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Date
Algebra II

Quadratics/Complex Numbers Review Sheet

1. Given i is the imaginary unit, $(2-yi)^2$ in simplest form is

1) $y^2 - 4yi + 4$
2) $-y^2 - 4yi + 4$
3) $-y^2 + 4$
4) $y^2 + 4$

	2	$-yi$
2	4	$-2yi$
$-yi$	$-2yi$	$+y^2i^2$

$4 - 4yi + y^2i^2$

$4 - 4yi + y^2(-1)$

$4 - 4yi - y^2$

2. The expression $(3-7i)^2$ is equivalent to

1) $-40 + 0i$
2) $-40 - 42i$
3) $58 + 0i$
4) $58 - 42i$

	3	$-7i$
3	9	$-21i$
$-7i$	$-21i$	$+49i^2$

$9 - 42i + 49i^2$

$9 - 42i + 49(-1)$

$9 - 42i - 49$

$-40 - 42i$

3. Solve for x and express your answer in simplest radical form: $x^2 - 6x = 3$

Completing the Square

$\left(\frac{-6}{2}\right)^2 = 9$

$x^2 - 6x = 3$

$x^2 - 6x + 9 = 3 + 9$

$(x-3)(x-3) = 12$

$\sqrt{(x-3)^2} = \sqrt{12}$

$x - 3 = \pm\sqrt{12}$

$+3 \quad +3$

$x = 3 \pm \sqrt{12}$

$\sqrt{4}\sqrt{3}$

$x = 3 \pm 2\sqrt{3}$

Quadratic Formula

$a = 1$
$b = -6$
$c = -3$

$x^2 - 6x = 3$
$-3 \quad -3$

$x^2 - 6x - 3 = 0$

$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$

$x = \frac{6 \pm \sqrt{(-6)^2 - 4(1)(-3)}}{2(1)}$

$x = \frac{6 \pm \sqrt{48}}{2}$

$\sqrt{48}$
$\sqrt{16}\sqrt{3}$
$4\sqrt{3}$

$x = \frac{6 \pm 4\sqrt{3}}{2}$

$x = 3 \pm 2\sqrt{3}$

4. Solve for x and express your answer in simplest $a+bi$ form: $4x^2 + 2x = -1$

$+1 \quad +1$

* Since $a \neq 1$, quadratic formula is the best choice.

