REVIEW WORKSHEET 5.1 THRU 5.6

1. Find the vertex by putting the equation into vertex form.

   a. $y = -8x^2 - 40x - 45$ $y-5 = -8(x+5/2)^2$ $V(-5/2, 5)$

   b. $y = \frac{3}{4}x^2 - 6x + 7$ $y+5 = \frac{3}{4}(x-4)^2$ $V(4,-5)$

2. Find the vertex using the "short cut" method. Also find the x-intercepts if they exist.

   a. $y = -8x^2 - 12x - 6$ $V\left(-\frac{3}{4}, -\frac{3}{2}\right)$ No x int: $x = \frac{3 \pm i\sqrt{3}}{-4}$

   b. $y = 6x^2 + 12x + 24$ $(-1, 18)$ No x int: $-1 \pm i\sqrt{3}$

3. Solve over the set of complex numbers

   a. $5x^2 + 2x + 6 = 0$

   b. $3x^2 - 3x + 4 = 0$

   c. $9x^2 - 9x - 1 = 0$

   d. $3x^2 + 3x - 33 = 0$

   e. $-2x^2 + 8x - 19 = 0$

   f. $3x^2 - 3x - 4 = 0$

   ⟹ 3a $\frac{-1 \pm i\sqrt{29}}{5}$ b. $\frac{3 \pm i\sqrt{39}}{6}$ c. $\frac{3 \pm \sqrt{13}}{6}$ d. $\frac{-1 \pm 3\sqrt{5}}{2}$ e. $\frac{4 \pm 2i\sqrt{22}}{2}$ f. $\frac{3 \pm \sqrt{57}}{6}$

4. Solve by factoring.

   a. $10x^2 - 7 = 33x$

   b. $3x^2 - 11x - 20 = 0$

   c. $49x^2 = 4$

   d. $x^2 - 4x - 21 = 0$

   e. $4x^2 - 21x + 5 = 0$

   f. $x^2 = 9x$

   ⟹ 4a. $-\frac{1}{5}, \frac{7}{2}$ b. $-\frac{4}{3}, 5$ c. $\pm\frac{2}{7}$ d. $7, -3$ e. $5, \frac{1}{4}$ f. $0, 9$

5. Perform the following operations using:
   $m = 3 + 7i$ $n = 6 - 2i$

   a. $m + n$ b. mn c. $\frac{m}{n}$

   5a. $9 + 5i$ b. $32 + 36i$ c. $\frac{1 + 12i}{10}$

6. Simplify.

   a. $-6\sqrt{-12} \cdot 5\sqrt{-24}$ $360\sqrt{2}$

   b. i^{427} $-i$

7. If $f(x) = 5x^2 + 2x + 6$, find:

   a. $f(-3)$ 45

   b. $f(2 + 5i)$ $-95 + 110i$

   c. If $f(x) = 8$, what is the value of x. $x = \frac{-1 \pm \sqrt{11}}{5}$

8. Determine the indicated information about each graph. (No calculator on this one.)

   a. $y = -3x^2 + 2x - 4$

   opens: down
   wide/ narrow/ normal: narrow (stretch)
   y- intercept: $(0, -4)$

   b. $y = \frac{2}{3}x^2 - 4x + 6$

   opens: up
   wide/ narrow/ normal: wider (shrink)
   y- intercept: $(0, 6)$

9. A parabola has the following characteristics: vertex of $(2, -3)$; opens down; narrower than $y = x^2$.

   a. Write a possible equation for the parabola in $y - k = a(x - h)^2$ form. $y + 3 = -a(x-2)^2$ (a: any number $|a| > 1$)

   b. Convert your answer from part a into standard form. convert to standard form by foiling

10. A quadratic equation has solutions of $x = 2$ and $x = -4$. Write the equation.

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

    $x^2 - 2x - 8 = y$