

Name and section: \_\_\_\_\_

Instructor's name: \_\_\_\_\_

- **Please do not open exam until instructed to begin.**
- This exam is to be completed in the allotted time period of 2 hours.
- There are 20 problems which appear on the fronts and backs of the pages of this exam.
- You may earn a total of 100 points.
- Read each question carefully.
- Credit may not be given without sufficient supporting work.
- Simplify answers when possible.
- The use of cell phones, books, or notes are not permitted while taking this exam.
- Approved calculators are allowed.

1. [5 points] Find the area and perimeter of a rectangle whose length is 11 feet and whose width is 5 feet. Be sure to include the correct unit in your answer.

2. [5 points] Simplify  $-3\{x^2 - 4[x - (x - 2x^2)]\}$ .

3. [5 points] Solve for  $m$ . Simplify answers.

$$92m + 12 - 62m = 50 - 16m$$

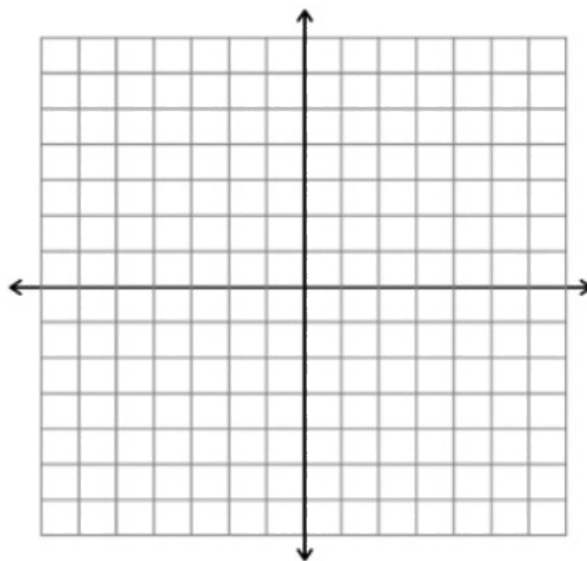
4. [5 points] Solve the following equation for  $y$ .

$$5 - \frac{1}{3}y = \frac{1}{12}y$$

5. [5 points] Write the following verbal statement in algebraic form. “ $x$  minus 3 equals four times the quantity of two times  $x$  minus 9”
6. [5 points] The average weekday high temperature last week was  $83^\circ$ . The high temperatures on Monday through Thursday were  $75^\circ$ ,  $78^\circ$ ,  $84^\circ$ , and  $87^\circ$ . What was the high temperature on Friday?
7. [5 points] Solve the inequality for  $y$ .

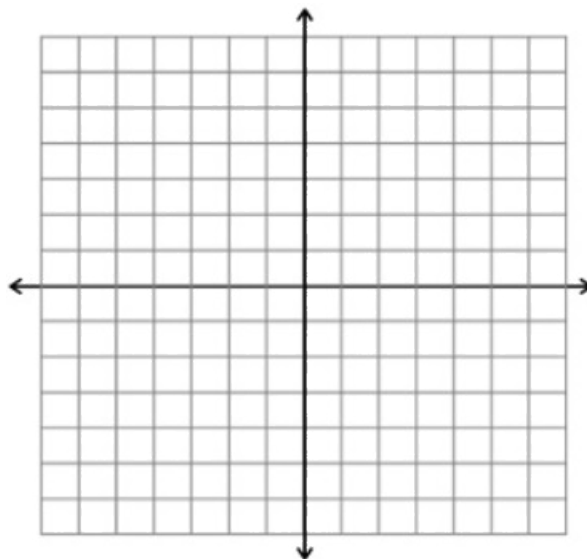
$$-7y - 19 \leq -3y - 11$$

8. [5 points] Graph the line with slope  $-\frac{2}{3}$  that passes through the point  $(2, -1)$ . Label your axes and put number values on them. Identify at least three points on your line.



