

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 7 meters and whose width is 14 meters. Be sure to include the correct unit in your answer.

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

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

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

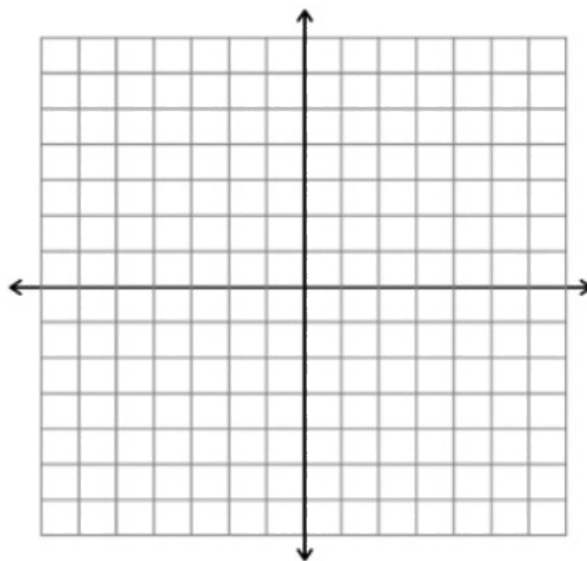
4. [5 points] Solve the following equation for y .

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

5. [5 points] Write the following verbal statement in algebraic form. “ x plus 5 equals three times the quantity of five times x minus 2”
6. [5 points] An athlete’s average time for all six track meets was 11.8 seconds. The athlete was unable to find their time in the last meet, but knew all of the other times: 11.7 seconds, 11.6 seconds, 12 seconds, 12.1 seconds, 11.9 seconds. What was her running time for her last meet?
7. [5 points] Solve the inequality for y .

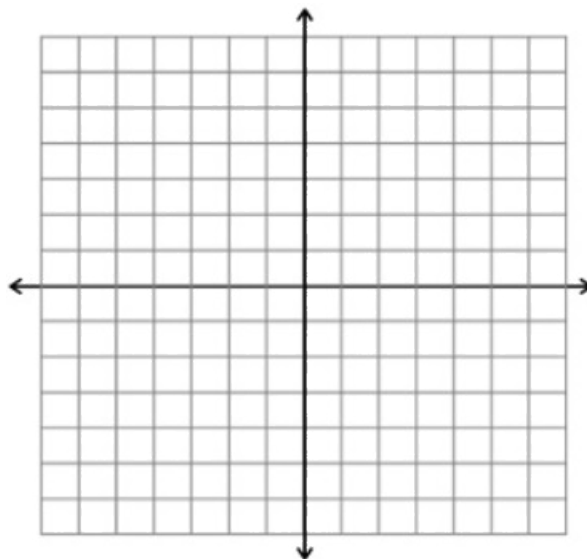
$$2y + 5 \leq 8y - 13$$

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 $y = 8x + 2$.

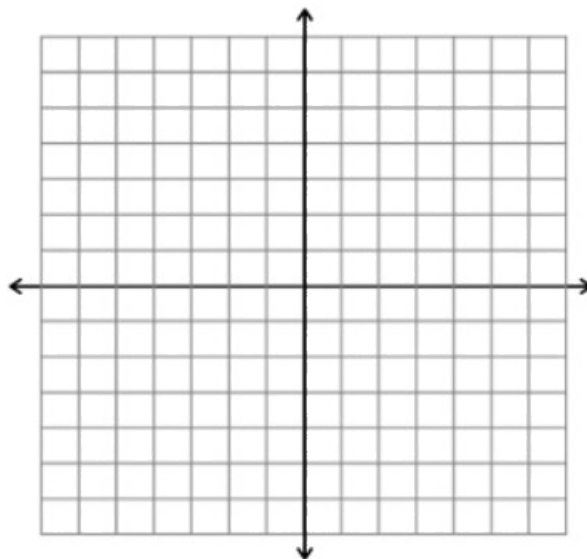
10. [5 points] Solve by graphing the given system of equations. Be sure to label axis with x , y , and with numbers. Identify and label the intersection point.



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

11. [5 points] An employment agency specializing in temporary construction help pays heavy equipment operators \$140 per day and general laborers \$90 per day. If thirty-five people were hired and the payroll was \$3950, how many heavy equipment operators were employed? How many laborers?

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.



$$\begin{cases} y < -x + 5 \\ y \geq 2x - 1 \end{cases}$$

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: $(-12)^{-2}$

(b) Rewrite without using a negative exponent: $-8y^{-10}$

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.

$$5 + 6x^9 + 4x^8 + 3x^7 - 2x$$

Degree: _____

Leading Coefficient: _____

17. [5 points] Simplify $(-12u^2 + 8u - 32) - (11u - 14u^2 - 10) + (-5 - 7u - 4u^2)$.

18. [5 points] Multiply and simplify $(x - 3)(3x^2 - 2x - 1)$.

19. [5 points] Simplify $(-5x^6yz^2)(-2x^5y^3z^4)^2$.

20. [5 points] Divide. Write your answer in standard form, $Q(x) + \frac{R}{3x}$.

$$(18x^3 - 9x^2 + 3x + 5) \div (3x)$$

Solutions

1. Find the area and perimeter of a rectangle whose length is 7 meters and whose width is 14 meters. Be sure to include the correct unit in your answer.

