SB: FC **7/3/2013** **First quiz review problems and HW #3**

There are more problems below than will be on the quiz. The quiz will cover the material of the first three course meetings. Most of the problems on the quiz should resemble problems given below or textbook problems such as problems already assigned and problems 11 and 12 of 2.6, and problems 1–10 and 13 and 14 of 3.7. I hope you won't need a calculator for these problems. No calculator may be used on the quiz.

1. If $f(x) = \dfrac{1}{x^2}$, use algebraic properties of limits to compute $\lim\limits_{h\to 0} \dfrac{f(x+h) - f(x)}{h}$.

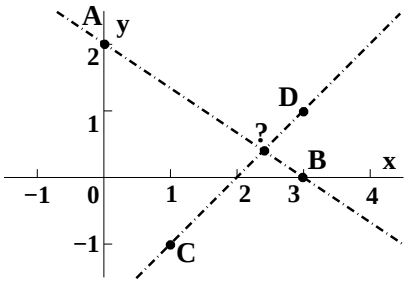
2. a) The limit $\lim\limits_{x\to 3} \dfrac{x^2 - 9}{x - 3}$ exists. What is it? Explain using algebra.

b) The limit $\lim\limits_{x\to 2} \dfrac{x^2 - 2x}{\sqrt{x} - \sqrt{2}}$ exists. What is it? Explain using algebra.

3. It turns out that if $f(x) = \sqrt{x^3 + 1}$, then $f'(x) = \dfrac{3x^2}{2\sqrt{x^3 + 1}}$. You don't need to verify this, but you may use it to answer this question:
What is the equation of a line tangent to $y = \sqrt{x^3 + 1}$ when $x = 2$?

4. What is the domain of $f(x) = \dfrac{1}{(x-2)\sqrt{x-1}}$?

5. The point **A** has coordinates $(0, 2)$, the point **B**, $(3, 0)$, the point **C**, $(1, -1)$, and the point **D**, $(3, 1)$ as shown to the right. Use algebra to find the coordinates of the point where the lines **AB** and **CD** intersect.



6. θ is an unspecified angle in the diagram shown. Five of the other angles, as indicated, are right angles. Find the area of the shaded rectangle in terms of trig functions evaluated at θ and the two numbers given (4 and 7).

Note One beginning step is to label every vertex in the picture!