Test 1
Dusty Wilson
Math 098

Name: _key_

There'll be plenty of time to rest in the grave.

Paul Erdös (1913 - 1996)
Hungarian mathematician

No work = no credit

No Symbolic Calculators

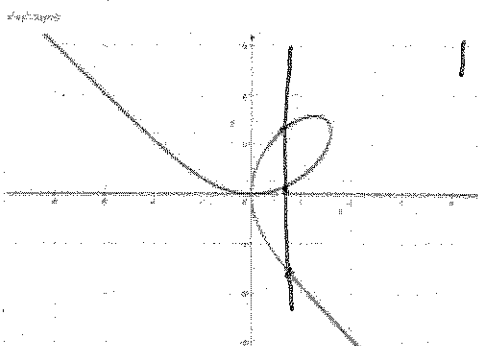Warm-ups (1 pt each): $-4^2 = \underline{-16}$ $(-4)^2 = \underline{16}$ $\dfrac{-4}{0} = \underline{undefined}$

1.) (1 pt) According to Erdös (see above), where should we catch up on sleep?

In the grave.

2.) (4 pts) Does the following graph represents a function?

1 x and 3 y's

Solution: _No_

3.) (6 pts) Find the following function values of $g(z) = 5z^2 - 7$

a.) $g(3) = \underline{\quad 38 \quad}$

b.) $g(a) = \underline{\quad 5a^2 - 7 \quad}$

c.) $g(a+h) - g(a) = \underline{\quad 10ah + 5h^2 \quad}$

$5(a+h)^2 - 7 - (5a^2 - 7)$
$= 5a^2 + 10ah + 5h^2 - 5a^2$

4.) (10 pts) Using the given graph, answer the following:

a.) Evaluate $f(-2) =$ ___2___

b.) Solve $f(x) = 1$
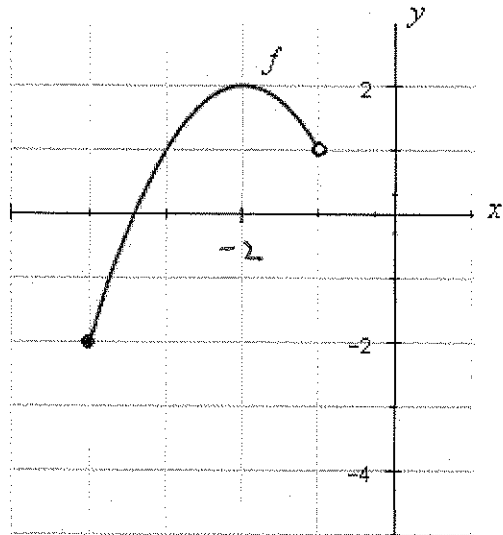
$$X = -3$$

c.) Estimate the zero(s) of f?

$$X \approx -3.4$$

d.) Write the domain of f in interval notation.

$$[-4, -1)$$
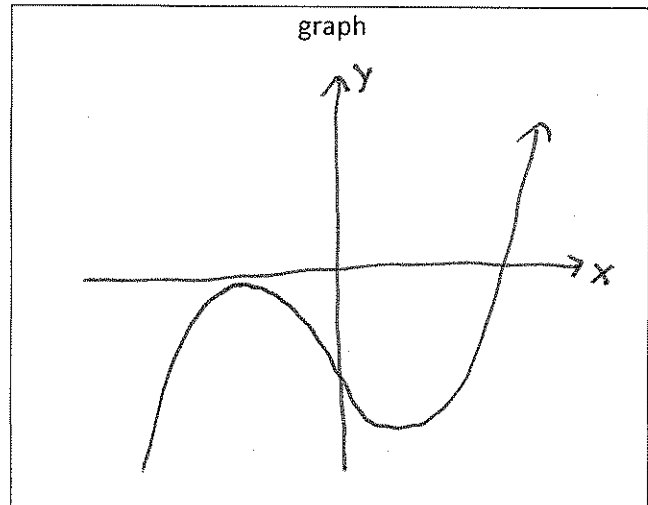
e.) Write the range of f in interval notation

$$[-2, 2]$$

5.) (4 pts) Use your calculator to generate a graph of $f(x) = 0.5x^3 + 1.08x^2 - 2.72x - 5.91$ and then find the zero(s) of this polynomial to the nearest thousandth. Carefully copy the graph into the box.

