9. [15 points] For each problem, circle the correct answer. There is only one correct answer for each part. You do not need to show your work, but unclear answers will be marked incorrect.

a. [3 points] A vertical asymptote of the function $y = \dfrac{2x^2 - x}{x - \frac{1}{2}}$ is

$x = 2$ $x = \frac{1}{2}$ $x = 1$ $x = 3$ [None of these]

b. [3 points] The limit of the function $y = \dfrac{3\ln x - 2\sqrt{x}}{\ln x + x}$ as $x \to \infty$ is

2 3 ∞ $-\infty$ [0] None of these

c. [3 points] Suppose $k(w)$ is an odd function defined for all real numbers w, and $k(3) = -7$. If $h(w) = 2k(w + 1)$, which of the following **must** have a value of 14?

$h(-3)$ $h(-2)$ $h(2)$ [$h(-4)$] None of these

d. [3 points] Suppose $C(t)$ is a periodic function with period 11. If $C(9) = -7$, which of the following **must** be true?

$C(t)$ has an amplitude of 5.5. $C(t)$ is sinusoidal. $C(-2) = 7$.

$C(14.5) = 7$. [$C(-2) = -7$] None of these

e. [3 points] Suppose $P = 3$ when $Q = 7$, and $P = 2$ when $Q = -7$. Which of the following **could** be true?

Q is a decreasing function of P. P is inversely proportional to Q.

$P = \dfrac{1}{49}(Q - 7)^2 + 3$. [$P$ is an invertible function of Q.] None of these