Name Answer Key Date Per AlgIIPreAP

Solving Quadratics Test Review

Solve the following equations by factoring.

1) $x^2 + 3x = -2$

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

$(x+2)(x+1)=0$

$x+2=0 \quad x+1=0$

$x=-2 \quad x=-1$

2) $25x^2 - 18x = 12x - 9$

$25x^2-30x+9=0$

$x^2-30x+225$

$(x-\frac{15}{25})(x-\frac{15}{25})$

$(x-\frac{3}{5})(x-\frac{3}{5})$

$(5x-3)(5x-3)$

$5x-3=0$

$5x=3$

$x=3/5$ double root

3) $4x^2 - 64 = 0$

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

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

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

$x=4 \quad x=-4$

Solve the following equations by completing the square.

4) $x^2 + 6x - 5 = 11$

$x^2+6x-16=0$

$(x^2+6x+\underline{(3)^2})-16-\underline{(3)^2}=0$

$(x+3)^2-16-9=0$

$(x+3)^2-25=0$

$\sqrt{(x+3)^2}=\sqrt{25}$

$x+3=\pm 5$

$x=-3\pm 5$ ← $x=-8$ and $x=2$

5) $x^2 + 10x + 6 = 0$

$(x^2-10x+\underline{(5)^2})+6-\underline{(-5)^2}=0$

$(x-5)^2+6-25=0$

$(x-5)^2-19=0$

$\sqrt{(x-5)^2}=\sqrt{19}$

$x-5=\pm\sqrt{19}$

$x=5\pm\sqrt{19}$

Solve the following equations by using the quadratic formula.

6) $x^2 - 5x - 7 = 0$

$(-5)^2-4(1)(-7)$

$25+28$

53

$x=\frac{5\pm\sqrt{53}}{2}$

$x=6.140 \quad x=-1.140$

7) $-x^2 = -10x + 1$

$0=x^2-10x+1$

$(-10)^2-4(1)(1)$

$100-4$

96

$x=\frac{10\pm\sqrt{96}}{2}$

$x=9.899 \quad x=0.101$

Find the discriminant and use it to determine the number and type of solutions for each equation.

8) $3x^2 - 10x + 1 = 0$

$(-10)^2 - 4(3)(1)$

$100 - 12$

88

There are two real solutions

9) $x^2 + 2x + 1 = 0$

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

$4 - 4$

0

There is one real solution

10) $4x^2 - 5x + 16 = 0$

$(-5)^2 - 4(4)(16)$

$25 - 256$

-231

There are two non-real solutions

Convert from vertex to standard form.

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

$(x-2)(x-2)$

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

$x^2 - 4x + 4$

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

$y = x^2 - 4x + 8$

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

$(x+4)(x+4)$

$x^2 + 4x + 4x + 16$

$x^2 + 8x + 16$

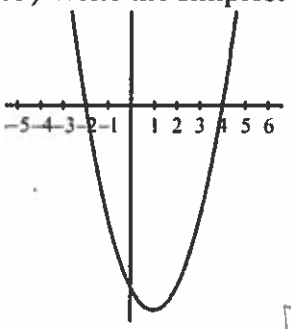
$y = -2(x^2 + 8x + 16) + 6$

$y = -2x^2 - 16x - 32 + 6$

$y = -2x^2 - 16x - 26$

Write the equation in standard form given the graph or points.

13) Write the simplest equation (a = 1)



$x = -2 \quad x = 4$

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

$x^2 - 4x + 2x - 8$

$x^2 - 2x - 8$

14) x-intercepts: x = 3 and x = 8; point: (2, 1.5)

$(x - 3)(x - 8)$

$x^2 - 8x - 3x + 24$

$x^2 - 11x + 24$

$y = a(x^2 - 11x + 24)$

$1.5 = a((2)^2 - 11(2) + 24)$

$\frac{1.5}{6} = \frac{6a}{6}$

$1/4 = a$

$y = \frac{1}{4}(x^2 - 11x + 24)$

$y = \frac{1}{4}x^2 - 2.75x + 6$

Does the following quadratic equation have a double root? Explain in words.

15) $x^2 + 12x + 30 = -6$

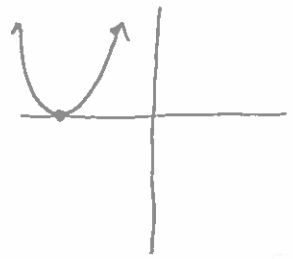
$x^2+12x+36=0$

$(x+6)(x+6)=0$

$x+6=0 \qquad x+6=0$

$x=-6 \qquad x=-6$

The solutions are both $x=-6$, so it is a double root.



The vertex is sitting on the x-axis, so it is a double root.

$(12)^2-4(1)(36)$

$144-144$

0

The discriminant is zero, so it is a double root.

Find the vertex of the following quadratic equations.

16) The path of a placekicked football can be modeled by the function $y=-0.026x^2+1.196x$ where x is the horizontal distance (in yards) and y is the corresponding height (in yards). What is the football's maximum height? How far away from the place the football is kicked will the maximum height be reached?

↑ Find the vertex

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

$x=\frac{-1.196}{2(-.026)}$

$x=23$ yards

$y=-0.026(23)^2+1.196(23)$

$y=13.754$ yards

The ball reaches its maximum height of 13.754 yards when it is 23 yards away from where it was kicked.

17) The path of a basketball thrown at an angle of 45° can be modeled by $y=-0.02t^2+t+6$, where t is the time in seconds and y is the height in feet. What time does the basketball reach its maximum height? What is the maximum height of the basketball?

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

$t=\frac{-1}{2(-.02)}$

$t=25$ sec

$y=-.02(25)^2+25+6$

$y=18.5$ ft

The ball reaches a maximum height of 18.5 ft after 25 seconds.