zero(s)

$$X \approx 2.336$$

graph

6.) (6 pts) Consider $6 - 9x^4 + 3x - 2x^2$

    a.) Write in descending order

$$-9x^4 - 2x^2 + 3x + 6$$

    b.) What is the degree of the given polynomial: _____4_____

    c.) What is the leading coefficient of the given polynomial: _____-9_____

7.) (8 pts) Add/subtract and simplify

    a.) $\left(-a^2 + 5b - 5ab - 2\right) + \left(5a^2 - b + 2ab + 11\right)$

        Solution: $\underline{4a^2 - 3ab + 4b + 9}$

    b.) $\left(4y^2 + 3y - 2\right) - \left(-y^2 + 5y + 6\right)$

        Solution: $\underline{5y^2 - 2y - 8}$

8.) (12 pts) Multiply and simplify

    a.) $(3q + 2)(5q - 4)$

        Solution: $\underline{15q^2 - 2q - 8}$

    b.) $(5w - 2)^2$

        $= (5w - 2)(5w - 2)$

        $= 25w^2 - 10w - 10w + 4$

        $= 25w^2 - 20w + 4$

        Solution: $\underline{25w^2 - 10w + 4}$

    c.) $\left(x^2 + 2x + 1\right)\left(x^2 - x + 2\right)$

        Solution: $\underline{x^4 + x^3 + x^2 + 3x + 2}$

9.) (24 pts) Factor

a.) $5y^3 - 5y^2 + 4y - 4$

$$= \left(5y^3 - 5y^2\right) + \left(4y - 4\right)$$

$$= 5y^2(y-1) + 4(y-1)$$

Solution: $(5y^2 + 4)(y-1)$

b.) $3p^2 - 15p - 72$

$$= 3\left(p^2 - 5p - 24\right)$$

$$= 3(p-8)(p+3)$$

Solution: $3(p-8)(p+3)$

c.) $6a^2 + 7a - 10$

$AC = -60$

$+12 \cdot (-5)$ ✓

$$\begin{array}{c|c} 6 & -5 \\ \hline 1 & +2 \end{array}$$

$$= \left(6a^2 - 5a\right) + \left(12a - 10\right)$$

$$= a(6a-5) + 2(6a - 2)$$

$$= (a+2)(6a-5)$$

Solution: $(6a-5)(a+2)$

d.) $12m^2 + 19m - 18$

$AC = -216$

$27(-8)$ ✓

$$\begin{array}{c|c} 4 & +9 \\ \hline 3 & -2 \end{array}$$

$$= \left(12m^2 - 8m\right) + \left(27m - 18\right)$$

$$= 4m(3m-2) + 9(3m-2)$$

$$= (3m+2)(4m+9)$$

Solution: $(4m+9)(3m-2)$

e.) $16y^2 - m^8 n^6$

Solution: $(4y + m^4 n^3)(4y - m^4 n^3)$

f.) $8 + 125w^3$

Solution: $(2+5w)(4 - 10w + 25w^2)$

10.) (12 pts) Solve

a.) $6x + x^2 = 55$

$$\Rightarrow \quad x^2 + 6x - 55 = 0$$

$$\Rightarrow \quad (x + 11)(x - 5) = 0$$

Solution: $\underline{\quad x = -11 \quad OR \quad x = 5 \quad}$

b.) $2x(4x + 3)(x - 5) = 0$

Solution: $\underline{\quad x = 0 \quad OR \quad x = -\dfrac{3}{4} \quad OR \quad x = 5 \quad}$

c.) $x^2 - 9 = 0$

$$\Rightarrow \quad (x + 3)(x - 3) = 0$$

Solution: $\underline{\quad x = \pm 3 \quad}$