

Solve by taking the square root.

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| $1. \sqrt{(x-7)^2} = \sqrt{64}$ $x-7 = \pm 8$ $x = 7 \pm 8$ $x = 15, -1$ | $2. \sqrt{(x-2)^2} = \sqrt{36}$ $x-2 = \pm 6i$ $x = 2 \pm 6i$ | $3. \sqrt{(x-5)^2} = \sqrt{0}$ $x-5 = 0$ $x = 5$ | $4. \sqrt{(x+1)^2} = \sqrt{24}$ $x+1 = \pm 2\sqrt{6}$ $x = -1 \pm 2\sqrt{6}$ |
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Complete the SQUARE trinomial and factor.

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|------------------------------------|---------------------------------|------------------------------------|--|
| $5. x^2 - 20x + 100$ $(x-10)^2$ | $6. x^2 - 8x + 16$ $(x-4)^2$ | $7. x^2 + 40x + 400$ $(x+20)^2$ | $8. x^2 + 125x + \frac{15625}{4}$ $(x + 125/2)^2$ or $(x + 62.5)^2$ |
|------------------------------------|---------------------------------|------------------------------------|--|

Solve by completing the square:

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| $9. x^2 - 12x = -39$ $x^2 - 12x + \frac{36}{(-6)^2} = -39 + \frac{36}{(-6)^2}$ $\sqrt{(x-6)^2} = \sqrt{-3}$ $x-6 = \pm i\sqrt{3}$ $x = 6 \pm i\sqrt{3}$ | $10. x^2 - 16x = -40$ $x^2 - 16x + \frac{64}{(-8)^2} = -40 + \frac{64}{(-8)^2}$ $\sqrt{(x-8)^2} = \sqrt{24}$ $x-8 = \pm 2\sqrt{6}$ $x = 8 \pm 2\sqrt{6}$ | $11. x^2 + 6x = 40$ $x^2 + 6x + \frac{9}{(3)^2} = 40 + \frac{9}{(3)^2}$ $\sqrt{(x+3)^2} = \sqrt{49}$ $x+3 = \pm 7$ $x = -3 \pm 7$ $x = 4, -10$ |
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Quadratic Formula

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| $12. \text{ State the Quadratic Formula}$ $x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$ | $13. \text{ State the discriminant}$ $b^2 - 4ac$ |
|---|---|

Standard form. Put in standard form and state a, b, and c

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| $14. x^2 - 3x = 5$ a = <u>1</u> b = <u>-3</u> c = <u>-5</u> $x^2 - 3x - 5 = 0$ | $15. 3x^2 - 7 = -5x$ a = <u>3</u> b = <u>5</u> c = <u>-7</u> $3x^2 + 5x - 7 = 0$ |
| $16. 3x - 4x^2 = 0$ a = <u>-4</u> b = <u>3</u> c = <u>0</u> $-4x^2 + 3x = 0$ | $17. x^2 - 6x = -9$ a = <u>1</u> b = <u>-6</u> c = <u>9</u> $x^2 - 6x + 9 = 0$ |
| $18. 8x^2 - 6 = 0$ a = <u>8</u> b = <u>0</u> c = <u>-6</u> | $19. 6x - 7 = x^2$ a = <u>1</u> b = <u>-6</u> c = <u>7</u> $x^2 - 6x + 7 = 0$ |

Solve by using the quadratic formula. SHOW ALL WORK. $2x^2 - 5x + 3 = 0$ $x = \frac{-(-5) \pm \sqrt{(-5)^2 - 4(2)(3)}}{2(2)}$

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|--|---|
| $20. x^2 + 7x + 15 = 0$ a = 1 b = 7 c = 15 $x = \frac{-7 \pm \sqrt{7^2 - 4(1)(15)}}{2(1)}$ $x = \frac{-7 \pm \sqrt{-11}}{2} = \frac{-7 \pm i\sqrt{11}}{2}$ | $21. 2x^2 - 5x = -3$ a = 2 b = -5 c = 3 $x = \frac{5 \pm \sqrt{1}}{4} = \frac{5 \pm 1}{4}$ $x = \frac{3}{2}, 1$ |
| $22. x^2 - 6x = -9$ a = 1 b = -6 c = 9 $x^2 - 6x + 9 = 0$ $x = \frac{-(-6) \pm \sqrt{(-6)^2 - 4(1)(9)}}{2(1)}$ $x = \frac{6 \pm \sqrt{0}}{2} = \frac{6}{2} = 3$ | $23. 3x^2 - 2x - 2 = 0$ a = 3 b = -2 c = -2 $x = \frac{-(-2) \pm \sqrt{(-2)^2 - 4(3)(-2)}}{2(3)}$ $x = \frac{2 \pm \sqrt{28}}{6} = \frac{2 \pm 2\sqrt{7}}{6}$ $x = \frac{1 \pm \sqrt{7}}{3}$ |

$$37) y = x^2 + 12x + 32$$

$$y - 32 + 36 = x^2 + 12x + 36$$

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

State the discriminant. Then state how many roots there are: 1 real, 2 real, or 2 complex.

