

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

Paul Erdős (1913 - 1996)  
Hungarian mathematician

No work = no credit

No Symbolic Calculators

Warm-ups (1 pt each):  $(-3)^2 = \underline{9}$        $-3^2 = \underline{-9}$        $\frac{3}{0} = \underline{\text{undefined}}$

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

In the grave

2.) (4 pts) Do the following table, graph and words describe a functional relationship? Circle your answer YES/NO. If NO, provide an explanation or circle the features you used to make your decision.

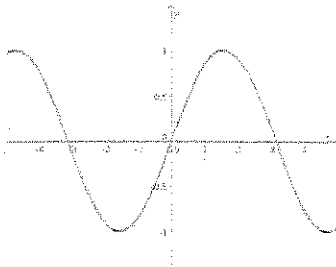
a.)

x	y
1	7
2	8
3	9
4	8
5	7

Is y a function of x?

Yes No

b.)



YES NO

c.) Is each student's bank/credit card number a function of their student ID number?

~~YES~~ NO card 1 card 2

3.) (10 pts) Find and simplify the following function values of  $g(x) = 3x^2 - 4$

a.)  $g(5)$   $3(5)^2 - 4$   
 $75 - 4$   
71

b.)  $g(-1)$   $3(-1)^2 - 4$   
 $3 - 4$   
-1

c.)  $g(a)$   
 $3a^2 - 4$

d.)  $g(a+h)$   
 $3(a+h)(a+h) - 4$   
 $3(a^2 + 2ah + h^2) - 4$   
 $3a^2 + 6ah + 3h^2 - 4$

e.)  $g(a+h) - g(a)$   
 $3(a+h)(a+h) - 4 - (3a^2 - 4)$

~~$3a^2 + 6ah + 3h^2 - 4 - 3a^2 - 4$~~   
 $6ah + 3h^2$

Please see me.

3/4

10

12  
18

4.) (7 pts) Using the given graph, answer the following:

a.) Evaluate  $f(2)$

$\boxed{-2}$

b.) Solve  $f(x) = 1$

$\boxed{x \approx 3.7}$

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

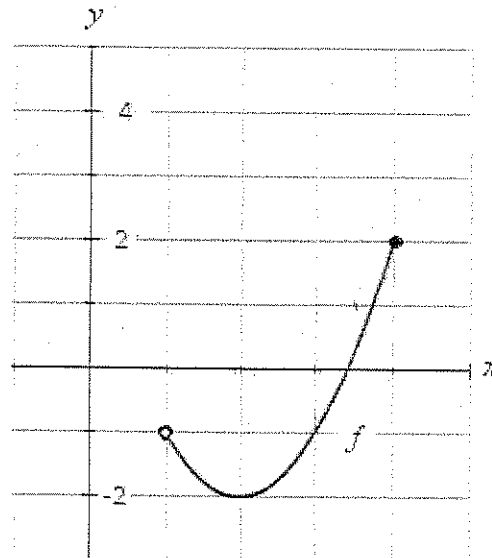
$\boxed{x \approx 3.4}$

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

$\boxed{(1, 4]}$

e.) Write the range of  $f$  in interval notation

$\boxed{[-2, 2]}$



5.) (8 pts) Graph  $f(x) = x^4 - 3x^2 - x - 6$  with the window  $[-3, 3] \times [-15, 10]$ . Find the zero(s), domain, and range of this polynomial to the nearest hundredth (two decimal places).

Carefully copy the graph into the box. Make sure to sketch it with the given window.

zero(s)

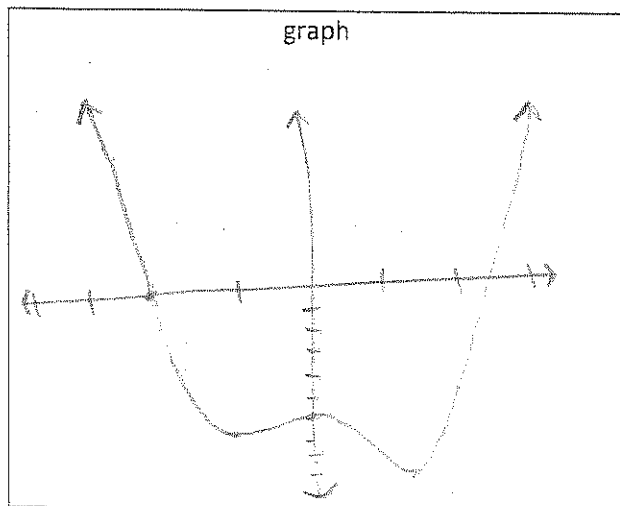
$-2, 2.17$

domain (any notation)

$(-\infty, \infty)$   
 $\mathbb{R}$

range (any notation)

