Name KEY

Sheet #241: Line,Circe,Parabola

Per/Sec. _____ Date _____

Graphing calculator needed.

1. Consider the equation $y = -x^2 + 5x - 3$.

   a) Sketch its graph. Label the axes with units and variables.

   b) Find the y intercept.

   $y = -3$ $\boxed{y = -3}$

   c) Find the x intercepts with a calculator. Round to 3 decimals.

   $X \approx 0.697$, $X \approx 4.303$ $\boxed{X \approx 0.697,\ X \approx 4.303}$

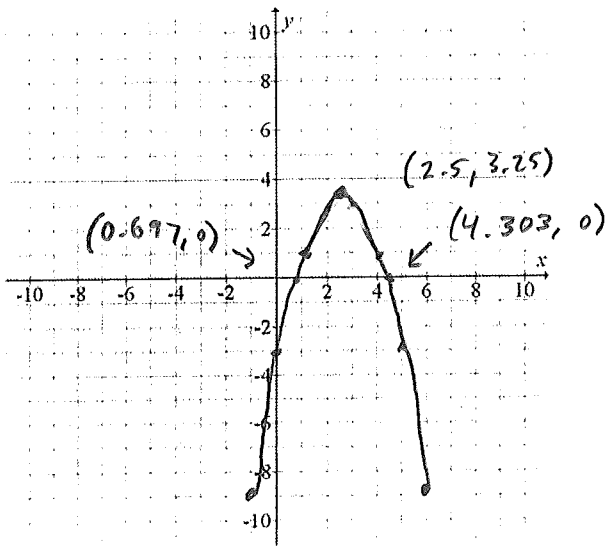
   d) Find the x and y coordinates of the vertex (maximum/minimum).

   $(2.5, 3.25)$

   e) Solve ALGEBRAICALLY with the quadratic equation.

$$X = \frac{-5 \pm \sqrt{5^2 - 4(-1)(-3)}}{2(-1)} = \frac{-5 \pm \sqrt{25-12}}{-2} = \frac{-5 \pm \sqrt{13}}{-2}$$

$$\boxed{\begin{cases} X = \frac{5}{2} + \frac{\sqrt{13}}{2} \\ X = \frac{5}{2} - \frac{\sqrt{13}}{2} \end{cases}}$$



1. $-3,\ 0.697,\ 4.303$
2. $19 + 9i$ $(2.5, 3.25)$
3. $1 + 13i$
4. $\frac{-7(2+7i)}{53}$
5. $\frac{1 \pm \sqrt{19}i}{2}$
6. $(4, -2),\ r = \sqrt{10}$
7. $(x+2)^2 + (y-3)^2 = 25$
8. $y = -4x + 1$
9. $y = 2x + 2$

Simplify.

2. $(7+3i)+(12+6i)$

$7+12+3i+6i$

2. $19+9i$

3. $(2+i)(3+5i)$

$2\cdot 3+2\cdot 5i+i\cdot 3+i\cdot 5i$ $\quad i^2=-1$

$6+10i+3i+5i^2$

$6+13i-5$

3. $1+13i$

4. $\dfrac{-7}{2-7i}$ ← COMPLEX CONJUGATE

$\dfrac{-7}{2-7i}\left(\dfrac{2+7i}{2+7i}\right)=\dfrac{-14-49i}{2^2+7^2}=\dfrac{-14-49i}{53}$

4. $-\dfrac{14}{53}-\dfrac{49}{53}i$

Solve using the quadratic formula.

5. $p^2-p+5=0$

$p=\dfrac{-(-1)\pm\sqrt{(-1)^2-4(1)\cdot 5}}{2(1)}=\dfrac{1\pm\sqrt{-19}}{2}$

5. $\dfrac{1+\sqrt{19}i}{2}$, $\dfrac{1-\sqrt{19}i}{2}$

Find the center and radius of the circle.

6. $(x-4)^2+(y+2)^2=10$ $\quad (x-h)^2+(y-k)^2=r^2$

$x-4=0$ $\quad y+2=0$ $\quad r^2=10$

$x=4$ $\quad y=-2$ $\quad r=\sqrt{10}$ (NOT $-\sqrt{10}$)

6. $(4,-2)$, $R=\sqrt{10}$

7. Find the equation of the circle with center $(-2,3)$ and radius $r=5$.

$(x-h)^2+(y-k)^2=r^2$

$(x+2)^2+(y-3)^2=5^2$

7. $(x+2)^2+(y-3)^2=25$

Write the equation of the line.

8. slope $=-4$, contains point $(1,-3)$

$y-k=m(x-h)$

$y-(-3)=-4(x-1)$

$y+3=-4(x-1)$

$y=-4x+4-3$

$y=-4x+1$

8. $y+3=-4(x-1)$ or $y=-4x+1$

9. passes through $(-3,-4)$ and $(5,12)$

$m=\dfrac{\text{RISE}}{\text{RUN}}=\dfrac{12-(-4)}{5-(-3)}=\dfrac{16}{8}=2$

$y-k=m(x-h)$

$y-(-4)=2(x-(-3))$

$y+4=2(x+3)$ GOOD ANSWER

$y=2x+6-4$

$y=2x+2$ ← ALSO ANSWER

or $y-12=2(x-5)$ ← ANOTHER GOOD ANSWER

9. $y+4=2(x+3)$ or $y=2x+2$

or $y-12=2(x-5)$