

**Calculator part.** You may use your calculator on this part of the test. Show all necessary work for full credit.

2 1. Simplify:  $\frac{6-8 \div 4}{2+(-3)} + \frac{6+2^4}{3-(-1)}$

$$\frac{6-2}{-1} + \frac{6+16}{4} = -4 + \frac{22}{4} = 1.5 = \frac{3}{2}$$

2 2. Simplify and write your answer as a decimal with 2 decimal places:  $\frac{6 + \sqrt{(-6)^2 - 4(3)(2)}}{4(3)}$

$$\frac{6 + \sqrt{36-24}}{12} = .79$$

3. The amount of gasoline (in gallons) left in the tank of a car after traveling  $m$  miles can be approximated by the formula  $G = 16 - \frac{1}{28}m$ .

2 A. How much gasoline is left in the tank of the car after traveling 150 miles?

$$G = 16 - \frac{1}{28}(150) = 10.64 \text{ gal}$$

3 B. How many miles can the car travel before there is 3 gallons of gasoline left in the tank?

$$3 = 16 - \frac{1}{28}m$$

$$\frac{1}{28}m = 13$$

$$m = 364 \text{ miles}$$

4. Given  $2x - 4y = 8$ :

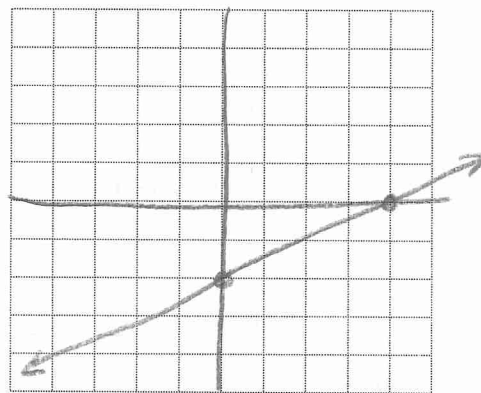
2 A. Find the x-intercept.

$$(4, 0)$$

2 B. Find the y-intercept.

$$(0, -2)$$

3 C. Sketch the graph.



3 5. Jim works for a car dealership. He makes a flat amount of \$100 per week plus 3% of his sales for the week. Write an equation for the amount of money Jim makes in terms of his sales.

$$m = 100 + .03s$$

6. The temperature in the desert at 6 am was 65°F. The temperature rose 6 degrees every hour until it reached its maximum value at 4 pm.

A. Complete the table of values for the temperature,  $T$ , at  $h$  hours after 6 am.

3

hours, $h$	temperature, $T$
0	65
5	95
8	113

B. Find an equation for the temperature,  $T$ , in terms of hours,  $h$ , since 6am.

3

$$T = 65 + 6h$$

C. When will the temperature be 90°F?

3

$$90 = 65 + 6h$$

$$25 = 6h$$

$$h = \frac{25}{6} = 4.17$$

10 am

D. Give an appropriate viewing window.

3

$$x_{\min} = 0 \quad y_{\min} = 50$$

$$x_{\max} = 10 \quad y_{\max} = 120$$

$$x_{\text{scl}} = 1 \quad y_{\text{scl}} = 10$$

7. Solve the equation using a table:  $\frac{1}{4}(x+1) = \frac{1}{2}(2x+5) - 6$

4

Fill in the table below and use it to solve the equation. Write your answer in interval notation.

$x$	-1	1	3	5	7
$\frac{1}{4}(x+1)$	0	.5	1	1.5	2
$\frac{1}{2}(2x+5) - 6$	-4.5	-2.5	-0.5	1.5	3.5

Solution:  $x = 5$

8. Peggy buys a 40-pound bag of rice and consumes 1.5 pounds per week.

3

A. Write an expression for the amount of rice that Peggy has left in terms of the number of weeks since she has bought the bag.

$$R = 40 - 1.5w$$

B. Find the vertical intercept and explain what it means in the context of this problem.

4

(0, 40) She starts with 40 lbs.