Area = $7 \times 14 = 98 \text{ m}^2$	2.5 pts
If missing units take off 0.5 pt	
Perimeter = $2(7 + 14) = 42 \text{ meters}$	2.5 pts
If missing units take off 0.5 pt	

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

$-2\{x^2 - 3[x - x + 2x^2]\}$	1 pt
$-2\{x^2 - 3[2x^2]\}$	2 pts to here
$-2\{x^2 - 6x^2\}$	3 pts to here
$-2\{-5x^2\}$	4 pts to here
$10x^2$	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 plus 5 equals three times the quantity of five times x minus 2”

$x + 5 = 3(5x - 2)$	5 pts
No partial credit.	

6. An athlete's average time for all six track meets was 11.8 seconds. The athlete was unable to find their time in the last meet, but knew all of the other times: 11.7 seconds, 11.6 seconds, 12 seconds, 12.1 seconds, 11.9 seconds. What was her running time for her last meet?

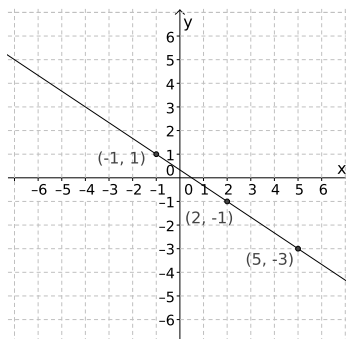
$\frac{11.7+11.6+12+12.1+11.9+x}{6} = 11.8$	2 pts to here
$59.3 + x = 70.8$	3 pts to here
$x = 70.8 - 59.3 = 11.5$	4 pts to here
The athlete ran an 11.5 second race.	5 pts total

7. Solve the inequality for y .

$$2y + 5 \leq 8y - 13$$

$2y - 8y \leq -13 - 5$	2 pts to here
$-6y \leq -18$	4 pts to here
$y \geq 3$	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.

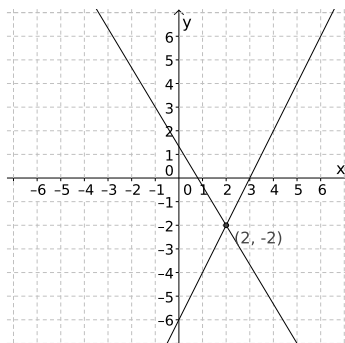


1 point for correct labeling of axes and numbers on them.
3 points for correctly identifying 3 pts.
1 pt for the correct line.

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.



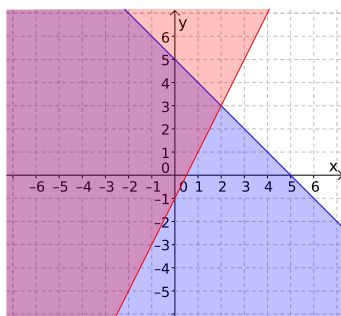
$$\begin{cases} 5x + 3y = 4 \\ 2x - y = 6 \end{cases}$$

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

11. An employment agency specializing in temporary construction help pays heavy equipment operators \$140 per day and general laborers \$90 per day. If thirty-five people were hired and the payroll was \$3950, how many heavy equipment operators were employed? How many laborers?

Let x = the number of heavy equipment operators	
and y = the number of laborers	1 pt to here
$x + y = 35$ and $140x + 90y = 3950$	2 pts to here
$x = 35 - y$ and $140(35 - y) + 90y = 3950$	3 pts to here
$4900 - 140y + 90y = 3950$	
$4900 - 50y = 3950$	4 pts up to here
$-50y = -950$	
$y = 19$ so $x = 35 - 19 = 16$	5 pts to here
There were 19 laborers	
and 16 heavy equipment operators.	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.



$$\begin{cases} y < -x + 5 \\ y \geq 2x - 1 \end{cases}$$

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: $(-12)^{-2}$
 (b) Rewrite without using a negative exponent: $-8y^{-10}$

(a) $\frac{1}{144}$ 2.5 pts
 No partial credit.
 (b) $\frac{-8}{y^{10}}$ 2.5 pts
 No partial credit.

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

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

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

$$5 + 6x^9 + 4x^8 + 3x^7 - 2x$$

Degree: _____

Leading Coefficient: _____

Degree: 9 2.5 pts
 Leading Coefficient: 6 2.5 pts
 No partial credit.

17. Simplify $(-12u^2 + 8u - 32) - (11u - 14u^2 - 10) + (-5 - 7u - 4u^2)$.

$-12u^2 + 8u - 32 - 11u + 14u^2 + 10 - 5 - 7u - 4u^2$ 2 pts to here
 $= -2u^2 - 10u - 27$ 5 pts total
 Partial credit: 1.5 pts for each correct term

18. Multiply and simplify $(x - 3)(3x^2 - 2x - 1)$.

$ \begin{aligned} &3x^3 - 2x^2 - x - 9x^2 + 6x + 3 \\ &= 3x^3 - 11x^2 + 5x + 3 \end{aligned} $	3 pts to here 5 pts total
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19. Simplify $(-5x^6yz^2)(-2x^5y^3z^4)^2$.

$-20x^{16}y^7z^{10}$	1 pt for each variable with correct exponent and 2 pts for the number -20
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20. Divide. Write your answer in standard form, $Q(x) + \frac{R}{3x}$.

$$(18x^3 - 9x^2 + 3x + 5) \div (3x)$$

$ \begin{aligned} &\frac{18x^3}{3x} - \frac{9x^2}{3x} - \frac{3x}{3x} + \frac{5}{3x} \\ &6x^2 - 3x + 1 + \frac{5}{3x} \end{aligned} $	3 pts to here 5 pts total
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