9. [5 points] Find the equation of the line that passes through  $(-8, -7)$  and is perpendicular to the line  $y = 8x + 2$ .

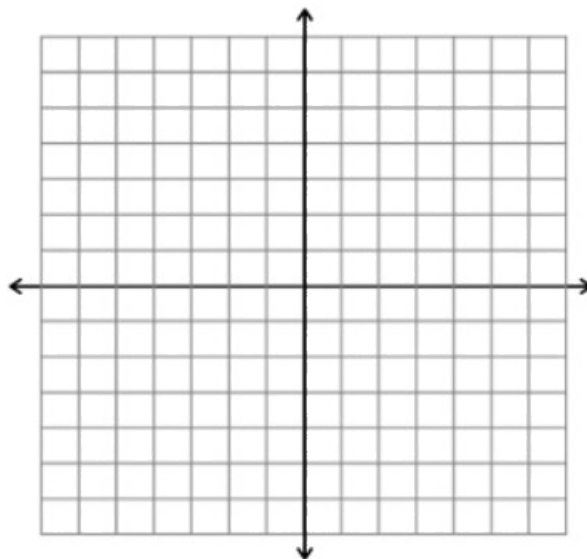
10. [5 points] Solve by graphing the given system of equations. Be sure to label axis with  $x$ ,  $y$ , and with numbers. Identify and label the intersection point.



$$\begin{cases} 5x + 3y = 4 \\ 2x - y = 6 \end{cases}$$

11. [5 points] A Broadway performance had a paid attendance of 308 people. Balcony tickets cost \$38 and orchestra tickets cost \$60. Ticket sales receipts totaled \$15,576. How many Balcony tickets were sold? How many orchestra tickets were sold?

12. [5 points] Graph the solution to the following system of inequalities. Be sure to label the  $x$  and  $y$  axes. Identify and label the intersection.



$$\begin{cases} y \geq -2x - 5 \\ y \geq 3x + 5 \end{cases}$$

13. [5 points] Multiply and simplify your answer.

$$6x^{-3}y^6z^{-4} \cdot 4x^5y^{-4}z^5 \cdot 3x^5$$

14. [5 points]

(a) Rewrite without an exponent:  $(-15)^{-2}$

(b) Rewrite without using a negative exponent:  $-16y^{-9}$

15. [5 points]

(a) Write 90,037,000 in scientific notation.

(b) Write 0.00005012 in scientific notation.

16. [5 points] Identify the degree and leading coefficient of the polynomial.

$$-6y^3 + 13y^2 - 2y - 14y^7 + 3y^4$$

Degree: \_\_\_\_\_

Leading Coefficient: \_\_\_\_\_

17. [5 points] Simplify  $(-9x^2 + 5x - 3) - (2x - 4 - 8x^2) + (-6x + 7 - 4x^2)$ .

18. [5 points] Multiply and simplify  $(x + 5)(3x^2 + 3x - 2)$ .

19. [5 points] Simplify  $(-4x^3y^7z^4)(-3x^3y^4z^2)^2$ .

20. [5 points] Divide. Write your answer in standard form,  $Q(x) + \frac{R}{2x}$ .

$$(6x^3 - 8x^2 - 10x + 5) \div (2x)$$



## Solutions

1. Find the area and perimeter of a rectangle whose length is 11 feet and whose width is 5 feet. Be sure to include the correct unit in your answer.

