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CC ALGEBRA 2

TROICI

MIDTERM REVIEW #4

Simplify:

1) $3\sqrt{-9}$

$3 \cdot 3i$
 $9i$

2) $2\sqrt{-18} + 4\sqrt{-32}$

$3\sqrt{9}\sqrt{2} + 4\sqrt{16}\sqrt{2}$
 $3 \cdot 3i \cdot \sqrt{2} + 4 \cdot 4i\sqrt{2}$
 $9i\sqrt{2} + 16i\sqrt{2}$
 $25i\sqrt{2}$

3) $2\sqrt{-423}$

$2 \cdot \sqrt{9} \sqrt{47}$
 $2 \cdot 3i \sqrt{47}$
 $6i\sqrt{47}$

4) $(-8-13i) + (3+6i)$

$-5-7i$

5) $(-5+i) - (5-2i)$

$(-5+i) + (-5+2i)$
 $-10+3i$

6) $(-1+3i)(-5-4i)$

$5+4i-15i-12i^2$
 $5-11i-12(-1)$
 $5-11i+12$
 $17-11i$

Discriminant is $b^2 - 4ac$

7) Describe the roots of the equation

$0 = ax^2 + bx + c$ if the discriminant is 49.

real, rational, unequal

8) Describe the roots of the equation $x^2 -$

$2x = 4$
 $-4 - 4$

$a = 1$

$b = 2$

$c = -4$

$(2)^2 - 4(1)(-4)$

20

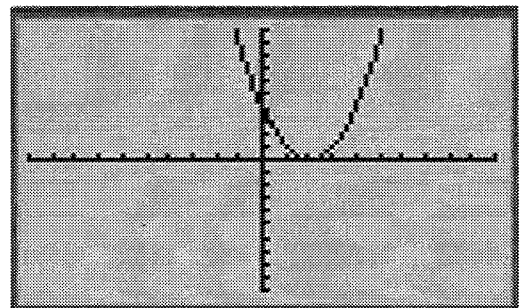
real, irrational, unequal

Value of the Discriminant	Nature of the Solutions
Negative	2 imaginary solutions
Zero	1 Real Solution
Positive - perfect square	2 Reals- Rational
Positive - non-perfect square	2 Reals- Irrational

9) What is the discriminant of the quadratic equation whose graph is shown? Explain how you know and describe the roots.

real, rational, equal

only hits x-axis one time.



10) Find the roots of $2x^2 = -2x - 1$ in simplest $a+bi$ form.

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

$$2x^2 + 2x + 1$$

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

$$a=2$$

$$b=2$$

$$c=1$$

$$x = \frac{2 \pm \sqrt{-4}}{2}$$

$$x = \frac{2 \pm 2i}{2} = \boxed{1 \pm i}$$

11) Draw the parabola and write the equation whose focus is $(0, 3)$ and directrix is $y = -1$.

$$y - k = \frac{1}{2p} (x - h)^2$$

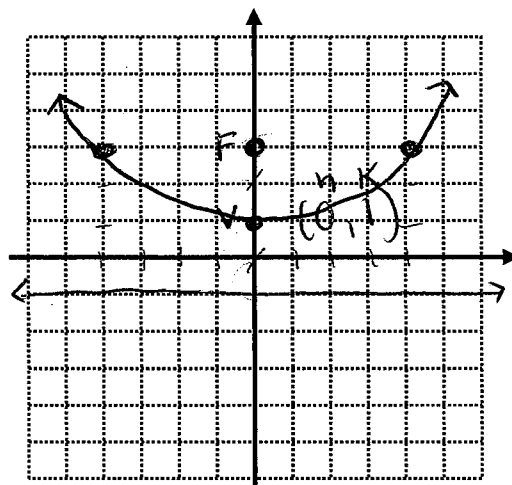
$$h = 0$$

$$k = 1$$

$$p = 4$$

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

$$\boxed{y = \frac{1}{8} x^2 + 1}$$



12) Draw the parabola and write the equation whose vertex is $(4, 3)$ and directrix $y = 5$.

$$y - k = \frac{1}{2p} (x - h)^2$$

$$h = 4$$

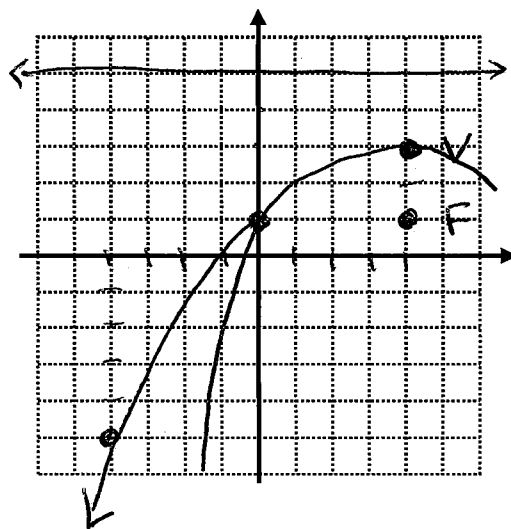
$$k = 3$$

$$p = -4$$

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

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

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



13) The directrix of the parabola $\frac{8(y+4)}{8} = \frac{(x-2)^2}{8}$ has the equation $y = 2$. Find the coordinates of the focus.

$$\boxed{\text{FOCUS} = (2, -10)}$$

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

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

$$\text{vertex} = (2, -4)$$