$$24. x^2 - 6x = -7 \quad x^2 - 6x + 7 = 0$$

$$a=1 \quad b=-6 \quad c=7$$

$$(-6)^2 - 4(1)(7) = 8$$

8 → 2 real solutions

$$25. x^2 - 6x + 9 = 0$$

$$a=1 \quad b=-6 \quad c=9$$

$$(-6)^2 - 4(1)(9) = 0$$

0 → 1 real solution

$$38) f(x) = 6x^2 + 12x + 13$$

$$f(x) - 13 + 6(1) = 6(x^2 + 2x + 1)$$

$$f(x) = 6(x+1)^2 + 7$$

$$26. x^2 = 6x - 11 \quad x^2 - 6x + 11 = 0$$


$$a=1 \quad b=-6 \quad c=11$$

$$(-6)^2 - 4(1)(11) = -8$$


-8 → 2 complex solutions

State how many times the parabola will cross the x-axis by the description of the discriminant.


27. the discriminant is < 0
(less than)

 It does not cross x-axis

28. the discriminant is > 0
(greater than)

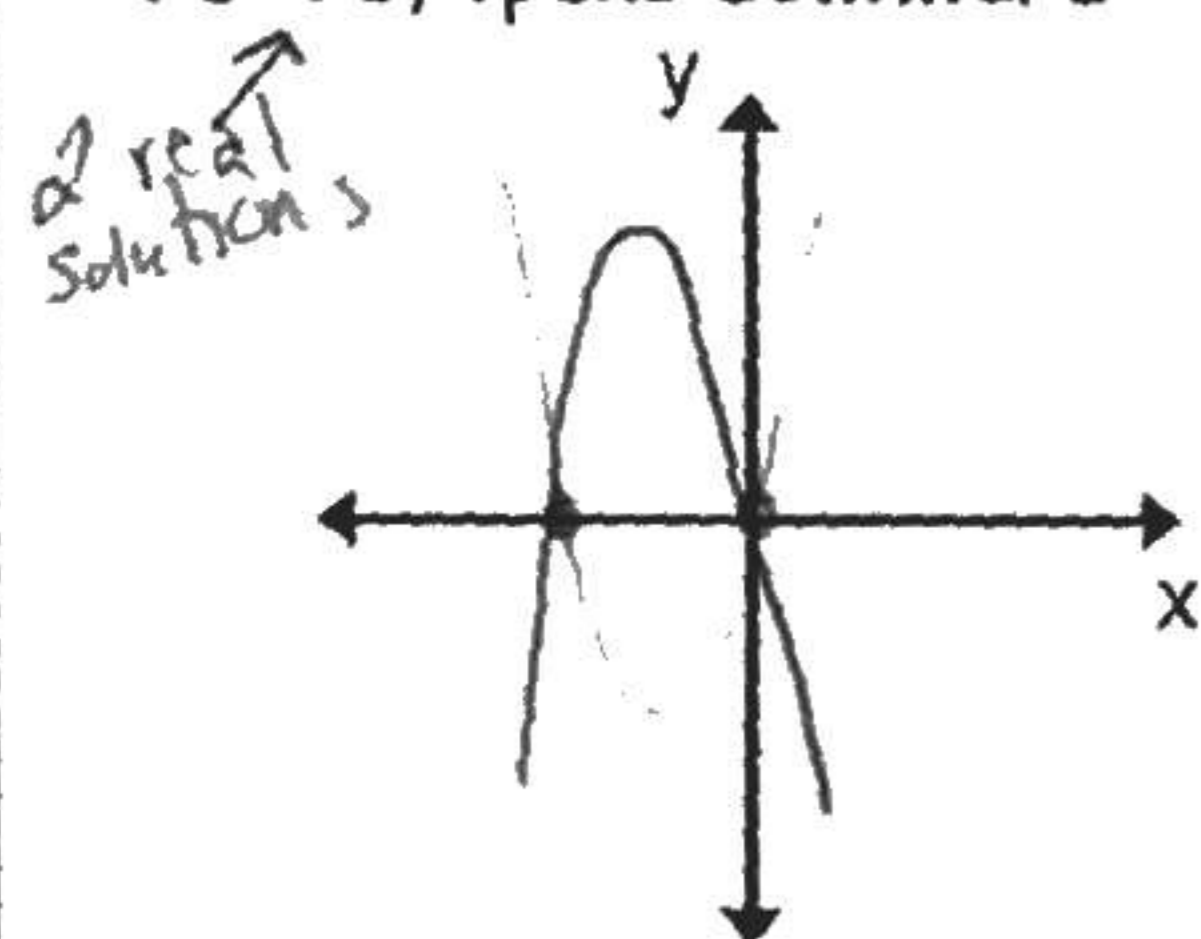
 twice

29. the discriminant = 0

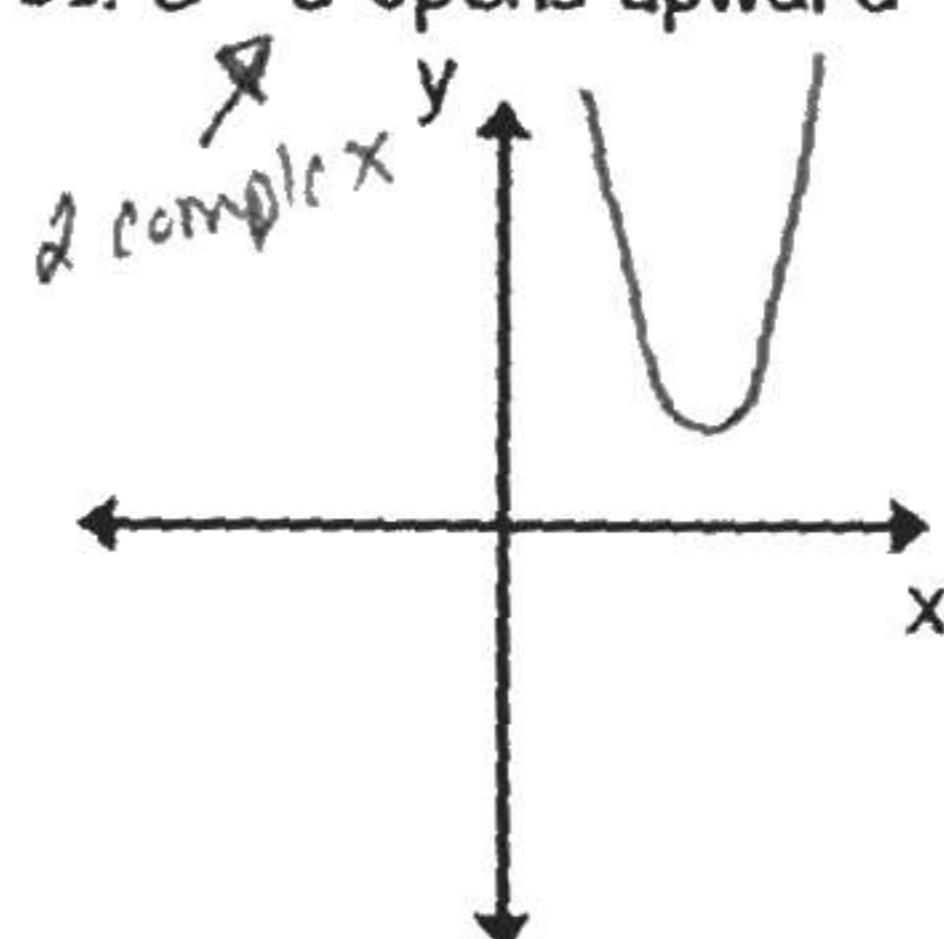
 once

Sketch a graph of a quadratic with the given information. (D = Discriminant)

