Unit 2 Review

① $f(x) = -(3-2x)^2 + 6$

$= -(-2)^2\left(-\frac{3}{2}+x\right)^2 + 6$

$= -4(x-3/2)^2 + 6$

reflect over x-axis
vertical stretch by factor of 4
translate right 3/2, up 6.

② a. $(3+\sqrt{-64}) - (5+3i^{79})$

$3 + 8i - 5 - 3(-i)$

$\boxed{-2+11i}$

b. $\frac{3-i}{5+2i} \cdot \frac{5-2i}{5-2i} = \frac{15-6i-5i+2i^2}{25-4i^2}$

$= \frac{15-11i+2(-1)}{25-4(-1)}$

$= \boxed{\frac{13}{29} - \frac{11}{29}i}$

③ $f(x) = -2(x+4)(x-2)$

a. maximum since $a<0$.

maximum = 18

x-coord = $\frac{-4+2}{2} = -1$

$f(-1) = -2(-1+4)(-1-2) = 18$

b.

$-2(x+4)(x-2) > 0$

$\boxed{-4 < x < 2}$

④ a. $2x^2 - 5x - 12 > 0$

$(2x+3)(x-4) > 0$

$\boxed{x < -3/2 \text{ or } x > 4}$

b. $2x^2 + 24 = 4 - 8x$

$x^2 + 4x + 10 = 0$

$x^2 + 4x + 4 = -10 + 4$

$(x+2)^2 = -6$

$x + 2 = \pm\sqrt{-6}$

$\boxed{x = -2 \pm \sqrt{6}\, i}$

c. $6x^2 + 3x = x + 20$

$6x^2 + 2x - 20 = 0$

$3x^2 + x - 10 = 0$

$(3x-5)(x+2) = 0$

$\boxed{x = 5/3, -2}$

④ d. $y = x^2 - 5x + 4$

$2x - 3y = 8$

$2(4) - 3y = 8$

$y = 0$

$2(5/3) - 3(y) = 8$

$-3y = \frac{14}{3}$

$y = -\frac{14}{9}$

$2x - 3(x^2 - 5x + 4) = 8$

$2x - 3x^2 + 15x - 12 = 8$

$0 = 3x^2 - 17x + 20$

$0 = (3x - 5)(x - 4)$

$x = 5/3, 4$

$(4, 0)$ $(5/3, -14/9)$

⑤ a. $(1, -4)$ $(5, -4)$ $(-1, -28)$

symmetric

vertex: $x = \frac{5+1}{2} = 3$

$-28 = a(-1-3)^2 + k$

$-4 = a(5-3)^2 + k$

$-28 = 16a + k$

$-4 = 4a + k$

$-24 = 12a$

$-2 = a$

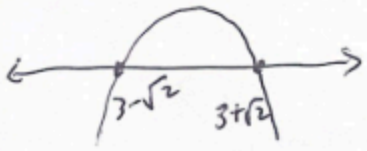
$k = 4$

$f(x) = -2(x-3)^2 + 4$

b. max since $a < 0$.

Max $= 4$

c.



$3 - \sqrt{2} \leq x \leq 3 + \sqrt{2}$

$0 = -2(x-3)^2 + 4$

$2 = (x-3)^2$

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

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

⑥ $x^2 + k + 2 = 2kx$

$x^2 - 2kx + k + 2 = 0$

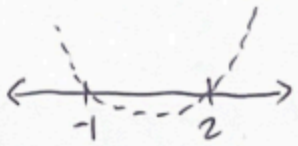
$b^2 - 4ac < 0$

$(-2k)^2 - 4(1)(k+2) < 0$

$4k^2 - 4k - 8 < 0$

$k^2 - k - 2 < 0$

$(k-2)(k+1)$



$-1 < k < 2$