Area = $5 \times 11 = 55 \text{ ft}^2$	2.5 pts
If missing units take off 0.5 pt	
Perimeter = $2(5 + 11) = 32 \text{ feet}$	2.5 pts
If missing units take off 0.5 pt	

2. Simplify  $-3\{x^2 - 4[x - (x - 2x^2)]\}$ .

$-3\{x^2 - 4[x - x + 2x^2]\}$	1 pt
$-3\{x^2 - 4[2x^2]\}$	2 pts to here
$-3\{x^2 - 8x^2\}$	3 pts to here
$-3\{-7x^2\}$	4 pts to here
$21x^2$	5 pts to here

3. Solve for  $m$ . Simplify answers.

$$92m + 12 - 62m = 50 - 16m$$

$30m + 12 = 50 - 16m$	1 pt to here
$30m + 16m = 50 - 12$	2 pts to here
$46m = 38$	3 pts to here
$m = 38/46$	4 pts to here
$m = 19/23$	5 pts total

4. Solve the following equation for  $y$ .

$$5 - \frac{1}{3}y = \frac{1}{12}y$$

$12(5 - \frac{1}{3}y) = 12(\frac{1}{12})y$	1 pts to here
$60 - 4y = y$	2 pts to here
$60 = 5y$	3 pts to here
$12 = y$	4 pts total

5. Write the following verbal statement in algebraic form. “ $x$  minus 3 equals four times the quantity of two times  $x$  minus 9”

$x - 3 = 4(2x - 9)$	5 pts
No partial credit	

6. The average weekday high temperature last week was  $83^\circ$ . The high temperatures on Monday through Thursday were  $75^\circ$ ,  $78^\circ$ ,  $84^\circ$ , and  $87^\circ$ . What was the high temperature on Friday?

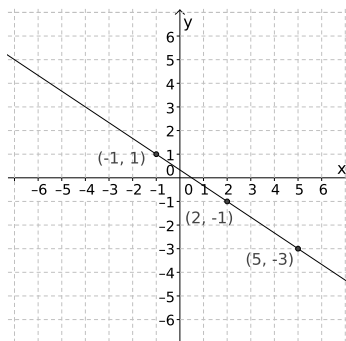
$\frac{75+78+84+87+x}{5} = 83$	2 pts to here
$324 + x = 415$	3 pts to here
$x = 415 - 324 = 91$	4 pts to here
It was $91^\circ$ on Friday.	5 pts total

7. Solve the inequality for  $y$ .

$$-7y - 19 \leq -3y - 11$$

$-7y + 3y \leq -11 + 19$	2 pts to here
$-4y \leq 8$	4 pts to here
$y \geq -2$	5 pts total.

8. Graph the line with slope  $-\frac{2}{3}$  that passes through the point  $(2, -1)$ . Label your axes and put number values on them. Identify at least three points on your line.

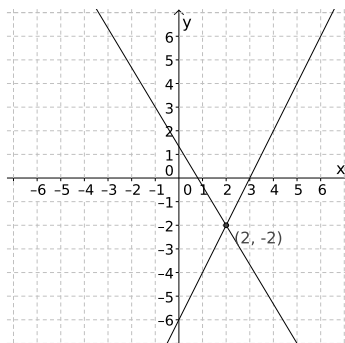


1 point for correct labeling of axes and numbers on them.
3 points for correctly identifying 3 pts.
1 pt for the correct line.

9. Find the equation of the line that passes through  $(-8, -7)$  and is perpendicular to the line  $y = 8x + 2$ .

Slope of the line $y = 8x + 2$ is 8	1 pt to here
Perpendicular slope: $m = -1/8$	2 pts to here
$-7 = -8(-1/8) + b$	3 pts to here
$-7 = 1 + b$ so $b = -8$	4 pts to here
$y = \frac{-1}{8}x - 8$	5 pts total

10. Solve by graphing the given system of equations. Be sure to label axis with  $x$ ,  $y$ , and with numbers. Identify and label the intersection point.



