ the limit of the constant times a function is the product of the constant and the limit of the function.

$$\lim_{x \rightarrow a} c[f(x)]$$

Examples using the Limit Properties

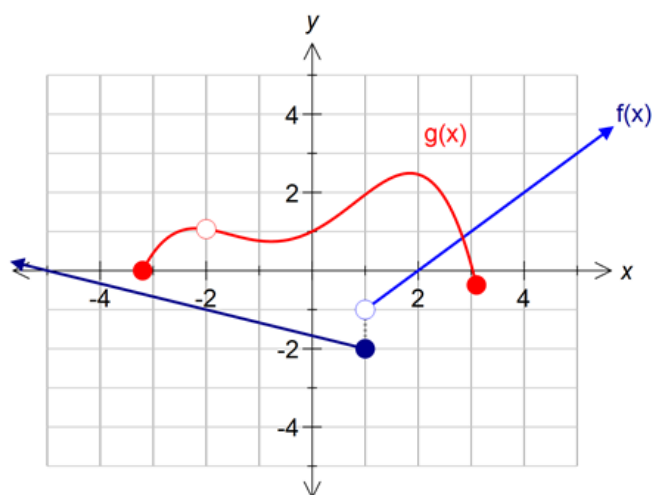
« Identify which limit property to use.

« Find the limit of each individually.

Example 1

Use the given graph to evaluate the following:

(a) $\lim_{x \rightarrow -2} [f(x) + 5g(x)]$



(b) $\lim_{x \rightarrow 1} [f(x) \cdot g(x)]$

(c) $\lim_{x \rightarrow -2} \frac{f(x)}{g(x)}$

→