Math 101, Spring 2018 Final Exam

Instructor's Name: _____

Directions

1. Time limit: 1 hour 50 minutes.

2. There are 100 points possible for this exam. The point value of each problem is shown.

3. For any partial credit to be possible, you must show work that explains how you obtained your answer or you must explain how you obtained your answer.

4. Your work must be neat, organized, and legible. Place answers on the line to the right of the problem where provided; otherwise box your solution.

5. You may use a calculator, but you may not use any notes, books or other sources. You may not use a cell phone, PDA, etc. and you may not share calculators. Use of a cell phone during the exam may result in a zero grade for this exam.

6. If a problem does not specify that an answer be written in fraction notation, mixed number notation, or decimal notation, then write the answer in the notation that you think is most appropriate for the problem. You should use exact answers unless otherwise noted. *All numerical fractions must be expressed in lowest terms.*

7. You are expected to do your own work. You are neither to receive nor to give any help on the exam.

I have read and agree to the directions above.

Signature:_____

Printed Name:_____

Date:_____

1. Combine like terms to simplify.

$2a+3ab-2ba+5b^2a^2-5a^2b+b-2a$

Ans:_____(3)

2. Perform the indicated operations and simplify.

a) Multiply $(x-1)(2x^2-3x-1)$

Ans:_____(3)

b) Divide $\frac{9x^3+4x-2}{6x^2}$

Ans:_____(3)

c) Expand $(3x-y)^2$

Ans:_____(3)

d) Divide $\frac{x^3-3x+4}{x-2}$

Ans:_____(3)

3. Simplify each expression. Write each result using positive exponents only.

a) $\left(-a^3b^{-1}\right)^{-4}$

Ans:_____(3)

b) 2^2+2^{-2}

Ans:_____(2)

c) $\dfrac{25x^{-3}y}{20x^{-2}y^{-1}}$

Ans:_____(3)

4. Solve.

a) $\dfrac{5}{6}=2-\dfrac{1}{10}x$

Ans:_____(3)

b) $2\left(8-x\right)+3=4x-2-x$

Ans:_____(3)

4. (Continued) Solve:

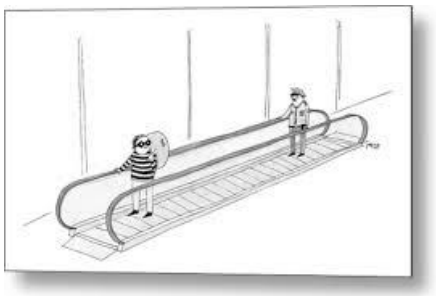
c) $2x-1=2(x-1)$

Ans:_____(3)

5. Solve $|x-9|=|2x|$

Ans:_____(4)

6. It took Alexis 6 seconds to run to the end of a 60 meter moving walkway and it took her 10 seconds to run back to the start of the moving walkway. How fast is the moving walkway?



Equation(s): _____(3)

_____

Ans:_____(1)

7. The population of Detroit in 2010 was 711,088. This represents a 21.9% decrease from the 2009 population. What was the 2009 population?

Ans:_____(3)

8. The population of India is approximately 1,350,200,000. Write the population in scientific notation.

Ans:_____(2)

9. Simplify each expression.

a) $2+3\left(8\div 2\cdot 4+1\right)$

Ans:_____(2)

b) $\frac{1}{5}-2\div\frac{2}{3}$

Ans:_____(2)

10. Evaluate each expression if $x = -3$ and $y = 10$.

a) $(2 + x)(2 - x)$

Ans:_____(2)

b) $\dfrac{x - 2}{y}$

Ans:_____(2)

11. Solve $F = \dfrac{9}{5}C + 32$ for C.

Ans:_____(3)

12. The difference of two numbers is 18. The larger number is 12 less than 3 times the smaller number. What are the two numbers?

Equation(s):_____(2)

_____

Ans:_____(1)

13. Find an equation of each line.

a) Through (2,5) and (2,3).

Ans:_____(2)

b) Through $(-1,5)$ and $(0,3)$. Write the equation in **standard form** with integer coefficients.

Ans:_____(3)

c) Through the point $(1,5)$ and perpendicular to the line with equation $y=\frac{2}{3}x-3$. Write the equation in **slope-intercept form**.

Ans:_____(3)

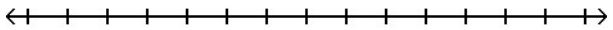
d) Through the point (2,3) and parallel to the line with equation $y=8$.