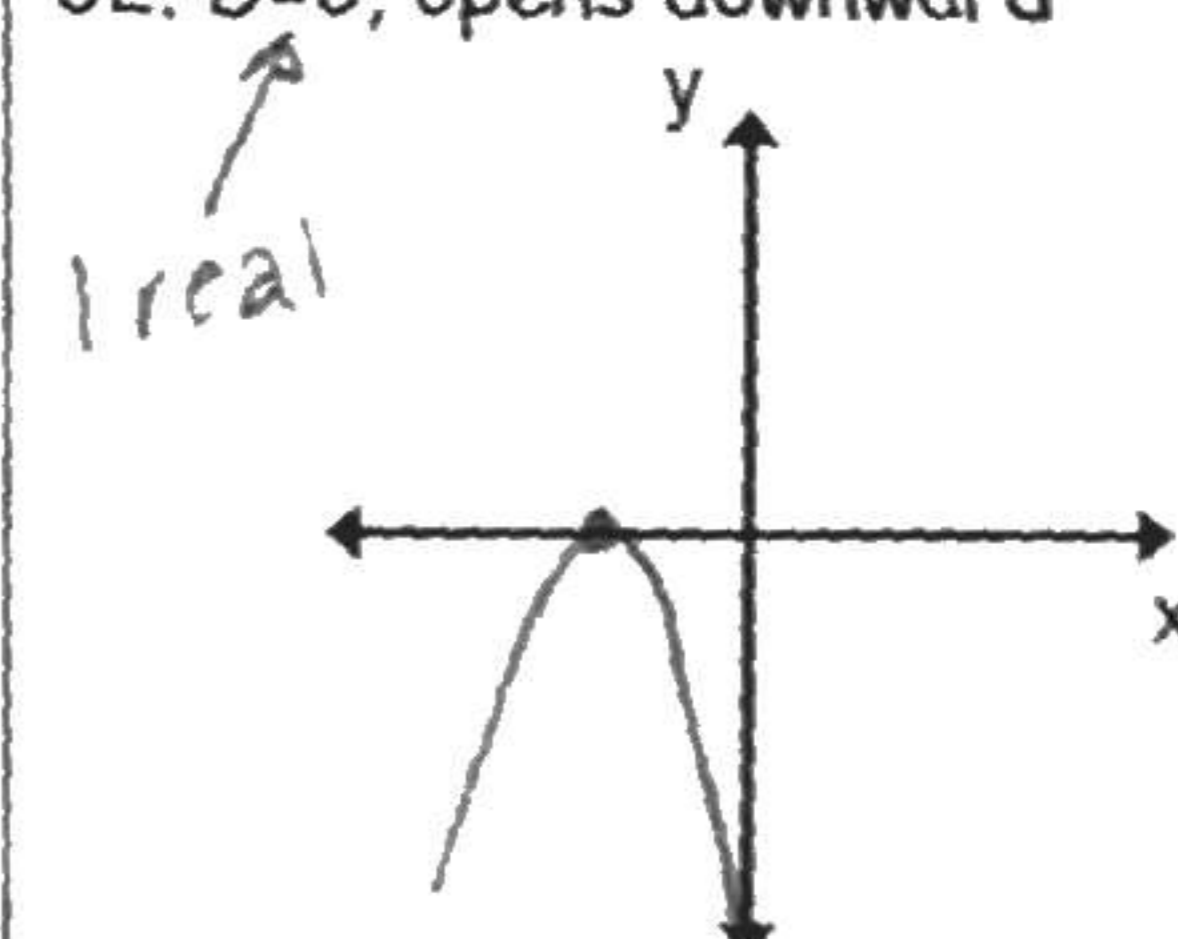
30. D=25, opens downward



31. D=-5 opens upward



32. D=0, opens downward



Determine if this data set could represent a quadratic function. Justify your answer. If so, use your calculator to find a quadratic function to model the data.

33.

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|---|----|----|---|----|-----|
| x | -2 | -1 | 0 | 1 | 2 |
| y | 40 | 22 | 6 | -8 | -20 |

-18, -10, -14, -12
+2, +2, -12 Quadratic

34. Find the value of y when x=10

$$y = x^2 - 15x + 6$$

$$\text{when } x=10 \rightarrow y = -44$$

$$y = (10)^2 - 15(10) + 6$$

or use table (2nd Graph)

35.

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|---|---|----|-----|-----|-----|
| x | 2 | 4 | 6 | 8 | 10 |
| y | 7 | 39 | 119 | 271 | 519 |

36. The table shows how wind affects a runner's performance in the 200 meter dash. Positive wind speeds correspond to tailwinds, and negative wind speeds correspond to headwinds. The change t in finishing time is the difference between the runner's time when the wind speed is s and the runner's time when there is no wind.

| | | | | | | | |
|--------------------------|------|------|------|---|-------|-------|-------|
| Wind speed | -6 | -4 | -2 | 0 | 2 | 4 | 6 |
| Change in finishing time | 2.28 | 1.42 | 0.67 | 0 | -0.57 | -1.05 | -1.42 |

A) Use a graphing calculator to find the QUADRATIC model.

$$y = 0.119x^2 - 0.3086x - 0$$

B) Predict the change in finishing time when the wind speed is 10 m/sec.

$$\text{change in finishing time} = -1.896$$