Math 111
Final Exam Name _____
Section_____ Date_____
VERSION B: Post Test, Math 111.

To receive full credit, show your work.

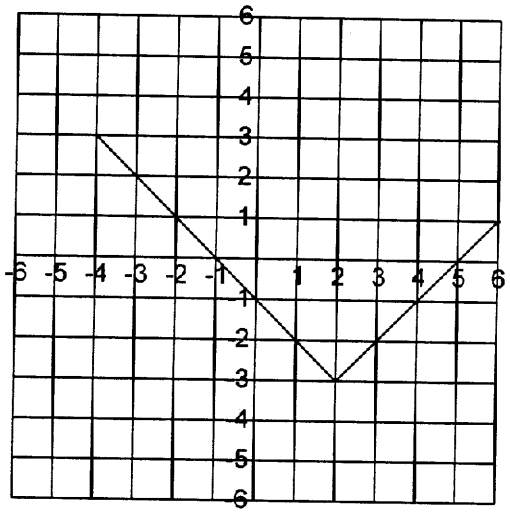
1. Find the equation of the line passing through the point $(3,-2)$, and parallel to the line $y=-3x+5$.

a. $y=-3x+7$ b. $y=-3x-11$ c. $y=-3x+11$ d. $y=-3x+8$ 1._____
2 points

2. $f(x)=2x^2-x+5$. Find $f(x-1)$.

a. $2x^2-5x+7$ b. $2x^2-x+4$ c. $2x^2-5x+6$ d. $2x^2-5x+8$ 2._____
2 points

3. Refer to the graph of $f(x)$ below. Find $f(-4)-f(2)$



a. 1 b. 2 c. 5 d. 6 3._____
2 points

4. Use the quadratic formula to solve the equation, $x^2+2x=-10$. The solutions are:

a. $3+i,\ 3-i$ b. $-1+3i,\ -1-3i$ c. $3+2i,\ 3-2i$ d. $1+3i,\ 1-3i$ 4._____
2 points

5. A rock falls from an airplane 576 ft. high. As it falls, its height, h, is given by the formula, $h = 576 - 16t^2$ where t represents time in seconds. When the rock hits the ground the height equals 0. How many seconds does it take to hit the ground?

a. 4 b. 5 c. 6 d. 7

5._____
2 points

6. Solve the inequality $x^3 - 9x \le 0$. Express the answer in interval notation.

a. $[-3,0] \cup [0,3]$ b. $(-\infty,-3] \cup [0,3]$ c. $(-\infty,0] \cup [-3,\infty)$ d. $[-3,0] \cup [3,\infty)$

6._____
2 points

7. Solve the system of equations for x and y. $\begin{aligned} y &= x^2 - 5x + 10 \\ 3x - y &= 6 \end{aligned}$ The sum of x and y is:

a. 7 b. 8 c. 9 d. 10

7._____
2 points

8. The profit for a company's first 5 years of business is shown in the table. Use a graphing calculator to fit the data with a linear function, $y = ax + b$. Using the linear function, predict the profit in year 7.

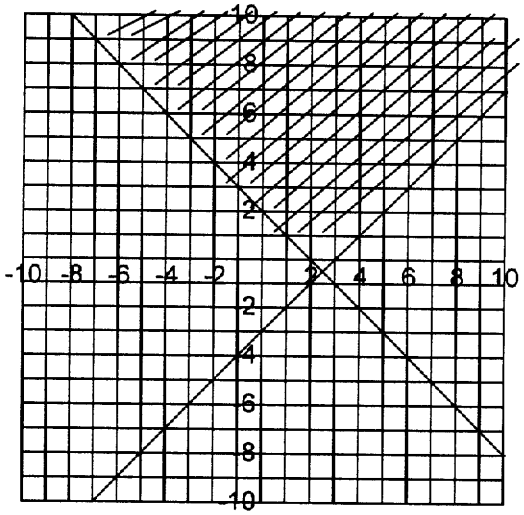
Year (x)	1	2	3	4	5
Profit, in thousands, (y)	27	30	36	41	45

	linear function	profit, in thousands
a.	$y = 4.7x + 21.7$	54.6
b.	$y = 5.1x + 20.3$	56.0
c.	$y = 4.7x + 20.5$	53.4
d.	$y = 5.2x + 21.3$	57.7

