Name: _____   _____ / 25

There are 25 points possible on this quiz. No aids (book, calculator, etc.) are permitted. **Show all work for full credit.**

1. **[11 points]** Let $P(0,6)$ be a point on the graph of $f(x) = \dfrac{10}{x+1} + x - 4$.

    a. Find the slope of the secant line passing through P and the point $Q(1, f(1))$.

    b. Find the slope of the secant line passing through P and the point $Q(4, f(4))$.

    c. The table below lists the slope of the secant line passing through the point P and the point $Q(x, f(x))$ for several values of x.

x	-0.1	-0.01	-0.001	0.001	0.01	0.1
f(x)	7.011111	6.091010	6.00901	5.99910	5.9910	5.91099
m_{sec}	-10.111111	-9.101010	-9.00100	-8.99900	-8.90099	-8.090909

    Use the information in the table to estimate the slope of the tangent line to $f(x)$ at the point $P(0,6)$.

    d. Use the slope from part (c) above to write an equation of the tangent line at point $P(0,6)$.

    e.
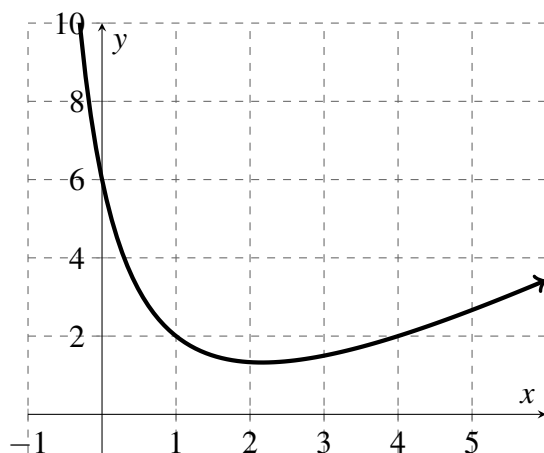
Left is a sketch of the graph of

$$f(x) = \frac{10}{x+1} + x - 4.$$

Sketch and label the **tangent** line to the graph at the point $P(0,6)$.
Sketch and label the **secant** line between $P(0,6)$ and $Q(4, f(4))$.

2. [8 points] Evaluate the expressions below. Assume all angles are measured in radians.
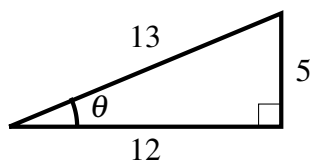
    a. $\sin(\pi/4) =$ **b.** $\cos(7\pi/6) =$

    c. $\tan(2\pi/3) =$ **d.** $\sin(-\pi/2) =$

3. [2 points] Use the right triangle below, with side lengths 12, 5 and 13, to evaluate the expressions.

    a. $\cos(\theta) =$

    b. $\csc(\theta) =$

4. [4 points] An athlete is running along a straight path. The position of the athlete is given by $d(t) = \frac{1}{2}t^2 + t$, where t is time measured in seconds and d is distance measured in meters. Find the average velocity of the athlete between $t = 2$ and $t = 4$. Include units with your answer.