**No calculator part.** You may not use your calculator on this part of the test. Show all necessary work for full credit.

- 3 1. Simplify the following:

$$\sqrt{49} - 3(2) + 2(1 - 4)^2$$

$$7 - 6 + 2(9) = 19$$

- 2 2. Write 0.000591 in scientific notation.  $5.91 \times 10^{-4}$

- 2 3. Write  $3.7 \times 10^5$  in standard notation. 370,000

- 3 4. Solve  $4y + 3(2y - 7) = 5 - 11y$

$$4y + 6y - 21 = 5 - 11y$$

$$10y - 21 = 5 - 11y$$

$$21y = 26$$

$$y = \frac{26}{21}$$

- 2 5. Use the table to solve the inequality  $0.5(3x-1) > 4$ . Explain or indicate on the table how you found your solution for full credit.

$$(3, \infty)$$

$$x > 3$$

X	Y1	
-1	-2	
0	-1.5	
1	-1	
2	-0.5	
3	0	
4	0.5	
5	1	
6	1.5	
7	2	
8	2.5	
9	3	
10	3.5	
11	4	
12	4.5	
13	5	
14	5.5	
15	6	
16	6.5	
17	7	
18	7.5	
19	8	
20	8.5	
21	9	
22	9.5	
23	10	
24	10.5	
25	11	
26	11.5	
27	12	
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433	215	
434	215.5	
435	216	
436	216.5	

$Y1 = 0.5(3X - 1)$



8. Given  $f(x) = 6x - 1$  and  $g(x) = x + 7$ , find:

3 A.  $(f - g)(x) = 5x - 8$

3 B.  $(fg)(4) = (23)(11) = 253$

3 C.  $(f \circ g)(x) = 6(x + 7) - 1 = 6x + 41$

9. Is temperature in Celsius a function of temperature in Fahrenheit? Why or why not?

3 yes, each Fahrenheit temp has one Celsius temp

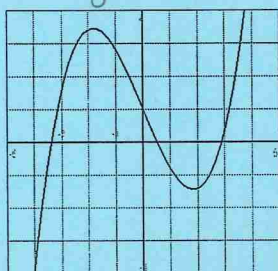
10. Is Adjusted Gross Income a function of Tax Bracket? Why or why not?

3 No, each tax bracket has multiple incomes

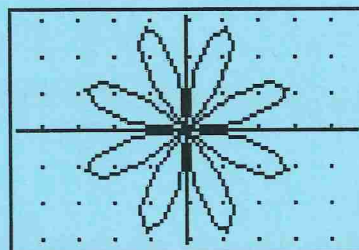
Tax Bracket (T)	Adjusted Gross Income (I)
0%	\$0-2479
11%	\$2480-3669
12%	\$3670-4749
14%	\$4750-7009
15%	\$7010-9169

11. Are the following graphs of functions?

4 A. yes



B. no



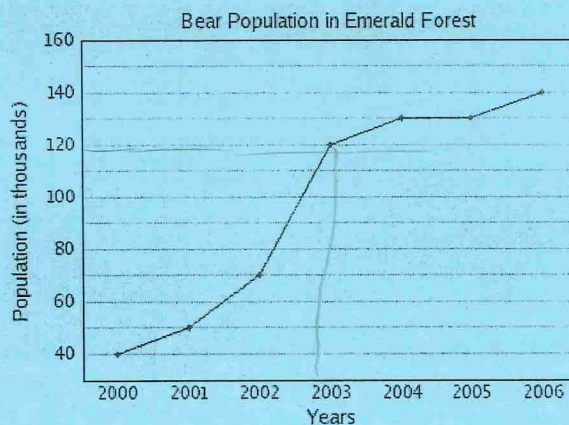
12. The graph shows the bear population in Emerald Forest for certain years.

4 A. Estimate  $P(2002)$  and explain what this means in context. 70

In 2002, there were 70 thousand bears.