$[-9.51, \infty)$



15 11  
 15 ✓

6.) (8 pts) Consider  $6x^4 - 4x^5 + 12x^{15} - 18x^7 + 8x^{13}$

a.) Write in descending order

$$12x^{15} + 8x^{13} - 18x^7 - 4x^5 + 6x^4$$

b.) What is the degree of the given polynomial: 15

c.) What is the leading coefficient of the given polynomial: 12

d.) What is the GCF of the given polynomial:  $2x^4$

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

a.)  $(4y^2 + 3y - 2) + (-y^2 + 5y + 6)$

$$3y^2 + 8y + 4$$

Solution:  $3y^2 + 8y + 4$

b.)  $(8c + 6j - 7g) - (4c + 4g - 4j)$

$$4c + 10j - 11g$$

Solution:  $4c + 10j - 11g$

8.) (12 pts) Multiply and simplify

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

$$8q^2 - 10q + 12q - 15$$

$$8q^2 + 2q - 15$$

Solution:  $8q^2 + 2q - 15$

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

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

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

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

Solution:  $4w^2 - 20w + 25$

c.)  $(x - 3)(x^2 - 2x + 6)$

$$x^3 - 2x^2 + 6x - 3x^2 + 6x - 18$$

$$x^3 - 5x^2 + 12x - 18$$

Solution:  $x^3 - 5x^2 + 12x - 18$

9.) (16 pts) Factor completely

a.)  $v^2 + 6v - 27$

$$(v-3)(v+9)$$

b.)  $8b^2 + 4b$

$$4b(2b+1)$$

c.)  $6+t-t^2$

$$-t^2 + t + 6$$

$$-(t^2 - t - 6)$$

$$-(t+2)(t-3)$$

d.)  $x^4 + 5x^3 - 50x^2$

$$x^2(x^2 + 5x - 50)$$

$$2/4$$

1 10  
2 5  
5 2  
10 1

10.) (4 pts) Determine the zeros (if any) of the function  $f(x) = 3x + 12$ .

$$3(x+4)$$

$$x+4=0$$

$$x=-4$$

11.) (4 pts) Factor  $xy + xz + wy + wz$  by grouping, if possible, and check.

$$(xy + xz) + (wy + wz)$$

$$x(y+z) + w(y+z)$$

$$(x+w)(y+z)$$

check

$$(x+w)(y+z)$$

$$xy + xz + wy + wz = \checkmark$$

22  
24

12.) (12 pts) Solve

a.)  $45 - x^2 = 4x$

$-x^2 - 4x + 45$

$-(x^2 + 4x - 45) = 0$

$-(x + 9)(x - 5)$

Solution: -5, 9

b.)  $5x(6x+7)(x-8) = 0$

$5x(6x^2 - 48x + 7x - 56)$

$5x(6x^2 - 41x - 56)$

$30x^3 - 205x^2 - 280x = 0$

3/4

\* Couldn't figure out where to go from that point, so I plugged in and my texan friend.

Just read it off. 😊

Solution: -1.16, 0, 8

c.)  $(x-2)(x+7) = -20$

$x^2 + 7x - 2x - 14 = -20$

$x^2 + 5x + 6$

$(x + 2)(x + 3)$

↓

↓

$x + 2 = 0$   
 $x = -2$

$x + 3 = 0$   
 $x = -3$

-7  
6

Solution: -3, -2



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Warm-ups (1 pt each):

$(-3)^2 = 9$

$-3^2 = -9$

$\frac{-3}{0} = \text{undefined}$

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

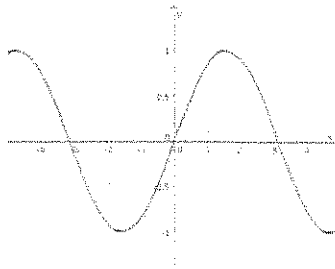
*in the grave*

2.) (4 pts) Do the following table, graph and words describe a functional relationship? Circle your answer YES/NO. If NO, provide an explanation or circle the features you used to make your decision.

a.)

x	y
1	7
2	8
3	9
4	8
5	7

b.)



c.) Is each student's bank/credit card number a function of their student ID number?

*no because its all going to be different one is not a function*

*card 1  
SID < card 2  
YES NO*

Is y a function of x?

Yes  No

YES  NO

3.) (10 pts) Find and simplify the following function values of  $g(x) = 3x^2 - 4$

a.)  $g(5)$   *$3(5)^2 - 4$*   
*71*

b.)  $g(-1)$   *$3(-1)^2 - 4$*   
*-1*

c.)  $g(a)$   *$3(a)^2 - 4$*

d.)  $g(a+h)$   *$3(a+h)^2 - 4$*

e.)  $g(a+h) - g(a)$

*$3(a+h)^2 - 4$*

*$6ah + 3h^2$*

*work*

*$3a^2 + 6ah + 3h^2 - 4$*

*Please see me*  
*97*

*17*  
*18*

4.) (7 pts) Using the given graph, answer the following:

