Name: _____ _____ / 25

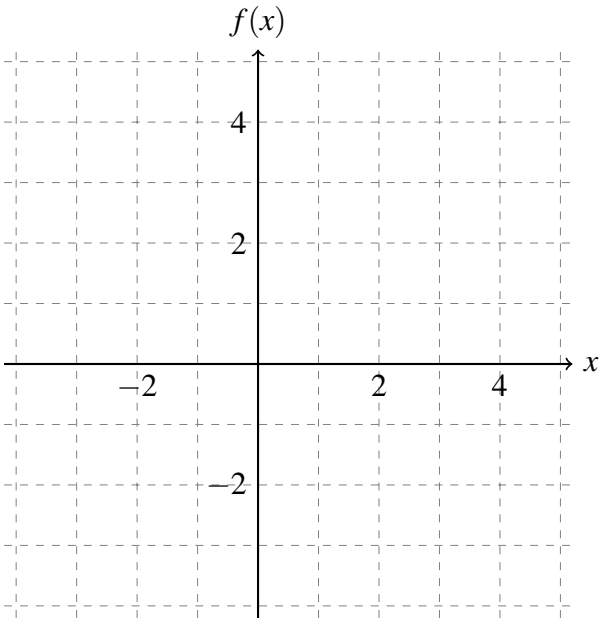
Circle one: **Faudree (F01)** | **Bueler (F02)** | **VanSpronsen (UX1)**

25 points possible. No aids (book, calculator, etc.) are permitted. Show all work and use proper notation for full credit.

1. [8 points] On the axes below, **sketch the graph** of the function

$$f(x) = \begin{cases} 1+x & x < 1 \\ 2 & x = 1 \\ \frac{1}{1-x} & x > 1. \end{cases}$$

Then compute the requested values.



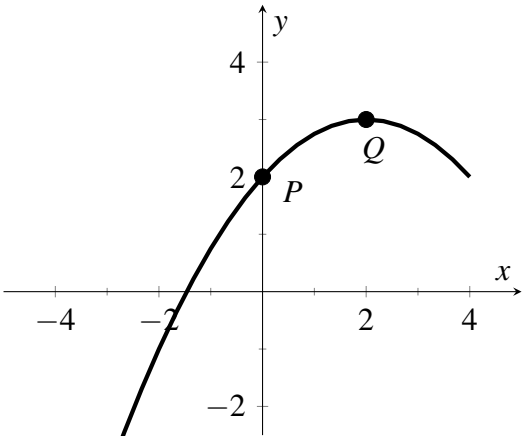
a. $f(1) =$ ☐

b. $\lim_{x \to 1^-} f(x) =$ ☐

c. $\lim_{x \to 1} f(x) =$ ☐

Justify your answer to part **c**:

2. [4 points] Consider the following graph $y = f(x)$.

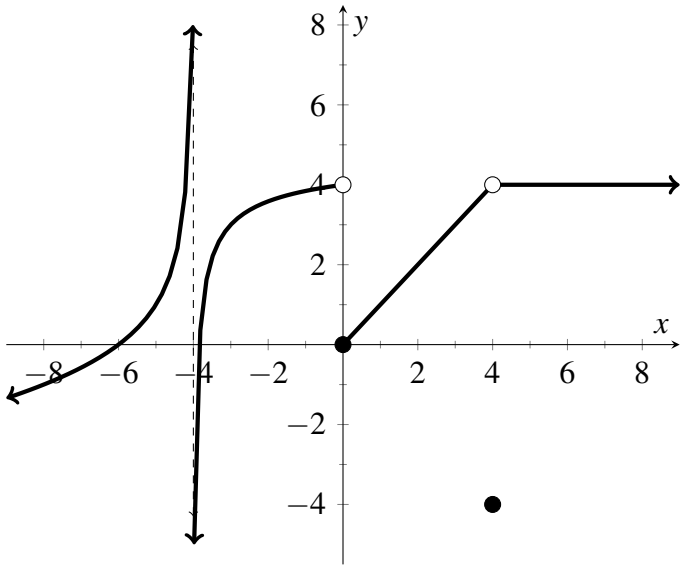


a. Sketch the secant line through points P and Q. (*Add the line to the graph at left.*)

b. Find the slope of the secant line through the same points $P(0,2)$ and $Q(2,3)$.

c. Sketch the tangent line through point P.

3. [9 points] Use the graph of the function $f(x)$ to answer the following questions.



a. $f(-6) =$ _____ **b.** $f(0) =$ _____ **c.** $f(4) =$ _____

d. $\lim_{x\to 0^+} f(x) =$ _____ **e.** $\lim_{x\to 0^-} f(x) =$ _____ **f.** $\lim_{x\to 0} f(x) =$ _____

g. $\lim_{x\to -4^+} f(x) =$ _____ **h.** $\lim_{x\to 6} f(x) =$ _____ **i.** $\lim_{x\to 4} f(x) =$ _____

4. [4 points] Compute the following limits.

a. $\lim_{x\to 4} \dfrac{x-3}{(x-4)^2} =$ $\boxed{}$

b. $\lim_{x\to 0^+} \dfrac{2}{\sin(x)} =$ $\boxed{}$