2 B. During which years was the population above 120 thousand bears?

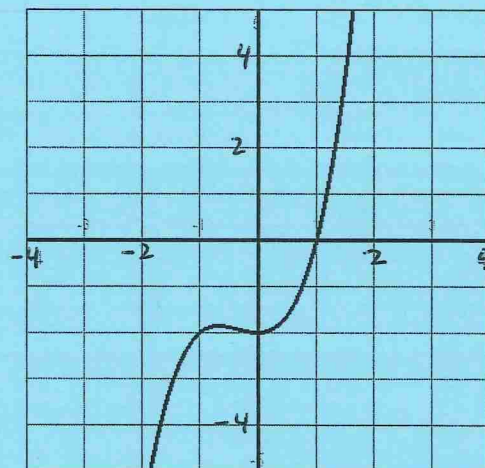
after 2003



13. Use the graph of  $f(t)$  shown to approximate the following.

2 A. What is the horizontal intercept?  $(1, 0)$

2 B. What is the vertical intercept?  $(0, -2)$



14. Given the table:

2 A. Find  $H(22)$ . 66

3 B. What is an appropriate viewing window for this data?

xmin = 0      xmax = 30      xscl = 5

ymin = 0      ymax = 70      yscl = 10

A, years	H(A), inches
2	22
5	40
12	58
17	64
22	66
30	66

15. Given  $F(t) = \frac{3t+1}{t+4}$ , find:

3 A.  $F(2) = \frac{7}{6}$

3 B.  $F(n-1) = \frac{3n-2}{n+3}$        $\frac{3(n-1)+1}{n-1+4}$



**Calculator part.** You may use your calculator on this part of the test. Show all necessary work for full credit.

1. Simplify:  $\frac{6-8 \div 2}{2+(-3)} + \frac{10+2^4}{3-(-1)}$   
2

$$\frac{6-4}{-1} + \frac{10+16}{4} = -2 + \frac{26}{4} = 4.5 = \frac{9}{2}$$

2. Simplify and write your answer as a decimal with 2 decimal places:  $\frac{9 + \sqrt{(-9)^2 - 4(5)(3)}}{4(5)}$   
2

$$\frac{9 + \sqrt{81 - 60}}{20} = .68$$

3. The amount of gasoline (in gallons) left in the tank of a car after traveling  $m$  miles can be approximated by the formula  $G = 16 - \frac{1}{28}m$ .

A. How much gasoline is left in the tank of the car after traveling 220 miles?  
2

$$G = 16 - \frac{1}{28}(220) = 8.14 \text{ gal}$$

B. How many miles can the car travel before there is 5 gallons of gasoline left in the tank?  
3

$$5 = 16 - \frac{1}{28}m \quad -11 = -\frac{1}{28}m \quad m = 308 \text{ miles}$$

4. Given  $4x - 2y = -8$ :

A. Find the x-intercept.

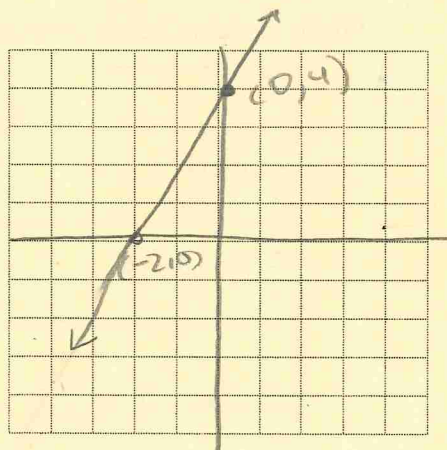
2  $(-2, 0)$

B. Find the y-intercept.

2  $(0, 4)$

C. Sketch the graph.

3



5. Jim works for a car dealership. He makes a flat amount of \$225 per week plus 2% of his sales for the week. Write an equation for the amount of money Jim makes in terms of his sales.