a.) Evaluate  $f(2)$

-2

b.) Solve  $f(x) = 1$

3, 7

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

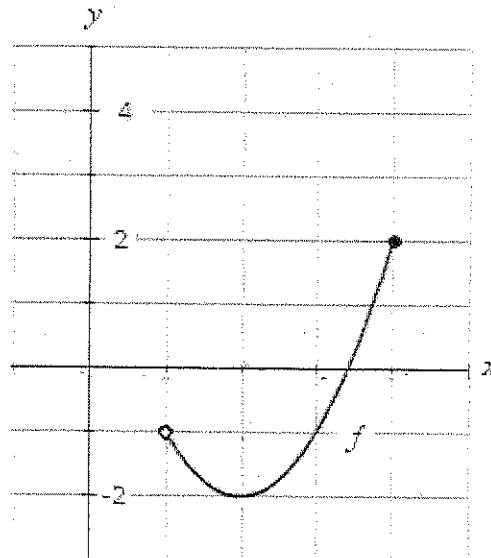
3, 4

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

$(1, 9]$

e.) Write the range of  $f$  in interval notation

$[-2, 14]$



7

5.) (8 pts) Graph  $f(x) = x^4 - 3x^2 - x - 6$  with the window  $[-3, 3] \times [-15, 10]$ . Find the zero(s), domain, and range of this polynomial to the nearest hundredth (two decimal places).

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zero(s)

-2, 2, 1

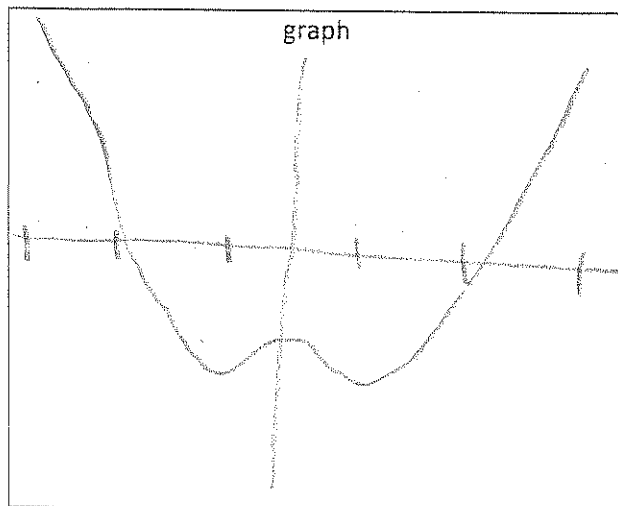
domain (any notation)

$(-\infty, \infty)$

range (any notation)

$[-9.91, \infty)$

8



$\frac{15}{15}$  ✓



6.) (8 pts) Consider  $6x^4 - 4x^5 + 12x^{15} - 18x^7 + 8x^{13}$

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6/8

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a.)  $(4y^2 + 3y - 2) + (-y^2 + 5y + 6)$

$$4y^2 - y^2 \quad 3y + 5y \quad -2 + 6$$

Solution:  $3y^2 + 8y + 4$

b.)  $(8c + 6j - 7g) - (4c + 4g - 4j)$

$$8c + 6j - 7g - 4c - 4g + 4j$$

$$4c + 10j - 11g$$

Solution:  $4c + 10j - 11g$

8

8.) (12 pts) Multiply and simplify

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

$$8q^2 - 10q + 12q - 15$$

$$8q^2 + 2q - 15$$

Solution:  $8q^2 + 2q - 15$

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

$$(2w - 5)(2w - 5) \text{ FOIL}$$

$$4w^2 - 10$$

Solution:  ~~$4w^2 - 10$~~

c.)  $(x - 3)(x^2 - 2x + 6)$

$$x^3 - 2x^2 + 6x - 3x^2 + 6x - 18$$

$$x^3 - 5x^2 + 12x - 18$$

Solution:  $x^3 - 5x^2 + 12x - 18$

9/12

23/28

9.) (16 pts) Factor completely

a.)  $v^2 + 6v - 27$

$(v + 9)(v - 3)$

b.)  $8b^2 + 4b$

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$-(t + 2)(t + 3)$

d.)  $x^4 + 5x^3 - 50x^2$

$x^2(x^2 + 5x - 50)$

2/1

10.) (4 pts) Determine the zeros (if any) of the function  $f(x) = 3x + 12$ .

$3x + 12$

$3(x + 4)$

$x + 4 = 0$   
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$(xy + xz) + (wy + wz)$

$x(y + z) + w(y + z)$

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12.) (12 pts) Solve

a.)  $45 - x^2 = 4x$

$$-x^2 + 45 - 4x$$
$$-(x^2 + 4x - 45) = 0$$
$$-(x-5)(x+9)$$

Solution: -5, 9

b.)  $5x(6x+7)(x-8) = 0$

$$5x(6x^2 + 42x - 56)$$
$$5x(6x^2 - 42x - 56)$$
$$30x^3 - 210x^2 - 280x = 0$$

Solution: -7/6, 0, 8

c.)  $(x-2)(x+7) = -20$

$$x^2 + 7x - 2x - 14 = -20$$
$$x^2 + 5x + 6$$
$$(x+2)(x+3)$$
$$x+2=0 \quad x+3=0$$
$$-2 \quad -3$$

Solution: -2, -3

11  
12

