Chapter 4 test review without calculator **Name** key **Date** _____ **Period** ___

1. Graph the quadratic function. Label the vertex, axis of symmetry, and the two points that you mirror.

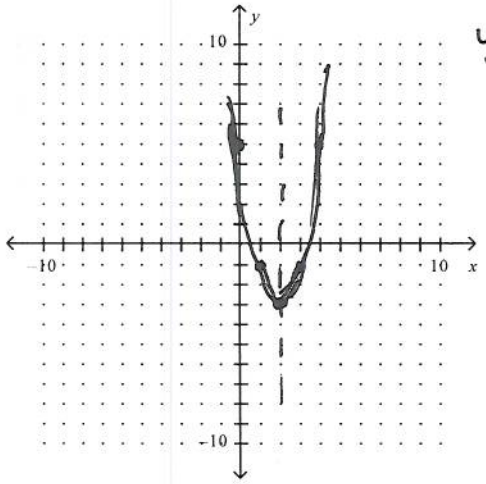
$y = 2x^2 - 8x + 5$

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

Line of Symmetry $x = 2$

$y = 2(2)^2 - 8(2) + 5 = 8 - 16 + 5 = -3$

Vertex $(2, -3)$

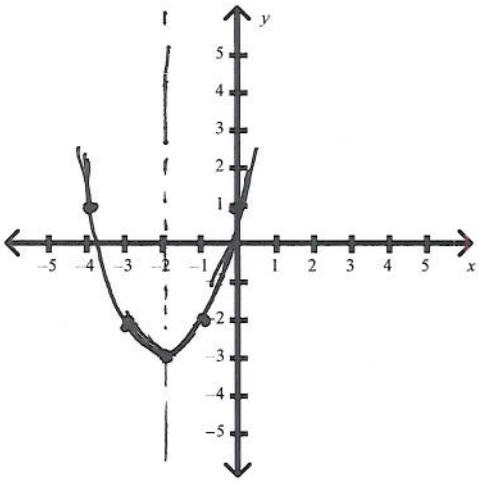


x	y
3	-1
4	5

2. Graph the parabola: $y = (x+2)^2 - 3$ Label vertex, line of symmetry, and the two points that you mirror.

Line of Symmetry $x = -2$

Vertex $(-2, -3)$



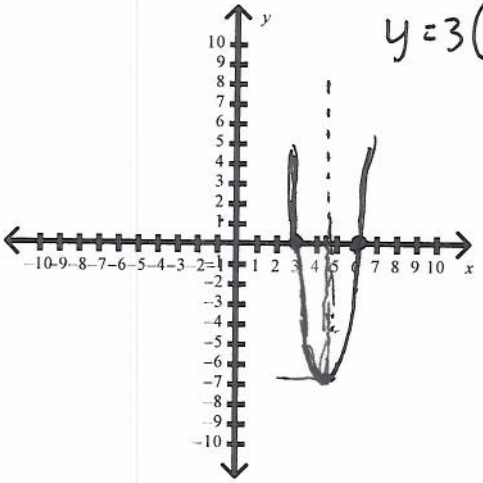
x	y
-1	-2
0	1

____ 3. Graph the function. Label the vertex, axis of symmetry, and x-intercepts.

$y = 3(x-3)(x-6)$

$x = \frac{3+6}{2} = \frac{9}{2}$

$y = 3\left(\frac{9}{2}-3\right)\left(\frac{9}{2}-6\right)$



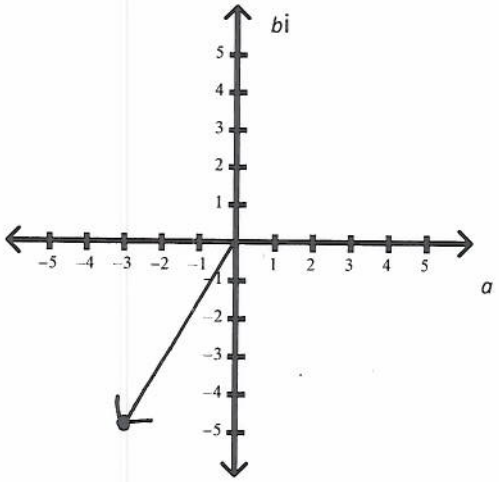
Line of Symmetry $x = \frac{9}{2}$

Vertex $\left(\frac{9}{2}, -\frac{27}{4}\right)$ or $(4.5, -6.75)$

x-intercepts $x = 3, x = 6$ or $(3,0)\ (6,0)$

Plot the number in a complex plane.

____ 4. $-3 - 5i$



Chapter 4 test review with calculator

1. Does the parabola open *up* or *down*? $y = -7 - 5x + 3x^2$

$a = 3 > 0$

1. up

Find the maximum value or minimum value for the function.

