Name: KEY

Algebra 2 Quadratics Review/Practice Test

Quadratics Review/Practice Test -- NO CALCULATOR ALLOWED ON #1-5

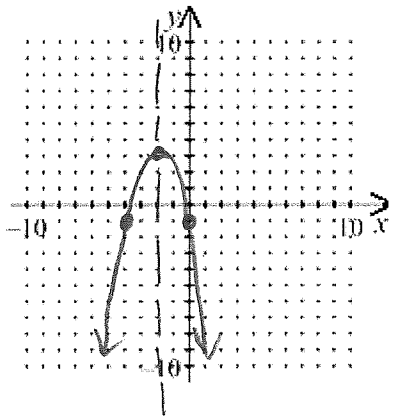
1. $y = -(x+2)^2 + 3$

vertex: $(-2, 3)$ opens down

$(0, \quad)$

$-(0+2)^2 + 3$

$-4 + 3 = -1 \qquad (0, -1)$



2. $y = 2(x+1)(x+5)$

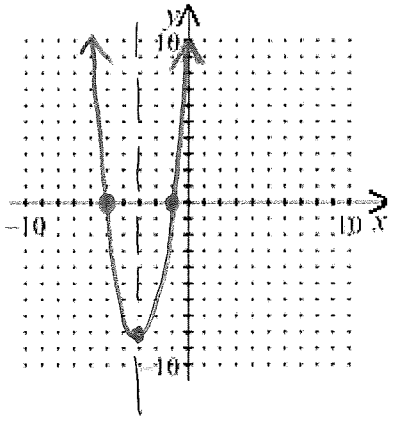
vertex: $x = \frac{-1+-5}{2} = \frac{-6}{2} = -3$

$(-3, ?)$

$y = 2(-3+1)(-3+5) = 2(-2)(2) = -8$

$(-3, -8)$

X-intercepts: -1 and -5



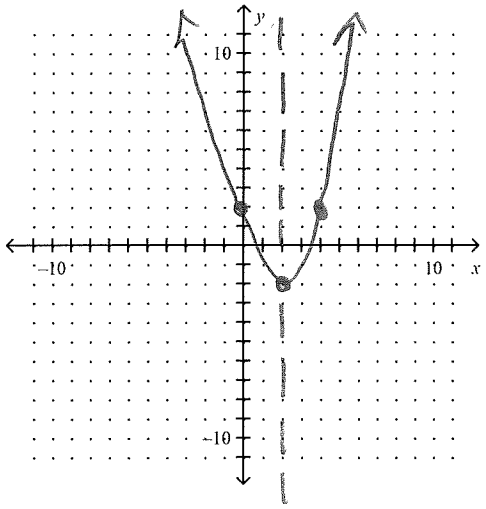
3. $y = x^2 - 4x + 2$

$x = \frac{-b}{2a} = \frac{4}{2(1)} = 2 \qquad (2, ?)$

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

$= 4 - 8 + 2 = -2 \qquad (2, -2)$

y-intercept $= 2$



4. How does the graph of $y = \frac{1}{3}(x+3)^2 + 7$ compare to the graph $y = x^2$?

Wider
Left 3
Up 7

5. Write an equation for the graph of $y = x^2$ that is narrower, reflected in the x-axis, translated 4 units right, and translated 5 units down.

Answers vary:

$y = -2(x-4)^2 - 5$

Solve for x.

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

$2x^2 = 50$

$x^2 = 25$

$x = \pm 5$

7. $-5(x-8)^2 = -110$

$-5 \quad -5$

$(x-8)^2 = 22$

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

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

Factor the expression.

8. $3x^2 - 18x$

$3x(x-6)$

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

$(x+5)(x+5)$ or $(x+5)^2$

10. $81x^2 - 25$

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

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

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

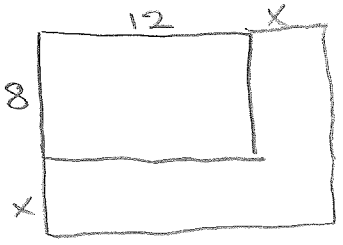
$x - 9 = 0$ $\quad x + 7 = 0$

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

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

not factorable

16. 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. Draw a picture to model the situation. Write an solve an equation to find x. Are the answer(s) valid? Explain.



Area $= 8 \cdot 12 = 96$

New area $= 96 \cdot 2$

$= 192$

$(x+8)(x+12) = 192$

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

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

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

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

Answer cannot be negative. $x = 4$ feet

Write the expression as a complex number in standard form.

17. $(5-2i)-2(3+i)$

$5-2i-6-2i$

$-1-4i$

Remember

$i^2=-1$

18. $(5-2i)+(3-2i)$

$5-2i+3-2i$

$8-4i$

19. $(2+3i)(1-4i)$

$2-8i+3i-12i^2$

$2-5i+12$

$10-5i$

20. $\frac{8+7i}{3-4i}\cdot\frac{3+4i}{3+4i}=\frac{24+32i+21i+28i^2}{9-16i^2}$

$\frac{24+53i-28}{9+16}=\frac{-4+53i}{25}=-\frac{4}{25}+\frac{53}{25}i$

21. Solve the equation by completing the square.

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

$x^2-4x=2$

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

$(x-2)^2=6$

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

$\rightarrow x=2\pm\sqrt{6}$

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

22. $y=3x^2-36x+101$

$y=3(x^2-12x)+101$

$y=3(x^2-12x+36)+101-108$

$y=3(x-6)^2-7$

vertex: $(6,-7)$

23. Solve by the quadratic formula: $2x^2-3x-5=0$.

$a=2\quad b=-3\quad c=-5$

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

$x=\frac{3\pm\sqrt{(-3)^2-4(2)(-5)}}{2(2)}$

$\rightarrow x=\frac{3+\sqrt{9+40}}{4}$

$x=\frac{3\pm\sqrt{49}}{4}=\frac{3\pm7}{4}=\frac{10}{4}=\frac{5}{2}$ / $-\frac{4}{4}=-1$

24. The height, y, in feet of a voleyball that is hit can be modeled by the equation $y=-16x^2+40x+6$, where x represents the time in seconds since the ball was hit.

a. From what height is the ball hit?

6 ft.

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

31 ft. see graph below

c. When is the maximum height reached?

$x=\frac{-b}{2a}=\frac{-40}{2(-16)}=\frac{40}{32}=1.25$ sec

or see graph below

d. When does the ball hit the ground?

2.64 sec