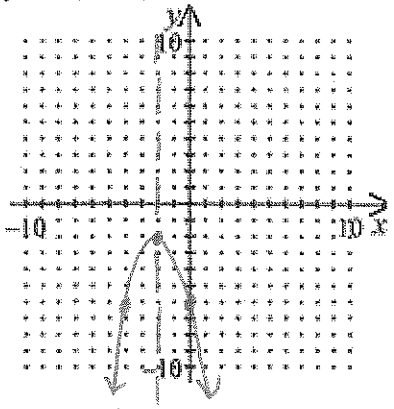
Name: KEY

Algebra 2

Quadratics Review/Practice Test

Quadratics Review/Practice Test -- Answers available at fur.ly/96ai (Morman's website.)

1. $y = -(x+2)^2 - 2$ vertex form



vertex $(-2,-2)$

opens down

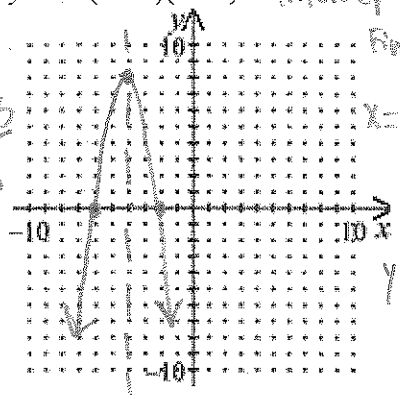
$(0,?)$

$y = -(0+2)^2 - 2$

$= -4 - 2 = -6$

$(0,-6)$

2. $y = -2(x+2)(x+6)$ Intercept form



opens down

x-intercepts -2 and -6

Find Vertex:

$x = \frac{-2+-6}{2} = \frac{-8}{2} = -4$

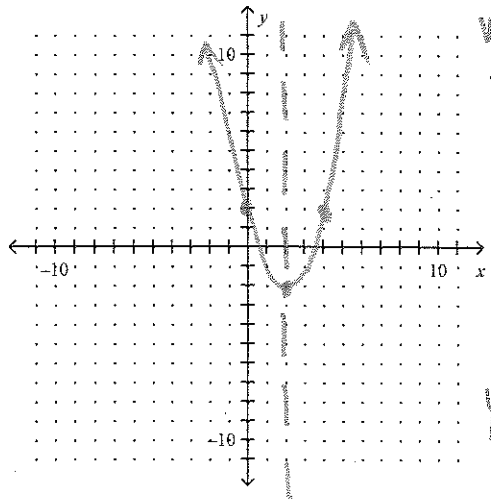
$(-4,?)$

$y = -2(-4+2)(-4+6)$

$= -2(-2)(2)$

$= 8$ $(-4,8)$

3. $y = x^2 - 4x + 2$ Standard form



opens up

y-int 2

vertex

$x = \frac{-b}{2a}$

$x = \frac{4}{2(1)}$

$= 2$

$(2,?)$

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

$= 4 - 8 + 2$

$= -2$

$(2,-2)$

No graphing calculator for #1–5.

4. How does the graph of $y = (x+3)^2$ compare to the graph $y = x^2$?

Translated 3 units left.

5. How does the graph of $y = x^2 + 4$ compare to the graph of $y = x^2$?

Translated 4 units up.

Solve for x.

6. $2x^2 + 9 = 59$

$2x^2 = 50$

$x^2 = 25$

$\sqrt{x^2} = \sqrt{25}$

$x = \pm 5$

7. $\frac{-5(x-8)^2}{-5} = \frac{-110}{-5}$

$(x-8)^2 = 22$

$\sqrt{(x-8)^2} = \sqrt{22}$

$x - 8 = \pm\sqrt{22}$

$x = 8 \pm \sqrt{22}$

Factor the expression.

8. $x^2 - x - 12$

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

9. $x^2 + 10x + 25$

$(x+5)(x+5)$

or $(x+5)^2$

10. $81x^2 - 25$ Difference of Two Squares

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

11. $5x^2 - 33x - 14$

$(5x+2)(x-7)$

Solve the quadratic equation by factoring.

12. $x^2 + 6x = 0$

$x(x+6) = 0$

$x = 0$ $\quad x+6=0$

$x = -6$

13. $2x^2 - 9x - 18 = 0$

$(2x+3)(x-6) = 0$

$2x+3=0$ $\quad x-6=0$

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

$x = -\frac{3}{2}$

14. $x^2 - 2x - 63 = 0$

$(x-9)(x+7) = 0$

$x-9=0$ $\quad x+7=0$

$x=9$ $\quad x=-7$

15. $2x^2 + 4x - 5 = 0$

$(2x \quad)(x \quad) = 0$

NOT FACTORABLE

16. The base of a triangle is four feet longer than the height. The area of the triangle is 30 square feet. Find the height and base of the triangle.