2. $f(x) = 4x^2 + 6x + 3$ $\quad x = \frac{-6}{2(4)} = \frac{-6}{8} = \frac{-3}{4}$

2. $\frac{3}{4}$ or .75

$f\left(\frac{-3}{4}\right) = 4\left(\frac{-3}{4}\right)^2 + 6\left(\frac{-3}{4}\right) + 3 = \frac{3}{4}$

Write in standard form

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

$y = 2(x^2 - 2x - 3x + 6)$

$y = 2(x^2 - 5x + 6)$

$y = 2x^2 - 10x + 12$

3. $y = 2x^2 - 10x + 12$

4. $y = -(x-3)^2 + 4$

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

$y = -(x^2 - 3x - 3x + 9) + 4$

$y = -(x^2 - 6x + 9) + 4$

$y = -x^2 + 6x - 9 + 4$

4. $y = -x^2 + 6x - 5$

Factor the expression.

5. $x^2 + 14x + 49$

$(x+7)(x+7)$

5. $(x+7)^2$

____ 6. What are the solutions of the equation?

$x^2 - 4x - 45 = 0$

$(x-9)(x+5) = 0$

$x - 9 = 0$ or $x + 5 = 0$

6. $x = 9$ or -5

Factor the expression.

7. $4x^2 - 36$

$(2x)^2 - (6)^2$ or better ↓

$4(x^2 - 9)$

$4(x+3)(x-3)$

Take GCF first!

7. $(2x+6)(2x-6)$ ← Not completely factored

$4(x+3)(x-3)$

Factor the expression.

8. $40x^2 - 73x + 30$

factors of 1200 that add to 73: $-\frac{25}{40}$ and $-\frac{48}{40}$, i.e. $-\frac{5}{8}$ and $-\frac{6}{5}$

$(8x-5)(5x-6)$

8. $(8x-5)(5x-6)$

Solve.

9. $4x^2 - 40x + 64 = 0$

$4(x^2 - 10x + 16) = 0$

$4(x-8)(x-2)$

9. $4(x-8)(x-2)$

Factor completely.

10. $45u^5 + 48u^4 - 45u^3$

$3u^3(15u^2 + 16u - 15)$

$3u^3(3u+5)(5u-3)$

factors of 225 that subtract to leave 16: $+\frac{25}{15}$ and $-\frac{9}{15}$, i.e. $+\frac{5}{3}$ and $-\frac{3}{5}$

10. $3u^3(3u+5)(5u-3)$

11. Solve the equation. $4x^2 + 20 = 0$

$-20 \quad -20$

$\frac{4x^2}{4} = \frac{-20}{4}$

$x^2 = -5$

$x = \pm\sqrt{-5}$

11. $x = \pm i\sqrt{5}$

12 – 14 Write the expression as a complex number in standard form.

12. $(1+i) + (8-6i)$

$1 + i + 8 - 6i$

12. $9 - 7i$

13. $(-3+7i)(1-2i) = -3 + 6i + 7i - 14(i^2)$ ($i^2 = -1$)

$-3 + 14 + 13i$

13. $11 + 13i$

14. $\frac{(3-9i)(2-3i)}{(2+3i)(2-3i)} = \frac{6 - 9i - 18i + 27i^2}{13}$ ($i^2 = -1$)

$2^2 + 3^2 = 4 + 9 = 13$

$\frac{6 - 27 - 27i}{13}$

14. $-\frac{21}{13} - \frac{27}{13}i$

15. Use the quadratic formula to solve: $x^2 - 3x - 1 = 0$

$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$ $\quad a = 1, b = -3, c = -1$

$x = \frac{3 \pm \sqrt{9 - (4 \cdot 1 \cdot -1)}}{2} = \frac{3 \pm \sqrt{13}}{2}$

15. $x = \frac{3 \pm \sqrt{13}}{2}$

16. State the discriminant of the quadratic. $3x^2 - 4x + 4 = 0$

$b^2 - 4ac \quad a = 3 \quad b = -4 \quad c = 4$

$(-4)^2 - 4(3)(4) =$

16. -32

17. Use the discriminant to determine the number and type of solutions of the equation. $5x^2 - 3x + 1 = 0$

$b^2 - 4ac \quad a = 5 \quad b = -3 \quad c = 1$

$(-3)^2 - 4(5)(1)$

$9 - 20 = -11$

17. 2 imaginary roots

18. Write the equation $y = x^2 - 8x + 23$ in the form $y = a(x - h)^2 + k$.

$h = \frac{-b}{2a} = \frac{-(-8)}{2(1)} = +4$

$a = 1$

$h = 4$

$k = 7$

$k = (4)^2 - 8(4) + 23 =$

$16 - 32 + 23$

7

18. $y = (x-4)^2 + 7$