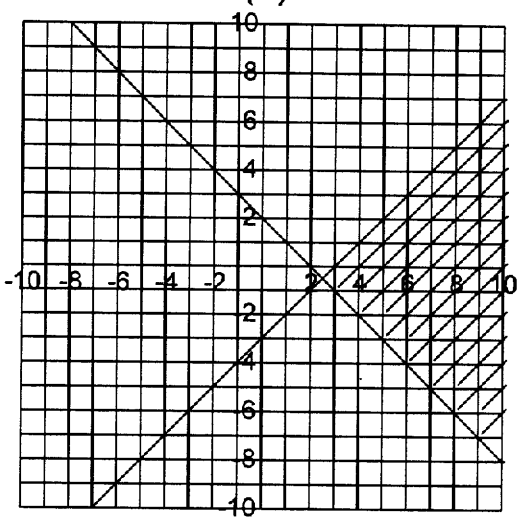
8._____
2 points

9. Graph the solution of the system of inequalities. $y \le x - 3$
$y \ge -x + 2$

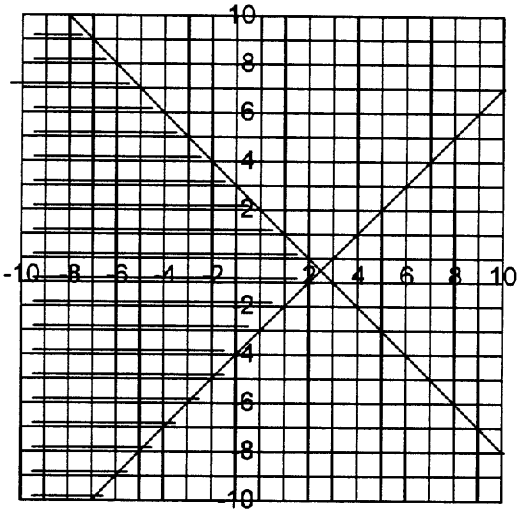
(a)



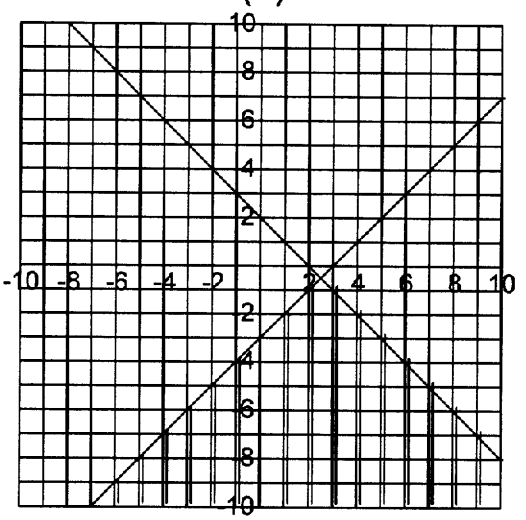
(b)



(c)



(d)



9._____
2 points

10. The population of Kenya has an exponential growth rate of 2.1% and an initial population of 24 million people. Using the exponential growth function, $P(t) = P_o e^{kt}$, find t, the number of years it takes the population to double. Round to the nearest whole year.

