$\bar{X} = 256/30$

$M = 27$

25

Name ___Key___

allowed 27m. Find @ k.

12, 12, 14, 14, 15, 15, 17, 18, 18, 20, (21)
21, 23, 25, 25, 23, 25, 25, 27, 27, 29

1. Find each of the following derivatives. You may use the rules from <u>class</u>. NO need to simplify!

   a. $f(x) = x^4 + 23x^3 - \dfrac{1}{x}$, $f'(x) = 4x^3 + 64x^2 + x^{-2}$

   $-x^{-1} \qquad = 4x^3 + 64x^2 + \dfrac{1}{x^2} \leftarrow$ *unasked*

   b. $y = (3x^4 - x^3 + x^2 - 10)(20x^6 - 2x^5 + 2x)$, $\left(\dfrac{dy}{dx}\right) =$

   3 wrong

   $\sqrt{} \quad (3x^4 - x^3 + x^2 - 10)(120x^5 - 10x^4 + 2) + (20x^6 - 2x^5 + 2x)(12x^3 - 3x^2 + 2x + 0)$

   c. $f(x) = (x^2 + 2)^2$, $f'(x) = 4x^3 + 8x$

   ok

   $(x^2 + 2)(x^2 + 2) = (x^4 + 4x^2 + 4)$

   all but 3

   d. $z = \dfrac{x^2 - 1}{x^2 + x}$ $\left(\dfrac{dz}{dx}\right) = ok \qquad \dfrac{(x^2 + x)(2x) - (x^2 - 1)(2x + 1)}{(x^2 + x)^2}$

   all but 6

   one guy foiled out $(x + 1)$

2. What is the equation of the straight line tangent to the curve $y = 3x^4 - x$ at $(1,2)$?

   $\dfrac{dy}{dx} = 12x^3 - 1$

   $(1,2) \qquad m = 12 - 1 = 11$

   $y - 2 = 11(x - 1)$
   $y - 2 = 11x - 11$
   $y = 11x - 9$

   all but 3

3. Use the quotient rule to show that for $f(x) = x^{-4}$, $f'(x) = \boxed{\dfrac{-4x^{-5}}{1 \; correct}}$. (and fill in) *needs*

   power forla

   $f(x) = \dfrac{1}{x^4}$

   $f'(x) = \dfrac{x^4(0) - 1(4x^3)}{x^8} = \dfrac{-4x^3}{x^{16}} = -4x^{-5}$

   all but 9

4. Suppose the height (ft.) above ground of an object under (free fall) is given by

   many thought this is (drops)

   $h = 200 + 20t - 16t^2$, where t is time in seconds, $t \geq 0$. (Give units of answers)

   a. Find a formula for the velocity.

   $v = \dfrac{dh}{dt} = 20 - 32t$

   b. What is the velocity at $t = 2$ sec.? Is (it) going up or down? How do you know?

   object

   when t = 0

   $v = 20 - 32(2) = 20 - 64 = -44 \; ft/sec \; down$

   c. Find a formula for the acceleration.

   $a = \dfrac{dv}{dt} = -32 \; ft/sec^2$

   all but 1 or

   got all

   d. How high does (it) go? Show work.

   $v = 0 \qquad 20 - 32t = 0$

   $t = \dfrac{20}{32} = \dfrac{5}{8}$

   $h = 206.25$