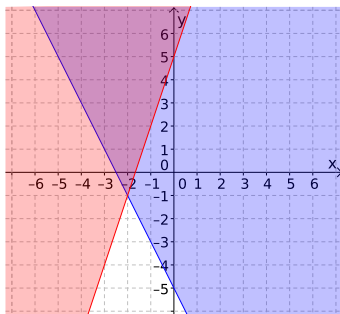
$$\begin{cases} 5x + 3y = 4 \\ 2x - y = 6 \end{cases}$$

Correct system is graphed	award 2 pts
Axes are labeled	award 2 pts
Intersection point $(2, -2)$	award 1 pt

11. A Broadway performance had a paid attendance of 308 people. Balcony tickets cost \$38 and orchestra tickets cost \$60. Ticket sales receipts totaled \$15,576. How many Balcony tickets were sold? How many orchestra tickets were sold?

Let $x$ = the number of balcony tickets sold	
and $y$ = the number of orchestra tickets sold	1 pt to here
$x + y = 308$ and $38x + 60y = 15576$	2 pts to here
$x = 308 - y$ and $38(308 - y) + 60y = 15576$	3 pts to here
$11704 - 38y + 60y = 15576$	
$11704 + 22y = 15576$	4 pts up to here
$22y = 3872$	
$y = 176$ so $x = 308 - 176 = 132$	5 pts up to here
There were 176 orchestra tickets sold and 132 balcony tickets sold.	6 pts total

12. Graph the solution to the following system of inequalities. Be sure to label the  $x$  and  $y$  axes. Identify and label the intersection.



$$\begin{cases} y \geq -2x - 5 \\ y \geq 3x + 5 \end{cases}$$

1 pt for each correct inequality (2 pts total)  
 1 pt for correct intersection  
 2 pts for the  $x$  and  $y$  axis labels

13. Multiply and simplify your answer.

$$6x^{-3}y^6z^{-4} \cdot 4x^5y^{-4}z^5 \cdot 3x^5$$

$72x^7y^2z$  1 pt for each variable with correct exponent  
 and 2 pts for the number 72

14. (a) Rewrite without an exponent:  $(-15)^{-2}$   
 (b) Rewrite without using a negative exponent:  $-16y^{-9}$

(a)  $\frac{1}{225}$  2.5 pts  
 No partial credit.  
 (b)  $\frac{-16}{y^9}$  2.5 pts  
 No partial credit.

15. (a) Write 90,037,000 in scientific notation.  
 (b) Write 0.00005012 in scientific notation.

(a)  $9.0037 \times 10^7$  2.5 pts  
 No partial credit.  
 (b)  $5.012 \times 10^{-5}$  2.5 pts  
 No partial credit.

16. Identify the degree and leading coefficient of the polynomial.

$$-6y^3 + 13y^2 - 2y - 14y^7 + 3y^4$$

Degree: \_\_\_\_\_

Leading Coefficient: \_\_\_\_\_

Degree: 7 2.5 pts  
 Leading Coefficient: -14 2.5 pts  
 No partial credit.

17. Simplify  $(-9x^2 + 5x - 3) - (2x - 4 - 8x^2) + (-6x + 7 - 4x^2)$ .

$-9x^2 + 5x - 3 - 2x + 4 + 8x^2 - 6x + 7 - 4x^2$  3 pts to here  
 $= -5x^2 - 3x + 8$  5 pts total  
 Partial credit: 1.5 pt for each correct term

18. Multiply and simplify  $(x + 5)(3x^2 + 3x - 2)$ .

$3x^3 + 3x^2 - 2x + 15x^2 + 15x - 10$	3 pts to here
$3x^3 + 18x^2 + 13x - 10$	5 pts total

19. Simplify  $(-4x^3y^7z^4)(-3x^3y^4z^2)^2$ .

$-36x^9y^{15}z^8$	1 pt for each variable with correct exponent and 2 pts for the number -36
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20. Divide. Write your answer in standard form,  $Q(x) + \frac{R}{2x}$ .

$$(6x^3 - 8x^2 - 10x + 5) \div (2x)$$

$\frac{6x^3}{2x} - \frac{8x^2}{2x} - \frac{10x}{2x} + \frac{5}{2x}$	3 pts to here
$3x^2 - 4x - 5 + \frac{5}{2x}$	5 pts total