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(* AP Calculus AB | Mr. Shubleka | Quiz 6 | Key/Commentary *)

(* Problem 1*)

Plot[(x^2 + x - 6) / Abs[x - 2], {x, -1, 4}]
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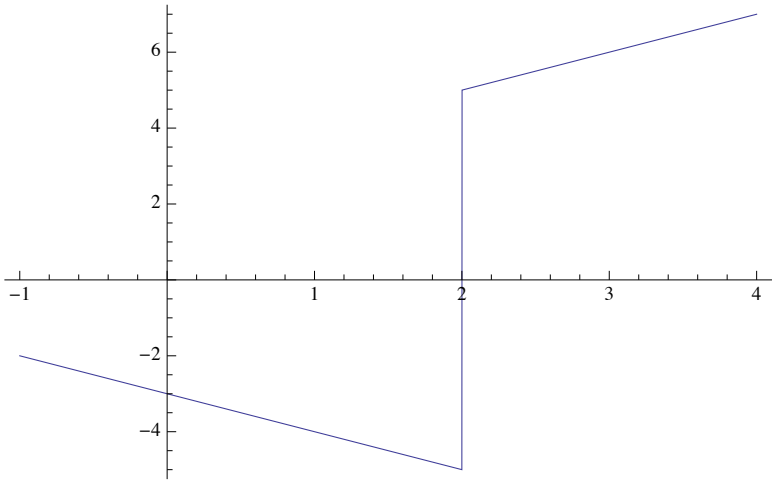

a) Note that the denominator is simply (x-2) when x > 2 (right-sided limit) and -(x-2) when x < 2 (left-sided limit). Factor the numerator into (x+3) (x-2), and evaluate the one sided limits: - 5 (left) and 5 (right).
b) The overall limit does not exist because the left and right limits do not coincide.
c) See graph above. This is an example of a jump discountinuity. Remember to draw open circles at the end of each branch, where x = 2.

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(* Problem 2 *)

Plot[Piecewise[{{x, x < 1}, {3, x == 1}, {2 - x^2, 1 < x ≤ 2}, {x - 3, x > 2}}],
 {x, -1, 5}, PlotRange → {-3, 4}]
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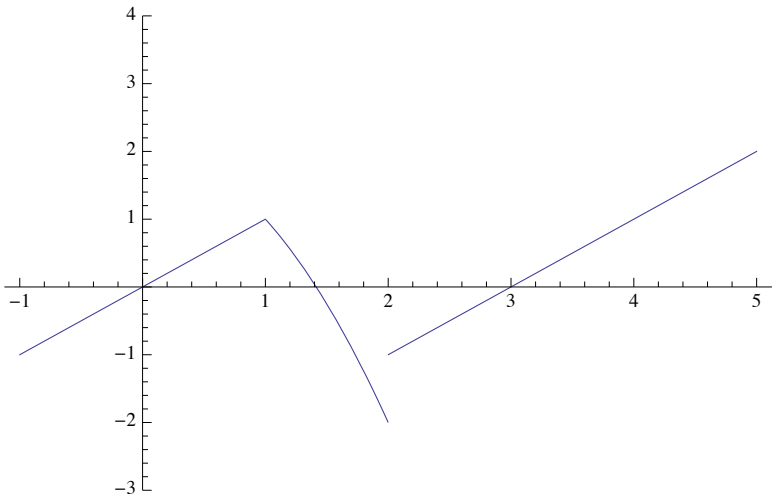

i) 1 ii) 1 iii) 3 iv) -2 v) -1 vi) DNE (the one sided limits don't coincide.)
*Note that in the graph above we need to include the point (1 , 3).