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Test 2
(short practice version)

Cal I (S) (Maths 201–NYA)

Answers

1. (a) $-\frac{5}{2}$ (b) -5 (c) $-2^- : +\infty$; $-2^+ : -\infty$ (d) $\frac{2}{3}$ (e) $\frac{3}{2}$
2. Discontinuous at $x = \frac{1}{2}$ (not removable), and at $x = 2$ (not removable).
3. $a = \frac{1}{3}$
4. Discontinuous at $x = \pm\frac{1}{3}$; removable at $\frac{1}{3}$; a vertical asymptote at $-\frac{1}{3}$.
   The function $\dfrac{x-1}{3x+1}$ removes the discontinuity at $x = \frac{1}{3}$.
5. $(x^2+1)^{\cos x}\left(-\sin x \ln(x^2+1) + \cos x \dfrac{2x}{x^2+1}\right)$
6. $-164(2x+7)^{-3}$
7. (a) Any continuous function with a sharp change in slope at $x = 0$.
   (b) Any otherwise continuous function with a "hole" at $x = 0$.
   (c) Impossible (differentiable implies continuous).
8. -0.729 m/s
9. 65 km/hr
10. min: -0.38 at $x = -\frac{2}{3}$; max: 1.41 at $x = 1$.
11. As $x \to 0$, $f(x) \to -\infty$, so f has no absolute minimum. (Actually, as $x \to -\infty$, $f(x) \to -\infty$ also.) As $x \to \infty$, $f(x) \to \infty$, so f has no absolute maximum.

Let me know if you think any of these answers is incorrect or unclear.