$4x^2 + 2x + 1 = 0$

$a = 4$
$b = 2$
$c = 1$

$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$

$x = \frac{-2 \pm \sqrt{(2)^2 - 4(4)(1)}}{2(4)}$

$x = \frac{-2 \pm \sqrt{-12}}{8}$

$\sqrt{-12}$
$i\sqrt{12}$
$\sqrt{4}\sqrt{3}$
$2i\sqrt{3}$

$x = \frac{-2 \pm 2i\sqrt{3}}{8}$

$x = -\frac{1}{4} \pm \frac{1}{4}i\sqrt{3}$

5. Solve for all values of x: $4x^3 - 10x^2 + 2x = 0$

$\frac{4x^3}{2x} \quad \frac{-10x^2}{2x} \quad \frac{2x}{2x}$

$2x(2x^2 - 5x + 1) = 0$

$2x = 0 \quad | \quad 2x^2 - 5x + 1 = 0$

$\frac{2x}{2} = \frac{0}{2}$

$x = 0$

$a = 2$

$b = -5$

$c = 1$

$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$

$x = \frac{5 \pm \sqrt{(-5)^2 - 4(2)(1)}}{2(2)}$

$x = \frac{5 \pm \sqrt{17}}{4}$

$x = \frac{5}{4} \pm \frac{\sqrt{17}}{4}$

6. Solve for all values of x: $x^3 + 4x^2 + 9x = -36$

$+36 \quad +36$

$x^3 + 4x^2 + 9x + 36 = 0$

$\frac{x^3}{x^2} \quad \frac{4x^2}{x^2} \quad \frac{9x}{9} \quad \frac{36}{9}$

$x^2(x+4) + 9(x+4) = 0$

$(x^2 + 9)(x + 4) = 0$

$x^2 + 9 = 0$

$-9 \quad -9$

$\sqrt{x^2} = \sqrt{-9}$

$x = \pm 3i$

$x + 4 = 0$

$-4 \quad -4$

$x = -4$

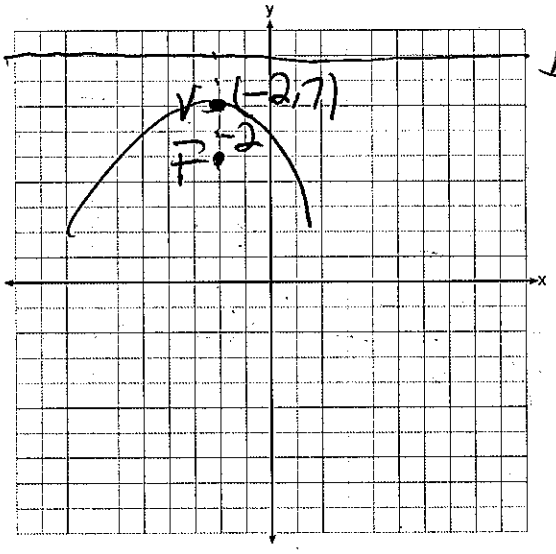
7. Which equation represents a parabola with a focus of $(-2, 5)$ and a directrix of $y = 9$?

1) $y = \frac{1}{8}(x+2)^2 + 7$

3) $y = \frac{1}{8}(x-2)^2 - 7$

2) $y = -\frac{1}{8}(x+2)^2 + 7$

4) $y = -\frac{1}{8}(x-2)^2 - 7$



D

$y = \frac{1}{4p}(x-v)^2 + t$

$V = -2$

$t = 7$

$P = -2$

$y = \frac{1}{4(-2)}(x+2)^2 + 7$

$y = -\frac{1}{8}(x+2)^2 + 7$

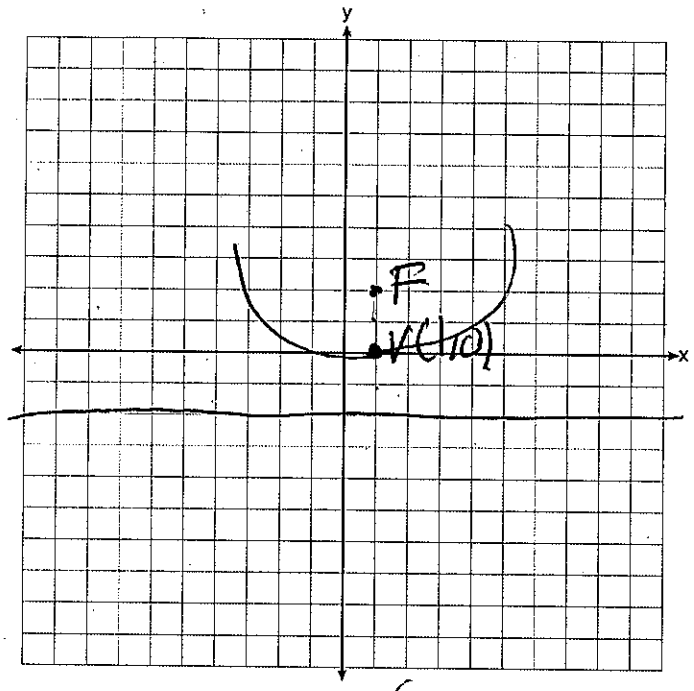
8. A parabola has its focus at (1, 2) and its directrix is $y = -2$. The equation of this parabola could be

1) $y = 8(x+1)^2$
2) $y = \frac{1}{8}(x+1)^2$
3) $y = 8(x-1)^2$
4) $y = \frac{1}{8}(x-1)^2$

