Calculus AB 2015 Release Items

1. The function $f(x) = x^3 - 3k^2x + 3$ (k is a constant) has two horizontal tangent lines. Find the distance between these two tangent lines.

a) k^2 *b)* $2k^2$ *c)* $3k^2$ *d)* $4k^3$ *e)* none of these

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2. For what value of x does the graph of $y = \frac{1}{\sqrt{x}}$ have a tangent line parallel to the line $x + 16y = 5$?

a) 2 *b)* $\frac{1}{\sqrt{2}}$ *c)* 4 *d)* $\sqrt{2}$ *e)* None of these

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3. Which of the following statements about the function $f(x) = x^4 - ax^3,\ a > 0$ is true?

(a) The function has no relative extrema.

(b) The graph of the function has one point of inflection and two relative extrema.

(c) The graph of the function has two points of inflection and one relative extremum.

(d) The graph of the function has two points of inflection and two relative extrema.

(e) none of these

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4. The slopes of $f(x) = \frac{x^3}{3} + 3x^2 + 12x$ and $g(x) = -8\ln(x)$ are equal at what value of x?

a) -2 *b)* 0 *c)* 0.461 *d)* 1 *e)* none of these

5. Show all work for this problem. Find the equations of all the lines containing the point $(1, 4)$ that are tangent to the graph of $y = x^3 - 10x^2 + 6x - 2$ and find their points of tangency.