3

$$m = 225 + .02s$$



6. The temperature in the desert at 7 am was  $68^{\circ}\text{F}$ . The temperature rose 6 degrees every hour until it reached its maximum value at 5 pm.

A. Complete the table of values for the temperature,  $T$ , at  $h$  hours after 7 am.

3

hours, $h$	temperature, $T$
0	68
5	98
8	116

B. Find an equation for the temperature,  $T$ , in terms of hours,  $h$ , since 7 am.

3

$$T = 68 + 6h$$

C. When will the temperature be  $80^{\circ}\text{F}$ ?

3

$$80 = 68 + 6h \quad h = 2 \quad 9 \text{ am}$$

$$12 = 6h$$

D. Give an appropriate viewing window.

3

$$x_{\min} = 0 \quad y_{\min} = 60$$

$$x_{\max} = 10 \quad y_{\max} = 120$$

$$x_{\text{scl}} = 1 \quad y_{\text{scl}} = 10$$

7. Solve the equation using a table:  $\frac{1}{4}(x+1) = \frac{1}{2}(2x+5) - 6$

Fill in the table below and use it to solve the equation. Write your answer in interval notation.

9

$x$	-1	1	3	5	7
$\frac{1}{4}(x+1)$	0	.5	1	1.5	2
$\frac{1}{2}(2x+5) - 6$	-4.5	-2.5	-.5	1.5	3.5

Solution:  $x = 5$

8. Peggy buys a 35-pound bag of rice and consumes 1.25 pounds per week.

3 A. Write an expression for the amount of rice that Peggy has left in terms of the number of weeks since she has bought the bag.

$$R = 35 - 1.25w$$

4 B. Find the vertical intercept and explain what it means in the context of this problem.

(0, 35) She starts with 35 pounds



60

Test 1 – MAT1033/MAC1105

Name Key**No calculator part.** You may not use your calculator on this part of the test. Show all necessary work for full credit.

1. Simplify the following:

$$3 \quad 2(1-4)^2 + \sqrt{81} - 3(5)$$

$$2(9) + 9 - 15 = 12$$

$$2 \quad 2. \text{ Write } 4,800,000 \text{ in scientific notation. } 4.8 \times 10^6$$

$$2 \quad 3. \text{ Write } 3.7 \times 10^{-5} \text{ in standard notation. } .000037$$

$$3 \quad 4. \text{ Solve } 5m + 3(2m - 7) = 4 - 9m$$

$$5m + 6m - 21 = 4 - 9m$$

$$11m - 21 = 4 - 9m$$

$$20m = 25$$

$$m = \frac{25}{20} = \frac{5}{4}$$

5. Use the table to solve the inequality  $0.5(3x-1) < 5.5$ . Explain or indicate on the table how you found your solution for full credit.

$$x < 4$$

$$(-\infty, 4)$$

X	Y1	
-1	-2	
0	-1.5	
1	-1	
2	-0.5	
3	0	
4	0.5	
5	1	
6	1.5	
7	2	

Y1 = 0.5(3X-1)