$y = \frac{1}{4p}(x-v)^2 + t$ $v = 1$ $t = 0$ $p = 2$

$y = \frac{1}{4(2)}(x-1)^2 + 0$

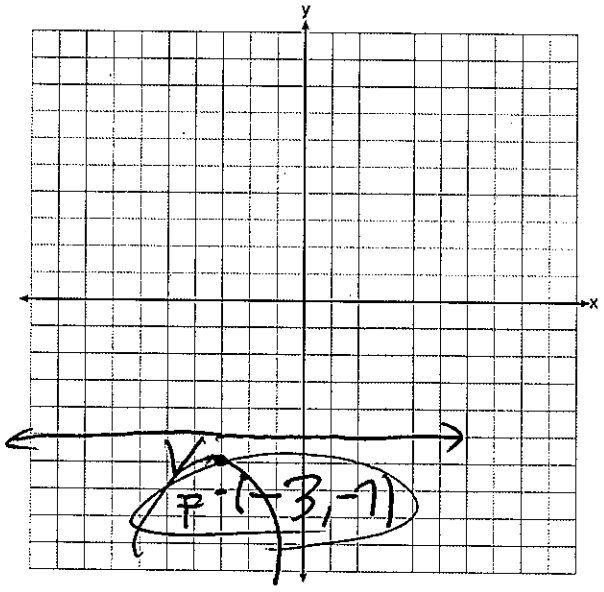
$y = \frac{1}{8}(x-1)^2$



$(-3,-6)$ = vertex

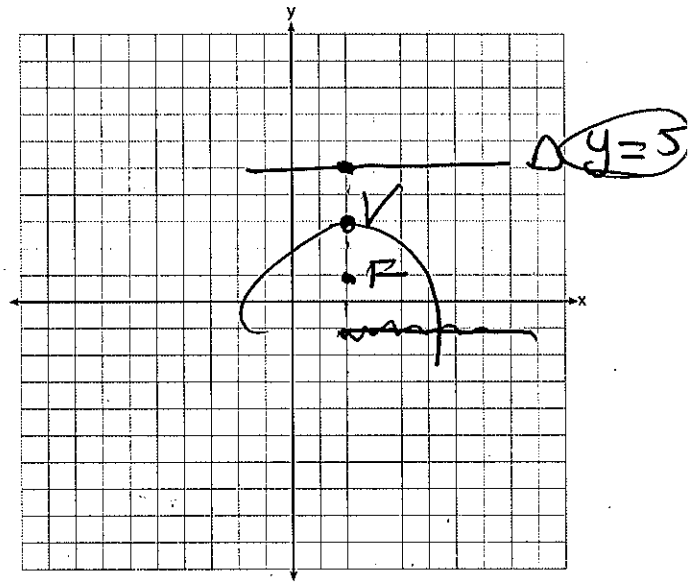
9. The parabola $y = -\frac{1}{4}(x+3)^2 - 6$ has a directrix at $y = -5$. What is the focus?

$p = \frac{-4}{4} = -1$



V(2,3)

10. The parabola $y=\frac{1}{8}(x-2)^2+3$ has a focus of (2,1).
What is the equation of the directrix?



Spiral Review
To determine if $x-a$ is a factor:
Find the remainder!
To find the remainder, use remainder theorem.
If $p(a)=0$, it is a factor.
If $p(a)\neq 0$, it is not a factor.

11. Which binomial is *not* a factor of the expression $x^3-6x^2-49x-66$?
1) $x-11$ $p(11)=0$
2) $x+2$ $p(-2)=0$
3) $x+6$ $p(-6)=-204$
4) $x+3$ $p(-3)=0$

12. Which binomial is a factor of the expression x^3-7x-6?
1) $x+3$ $p(-3)=-12$
2) $x-1$ $p(1)=-12$
3) $x-2$ $p(2)=-12$
4) $x+2$ $p(-2)=0$