1. 1E-1

   (a)
   $$f'(x) = 10x^9 + 15x^2 + 6x^2$$

   (b)
   $$f'(x) = 0$$

   (c)
   $$f'(x) = \frac{1}{2}$$

   (d)
   $$f(x) = x^8 + x^6 + x^5 + x^3$$
   $$f'(x) = 8x^7 + 6x^4 + 5x^4 + 3x^2$$

2. 1E-2

   (a)
   $$f(x) = \frac{a}{2}x^2 + bx$$

   (b)
   $$f(x) = \frac{1}{7}x^7 + \frac{5}{6}x^6 + x^4$$

   (c)
   $$f'(x) = x^6 + 2x^3 + 1$$
   $$f(x) = \frac{1}{7}x^7 + \frac{1}{2}x^4 + x$$

3. 1E-3
   $$y' = 3x^2 + 2x - 1$$

   $3x^2 + 2x - 1 = 0$ at $x = \frac{1}{3}$ or $x = -1$, so the point is $(\frac{1}{3}, \frac{49}{27})$ or $(-1, 3)$

4. 1E-4

   (a) f(x) continuous at x = 0,

   $$f'(x) = \begin{cases} 2ax + b <= 0 \\ 25x^4 + 12x^3 + 14x + 8 > 0 \end{cases}$$

   left limt = right limt at x = 0 so that b = 8. a can be any value.

   (b)
   $$f'(a) = 4a + 5$$

5. 1E-5

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(a)

$$f'(x) = \frac{1}{(1+x)^2}$$

(b)

$$f'(x) = \frac{-x^2 - 2ax + 1}{(x^2 + 1)^2}$$

(c)

$$f'(x) = \frac{-x^2 - 4x - 1}{(x^2 - 1)^2}$$

(d)

$$f'(x) = \frac{3x^5 - x^4}{x^2}$$