$b = h + 4$

$A = \frac{1}{2} \cdot b \cdot h$

$30 = \frac{1}{2}(h+4)h$

$30 = \frac{1}{2}(h^2+4h)$

$60 = h^2 + 4h$

$0 = h^2 + 4h - 60$

$0 = (h-6)(h+10)$

$h-6=0$ $\quad h+10=0$

$h=6$ $\quad h=-10$

$h=6$

$b=10$

17. A restaurant has a patio that is 8 feet wide and 12 feet long. The restaurant owners want to double the area of the patio by increasing the width and the length by the same distance x. Write an equation that x must satisfy. Can your equation be solved by factoring? Is there a single solution or more than one solution? *Explain.*

Area $= 8 \cdot 12 = 96$

New width $= x+8$

New length $= x+12$

New area: $(x+8)(x+12) = 2 \cdot 96$

$x^2 + 20x + 96 = 192$

$x^2 + 20x - 96 = 0$

$(x-4)(x+24) = 0$

$x-4=0$ $\quad x+24=0$

$x=4$ $\quad x=-24$

Name: _____ Practice Test

Answers on Mrs. Morman's website: fur.ly/96ai

Quadratics - Review and Practice Test

Write the expression as a complex number in standard form.

1. $(7-4i)+(3-3i)$

$7-4i+3-3i$

$10-7i$

2. $(6-2i)-(5+i)$

$6-2i-5-i$

$1-3i$

3. $9i(2-3i)$

$18i-27i^2$

$18i-27(-1)$

$18i+27$

$27+18i$

4. $\dfrac{5-3i}{1+2i}$

$\dfrac{(5-3i)}{(1+2i)}\cdot\dfrac{(1-2i)}{(1-2i)}=$

$\dfrac{5-10i-3i+6i^2}{1-4i^2}$

$\dfrac{5-13i+6(-1)}{1-4(-1)}$

$\dfrac{5-13i-6}{1+4}=\dfrac{-1-13i}{5}$

5. Solve the equation by completing the square.
$x^2+16x+39=0$

$x^2+16x=-39$

$x^2+16x+64=-39+64$

$(x+8)^2=25$

$x+8=\pm 5$

$x=-8\pm 5$ → -3, -13

6. Write the equation $y=x^2+20x-44$ in the form $y=a(x-h)^2+k$.

$y=(x^2+20x)-44$

$y=(x^2+20x+100)-44-100$

$y=(x+10)^2-144$

Write the quadratic equation in vertex form. Then identify the vertex.

7. $y=5x^2+10x+27$

$y=(5x^2+10x)+27$

$y=5(x^2+2x)+27$

$y=5(x^2+2x+1)+27-5$

$y=5(x+1)^2+22$

vertex: $(-1, 22)$

Answers on Mrs. Morman's website: fur.ly/96ai

8. Consider the quadratic function $y = x^2 - 8x + 19$.

a. Write the function in vertex form. Then identify the vertex.

$y = (x^2 - 8x) + 19$

$y = (x^2 - 8x + 16) + 19 - 16$

$y = (x-4)^2 + 3$ vertex: $(4, 3)$

b. Solve $x^2 - 8x + 19 = 0$ by completing the square.

$x^2 - 8x = -19$

$x^2 - 8x + 16 = -19 + 16$

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

$x - 4 = \pm\sqrt{-3}$

$x = 4 \pm i\sqrt{3}$

c. Does the function $y = x^2 - 8x + 19$ have any x-intercepts? *Explain.*

No. The solutions are both imaginary so there are no x-intercepts

Solve by any method.

9. $-7x^2 - 2x = 8$ → $-7x^2 - 2x - 8 = 0$

$x = \dfrac{2 \pm \sqrt{(-2)^2 - 4(-7)(-8)}}{2(-7)}$

$= \dfrac{2 \pm \sqrt{4 - 224}}{-14} = \dfrac{2 \pm \sqrt{-220}}{-14}$

$= \dfrac{2 \pm 2i\sqrt{55}}{-14}$

$= \dfrac{1 \pm i\sqrt{55}}{-7}$

10. $3x^2 + 5 = -13$

$3x^2 = -18$

$x^2 = -6$

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

$x = \pm i\sqrt{6}$

Use the quadratic formula to solve the equation.

11. $x^2 + 6x - 8 = 0$

$x = \dfrac{-6 \pm \sqrt{6^2 - 4(1)(-8)}}{2(1)}$

$= \dfrac{-6 \pm \sqrt{36 + 32}}{2}$

$= \dfrac{-6 \pm \sqrt{68}}{2} = \dfrac{-6 \pm 2\sqrt{17}}{2} = -3 \pm \sqrt{17}$

12. The height in feet (y) of a volleyball that is served can be modeled by the equation $y = -16x^2 + 32x + 6$, where x represents the time in seconds since the ball was served.

a. From what height is the ball served?

6 feet

b. What is the maximum height reached by the ball?

22 feet

c. When is the maximum height reached?

1 sec.

d. When does the ball hit the ground?

2.17 sec

e. For what time interval is the ball 18 feet above the ground or higher?

0.06 to 1.9 sec