Ans:_____(2)

14. Solve the following inequalities/compound inequalities. Graph each solution set and write it in interval notation.

a) $4-2x<-2$

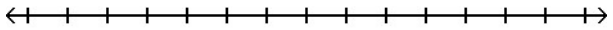
Graph (1)



Interval Notation:_____(2)

b) $2x+1\le -5$ or $x+3>2$

Graph (1)



Interval Notation:_____(2)

15. Find the domain and range of the relation. Is the relation a function?
{(2,1), (3,2), (4,3), (5,4), (5,5)}

Domain:_____(1)

Range:_____(1)

Function?:_____(1)

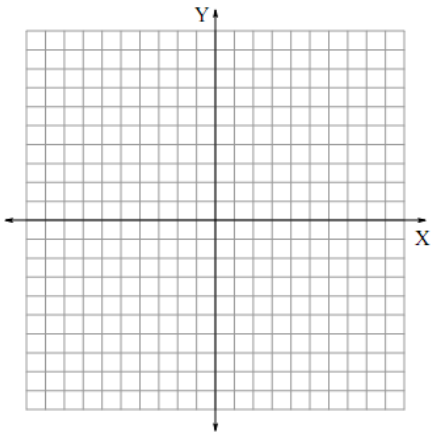
16. Consider the function $f(x)=|5-x|$.

a) Find $f(9)$.

Ans:_____(1)

b) Graph the function $f(x)=|5-x|$ by finding and plotting ordered pair solutions. Hint: consider *x*-values around and including $x=5$

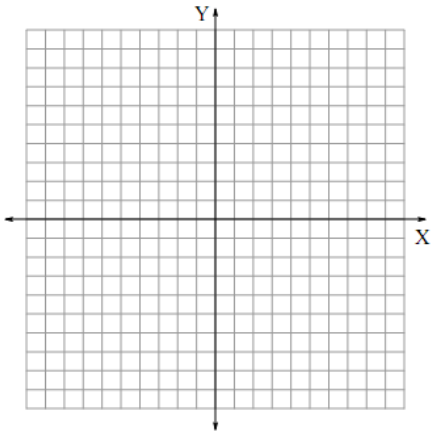
Graph (3)



17. Graph the linear equation by finding and plotting its intercepts.

$5x - 3y = -15$

Graph (2)



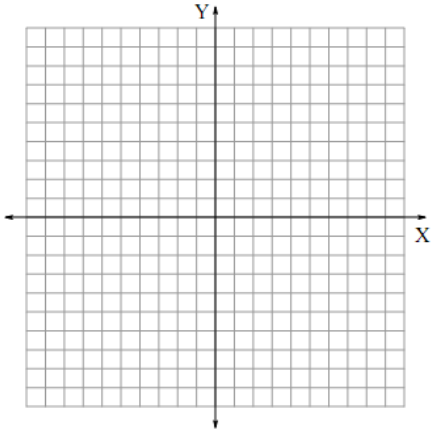
x-intercept:_____(1)

y-intercept:_____(1)

18. Graph the linear function using the slope and *y*-intercept.

$f(x) = -3x$

Graph (1)



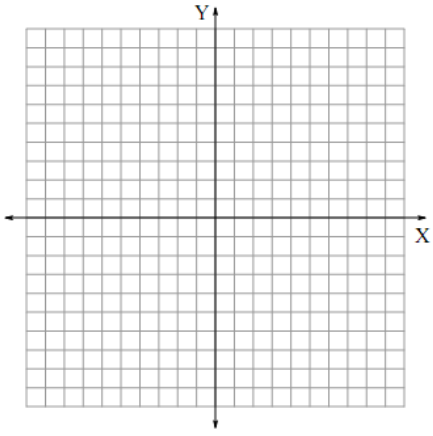
slope:_____(1)

y-intercept:_____(1)

19. Graph the solution of the system of linear inequalities.

$$\begin{cases} y < \frac{1}{4}x - 4 \\ 2x - y \le 6 - y \end{cases}$$

Graph (5)



20. Solve the system of equations by either the substitution method or the addition method.

$$\begin{cases} 3x - 2y = 7 \\ 2x + 3y = -4 \end{cases}$$

Ans:_____(3)

21. The River Theater has 820 seats. When every seat is sold, they take in $30,020. Premium seats sell for $59 while standard seats sell for $32. How many of each type of seat are there?

Equation(s):_____

_____(2)

Ans:_____(1)