6. A. Solve the inequality:  $-3x + 9 \leq -15$

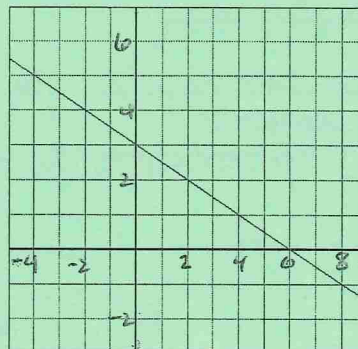
$$3 \quad -3x \leq -24$$

$$x \geq 8$$

B. Write the solution in interval notation.  $[8, \infty)$

7. Use the graph to fill in the missing table values. Assume the scales are 1 unit.

x	y
0	3
6	0
-4	5
-2	4



8. Given  $f(x) = 4x + 1$  and  $g(x) = 2x - 7$ , find:

3 A.  $(f - g)(x) = 2x + 8$

3 B.  $(fg)(4) = (17)(1) = 17$

3 C.  $(f \circ g)(x) = 4(2x - 7) + 1 = 8x - 27$

9. Is temperature in Fahrenheit a function of temperature in Celsius? Why or why not?

3 yes, each Celsius temp has one Fahrenheit temp

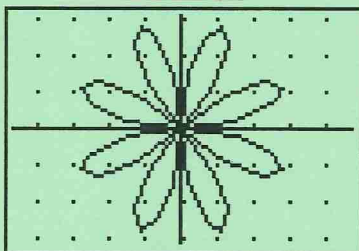
10. Is Adjusted Gross Income a function of Tax Bracket? Why or why not?

3 No, each tax bracket has multiple incomes

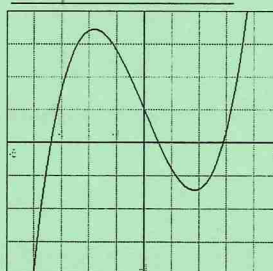
Tax Bracket (T)	Adjusted Gross Income (I)
0%	\$0-2479
11%	\$2480-3669
12%	\$3670-4749
14%	\$4750-7009
15%	\$7010-9169

11. Are the following graphs of functions?

4 A. No



B. Yes



12. The graph shows the bear population in Emerald Forest for certain years.

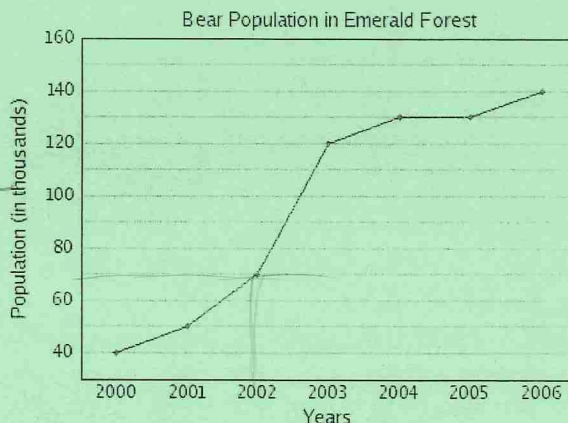
4 A. Estimate  $P(2003)$  and explain what this means in context.

$P(2003) = 120$

In 2003, the bear population was 120 thousand.

2 B. During which years was the population below 70 thousand bears?

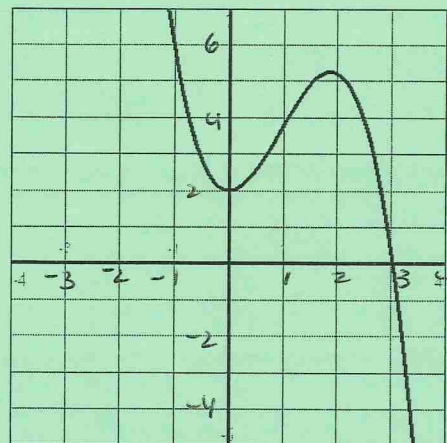
before 2002



13. Use the graph of  $f(t)$  shown to approximate the following.

2 A. What is the horizontal intercept?  $(3, 0)$

2 B. What is the vertical intercept?  $(0, 2)$



14. Given the table:

2 A. Find  $H(12)$ . 48

B. What is an appropriate viewing window for this data?

3  $x_{\min} = \underline{0}$   $x_{\max} = \underline{30}$   $x_{\text{scl}} = \underline{5}$

$y_{\min} = \underline{0}$   $y_{\max} = \underline{65}$   $y_{\text{scl}} = \underline{10}$

A, years	H(A), inches
2	12
5	30
12	48
17	54
22	62
30	62

15. Given  $F(x) = \frac{3x+1}{x+4}$ , find:

3 A.  $F(3) = \underline{\frac{10}{7}}$

3 B.  $F(t-1) = \underline{\frac{3t-2}{t+3}}$   $\frac{3(t-1)+1}{t-1+4}$

