Name: Key

Algebra 2: Midterm Review Part 2 Short Answer (4pts. Each)

1. Solve for r: $\frac{1}{3}V = \frac{2}{3}\pi r^3 \cdot \frac{3}{2}$

$\frac{3}{2}V = \pi r^3$

$\frac{3V}{2\pi} = r^3$

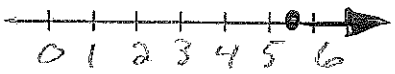
$r = \sqrt[3]{\frac{3V}{2\pi}}$

2. Solve the inequality, then graph the solution: $4x - 5 \geq 17$

$4x \geq 22$

$x \geq \frac{11}{2}$

$x \geq 5.5$

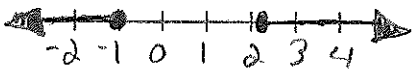


3. Solve the inequality, then graph the solution: $|3x - 2| \geq 5$

$3x - 2 \geq 5$ OR $3x - 2 \leq -5$

$3x \geq 7$ OR $3x \leq -3$

$x \geq \frac{7}{3}$ OR $x \leq -1$



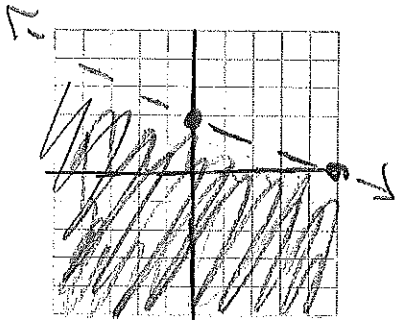
4. Graph: $2x + 5y < 10$

$x = 5$

$y = 2$

$0 < 10$

True



5. Find the vertex of the graph: $y = |x + 2| - 3$

$(-2, -3)$

6. The drama club sold 250 tickets for the end-of-year performance. Admission prices were $10 for adults and $7 for students. The total amount collected at the box office was $1900. How many students attended the play?

$(x+y=250)-7$

$10x+7y=1900$

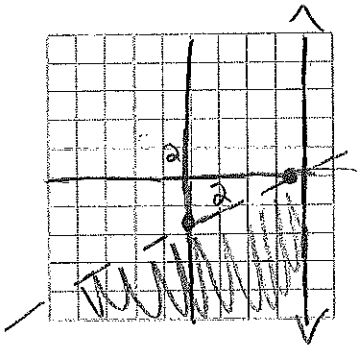
$-7x-7y=-1750$

$3x=150$

$x=50$

$y=200$ Students

7. Graph the system of inequalities: $3x-7y>21$, $x\leq 8$



8. Perform the matrix operation: $\begin{bmatrix}-3 & 2\\ 5 & 6\\ 2 & 3\end{bmatrix}\begin{bmatrix}4 & 2\\ -3 & 1\end{bmatrix}$

$\begin{bmatrix}-3(4)+2(-3) & -3(2)+2(1)\\ 5(4)+6(-3) & 5(2)+6(1)\\ 2(4)+3(-3) & 2(2)+3(1)\end{bmatrix}=\begin{bmatrix}-18 & -4\\ 2 & 16\\ -1 & 7\end{bmatrix}$

9. Solve the system using Cramer's Rule or Inverse Matrices: $3x+y=8$, $5x+2y=11$

$A=\begin{bmatrix}3 & 1\\ 5 & 2\end{bmatrix}$

$\det A=6-5=1$

$x=\begin{bmatrix}8 & 1\\ 11 & 2\end{bmatrix}=16-11=\frac{5}{1}=5$

$y=\begin{bmatrix}3 & 8\\ 5 & 11\end{bmatrix}=33-40=-7$

$(5,-7)$

10. Solve the equation: $\frac{1}{4}x^2-5=20$

$\frac{1}{4}x^2=25$

$x^2=100$

$x=\pm 10$

11. Solve the equation: $4x^2 + 2x - 5 = 0$ Quadratic Formula or complete Square

$$x = \frac{-2 \pm \sqrt{(2)^2 - 4(4)(-5)}}{2(4)}$$

$$x = \frac{-2 \pm \sqrt{84}}{8} = -\frac{2}{8} \pm \frac{2\sqrt{21}}{8} = \boxed{-\frac{1}{4} \pm \frac{\sqrt{21}}{4}}$$

12. Write the expression in standard form: $\frac{(3+i)}{(2-3i)} \cdot \frac{(2+3i)}{(2+3i)}$

$$\frac{6+9i+2i+3i^2}{4+6i-6i-9i^2} = \frac{3+11i}{13} = \boxed{\frac{3}{13} + \frac{11}{13}i}$$

13. Niagara Falls in New York is 235 feet high. How long does it take the water to fall from the top to the bottom of Niagara Falls? ($h = -16t^2 + h_0$)

$$0 = -16t^2 + 235$$

$$\frac{-235}{-16} = -16t^2$$

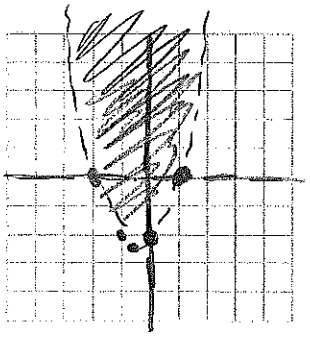
$$14.6875 = t^2$$

$$\boxed{t = 3.8 \text{ sec}}$$

14. Graph the inequality: $y > x^2 + x - 2$

$$\frac{-1}{2(1)} = -\frac{1}{2}$$

X	Y
-2	0
-1	-2
-.5	-2.25
0	-2
1	0



15. Solve: $81x^2 - 36 = 0$

$$81x^2 = 36$$

$$x^2 = \frac{36}{81}$$

$$\boxed{x = \pm \frac{6}{9}}$$