Bellwork 9/13

1. Evaluate

$$\lim_{x\to 5}\left(\frac{x^2+x-30}{5-x}\right)$$

2. Find $\lim_{x\to 0} f(x)$ where

$$f(x)=\begin{cases}\sqrt{4-x} & \text{if } x<0\\ x+2 & \text{if } x\geq 0\end{cases}$$

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Bellwork 9/13 - Solutions

1. $$\lim_{x \to 5} \left(\frac{x^2 + x - 30}{5 - x} \right) = \boxed{-11}$$

2. $$f(x) = \begin{cases} \sqrt{4 - x} & \text{if } x < 0 \\ x + 2 & \text{if } x \geq 0 \end{cases}$$

$$\lim_{x \to 0^-} f(x) = 2 \qquad \lim_{x \to 0^+} f(x) = 2$$

$$\implies \lim_{x \to 0} f(x) = \boxed{2}$$

Exercise 1

$$f(2) = 3$$
$$g(2) = -6$$
$$h(2) = -3$$

$$\lim_{x \to 2} f(x) = 4$$
$$\lim_{x \to 2} g(x) = -6$$
$$\lim_{x \to 2} h(x) = 2$$

What is $\lim_{x \to 2}[h(x)(5f(x) + g(x))]$?

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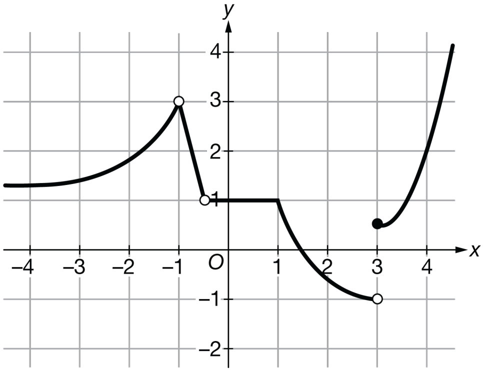
Exercise 1 - Solution

Since all of the limits are defined, we can directly rewrite the expression and substitute:

$$\lim_{x \to 2} [h(x)(5f(x) + g(x))]$$

$$= \lim_{x \to 2} h(x) \cdot \left[5 \lim_{x \to 2} f(x) + \lim_{x \to 2} g(x) \right]$$
$$= 2(5 \cdot 4 - 6)$$
$$= \boxed{28}$$

Exercise 2



Graph of f

What is $\lim_{x \to -1} f[f(x)]$?

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Exercise 2 - Solution

$$\lim_{x \to -1} f(x) = 3$$

$$\implies \lim_{x \to -1} f[f(x)]$$

$$=$$