a. 28 years b. 31 years c. 33 years d. 35 years

10._____
2 points

11. Factor Completely. $4n^3+108$

11. _____
2 points

12. Write in simplest form with only **positive exponents.**

$$\left(\frac{x^{-4}y^3}{3x^{-5}y^8}\right)^3$$

12. _____
3 points

13. Simplify. $\dfrac{x}{x^2+9x+20}-\dfrac{4}{x^2+7x+12}$

13. _____
3 points

14. Given two points A(4, -6) and B(1, 0).
a) Find the distance between A and B. Give exact value.

a. _____
2 points

b) Find the slope and write the equation of the line AB in **standard form.**

b. _____
3 points

15. For $f(x)=x^2+10$ and $g(x)=\sqrt{x-1}$, find
a. $f\circ g$

a. _____
2 points

b. $g(f(0))$

b. _____
1 point

16. Solve the equation $\frac{x}{x+4}=\frac{3}{x-1}$

6. _____
3 points

17. Solve the inequality, writing your answer in interval notation.
$-3 \le 2(x+3) < 6$

7. _____
3 points

18. Find the following for $f(x)=2x^2-x-36$.

a. x-intercepts — a. _____ 2 points

b. y-intercept — b. _____ 1 point

c. vertex — c. _____ 2 points

d. line of symmetry — d. _____ 1 point

19. Perform the following operations:

a. $(3-4i)+(4+2i)$ — a. _____ 1 point

b. $(3-4i)-(4+2i)$ — b. _____ 1 point

c. $(3-4i)(4+2i)$ — c. _____ 2 points

d. $\frac{(3-4i)}{(4+2i)}$ — d. _____ 2 points

20. Consider the polynomial function $P(x)=(x+1)^3(x+2)(x-2)^2$.

a. Determine the degree of the polynomial. a. _____ 1 point

b. Determine the zeros of the function and state the multiplicity 3 points

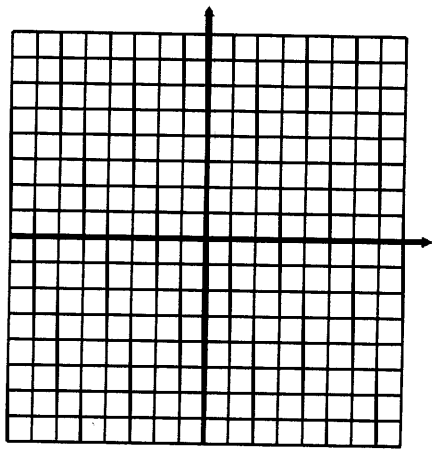
ZERO VALUES	MULTIPLICITY

c. Determine the end behavior of the graph of the function.

c. _____ 2 points

d. Determine the y-intercept of the function. d. _____ 1 point

e. Sketch the graph of the function. 3 points



21. Given that 1 and 3 are zeros of the function $P(x)=x^4-4x^3+7x^2-16x+12$, find the remaining zeros. **Show all work** to receive credit.

21. _____ 3 points

22. Consider the function: $f(x)=\dfrac{3x^2+5x-2}{x^2+x-12}$

a. Give the **equation(s)** of any vertical, horizontal, or oblique asymptotes of the function.

Vertical asymptotes: _____ 2 points

Horizontal asymptote: _____ 1 point

Oblique asymptote: _____ 1 point

b. Determine the coordinates of the **x** and **y-intercepts**

X-intercept(s): _____ 2 points

Y-intercept: _____ 1 point

23. a. How would you obtain the graph of $f(x)=\log\left(x-\dfrac{5}{2}\right)-1$ from the graph of $f(x)=\log x$?

_____ 2 points

b. What is the domain of the function in part a? (Give the answer in set builder notation)

b._____ 2 points

24. Suppose $4500 is invested at 3.5%, compounded monthly. How much will be in the account after 3 years? $A=P(1+\frac{r}{n})^{nt}$

24. _____ 3 points

25. Simplify using the rules of logarithms (must show steps and do not use calculator):

$5\log_4 2 + \log_4 2$

25. _____
3 points

26. Solve: $2\log_3 x - \log_3(x-2) = 2$

26. _____
3 points

27. Solve analytically: $\begin{aligned} 2x+3y &= -1 \\ 3x-y &= 4 \end{aligned}$

27. _____
3 points

28. **Write a system of equations and solve** the following application. Toby split his savings into two different investments, one earning 5% and the other earning 7%. He put twice as much in the investment earning 7%. In one year he earned $475 in interest. How much money did he invest in each account?

28. _____
4 points

29. Solve the system of equations using matrix methods. Write the matrix equation AX =B and give solution in the form (x, y, z).

$$2x-2y+3z=-1$$
$$2x-6y-4z=9$$
$$x+y+z=-6$$

a. Write the matrix equation, $AX=B$. a. _____ 2 points

b. Find A^{-1}, fractions only. b. _____ 2 points

c. Give solution in ordered triple, fractions only. c._____ 2 points

Notice

A grade of "C" or better in Math 111 is required to take Math 115 or Math 215, or if this course is to be applied to a teaching degree.

A passing grade (D or better) is required to take Math 118 or for this course to satisfy the A_2, Mathematics component of the University Core Curriculum.