

WARM UP

- 1) Factor: $x^2 - x - 42$ $(x-7)(x+6)$ Round each number to the nearest tenth.
 Factor: $9x^2 - 49$ $(3x-7)(3x+7)$ 2a) 5.872 2b) 12.345
 \uparrow \uparrow
 5.9 12.3
- 3) The graph of a quadratic function has a vertex of $(-5, 3)$.
 What is the axis of symmetry? $x = -5$
- 4) Simplify then classify as Quadratic, Linear or Constant. State the value of a, b and c.
 $y = (3x + 5) - 2(15x - 4)$
 $3x + 5 - 30x + 8 = -27x + 13$
- 5) Write a quadratic model for the data, using your calculator.

Data for #5

x	y
35	96
45	140
50	165
60	221

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17. $y = x^2 - 5x + 2$

19. $y = x^2 + 2x$

21. a. $y = -16x^2 + 33x + 46$, where x is the number of seconds after release and y is height in feet.
 b. 28.5 ft

22. a. $y = 0.0236x^2 + 0.907x - 2.09$
 b. 58.5%

23. $y = 4x^2$

25. no

27. $(-\frac{1}{2}, -\frac{1}{2}), x = -\frac{1}{2}$

29. $(\frac{1}{2}, 0), x = \frac{1}{2}$

30. a. $x: 4, 5; y: 6, 10$
 b. $y = \frac{1}{2}x^2 - \frac{1}{2}x$
 c. 45 segments

32. $c = 3$

38. a. $y = 3.157x - 52.34$
 b. $y = 0.04243x^2 - 0.04080x + 0.8890$
 c. Answers may vary. Sample: Quadratic; the quadratic model comes closer to most data points than the linear model because the data follows a curve.

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

20. $y = -3x^2 + 20$

24. $y = -2x^2 + 3x + 5$

26. $y = \frac{5}{8}x^2 - \frac{7}{4}x + 1$

28. $(-1, 4), x = -1$

31. a. $y = -0.0112x^2 + 1.24x + 9.97$
 b. Answers may vary. Sample: domain, whole number 0 to 50; range, positive whole numbers to 200.
 c. 1992
 d. Never; the quadratic model reaches a maximum of 45 cents, so it is useful for only a limited number.

33. $c = 8$

34. $c = 6$

CHECK HW 5.1 p. 241

Apr 12-1:14 PM

5.2 Properties of Parabolas

$$f(x) = ax^2 + bx + c$$

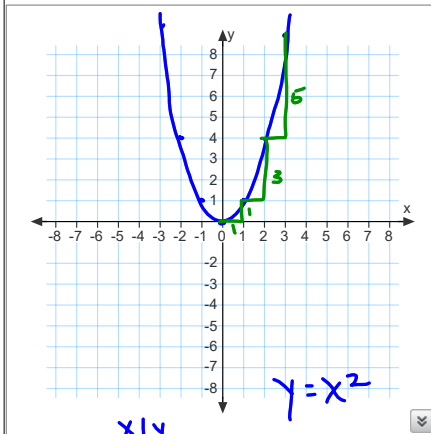
(WORKBOOK pg 33)

- Axis of Symmetry: $x = \frac{-b}{2a}$

- Vertex: $\left(\frac{-b}{2a}, f\left(\frac{-b}{2a}\right)\right)$

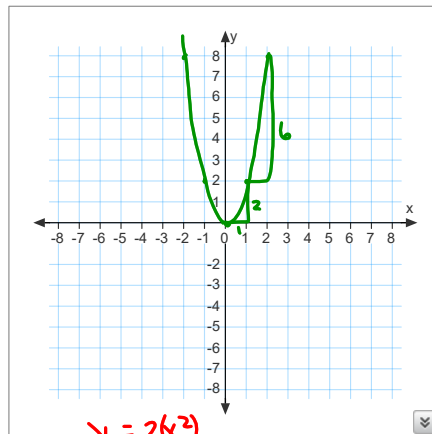
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The pattern of a parabola



x	y
0	0
1	1
2	4
3	9

over 1 up 1, 3, 5, 7, ...



x	y
0	0
1	2
2	8

over up 2, 6, 10, ...

x	y
0	0
1	2
2	8
3	18

$y = 2|x|$
 ↓
 vertical stretch

Find the axis of symmetry and vertex, then graph.

1) $y = x^2 - 2x - 3$ y-int

• $a = 1$ $b = -2$ $c = -3$

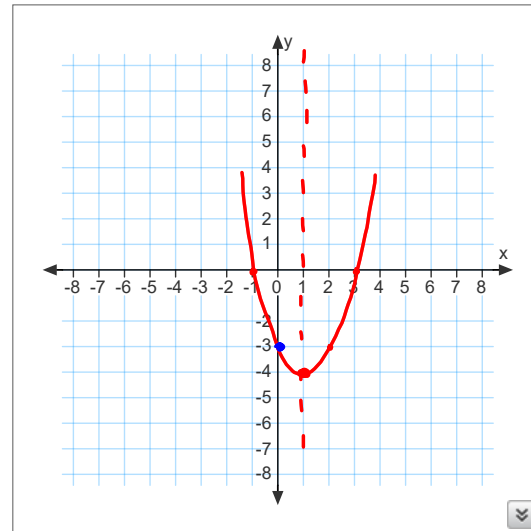
• Axis of symmetry:

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

• Vertex: $(1, -4)$

$$y = (1)^2 - 2(1) - 3 = -4$$

• Graph 1, 3, 5, 7, ...



• Domain $(-\infty, \infty)$ Range $[-4, \infty)$

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Find the axis of symmetry and vertex, then graph.

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

• $a = 2$ $b = 4$ $c = -3$

• Axis of symmetry:

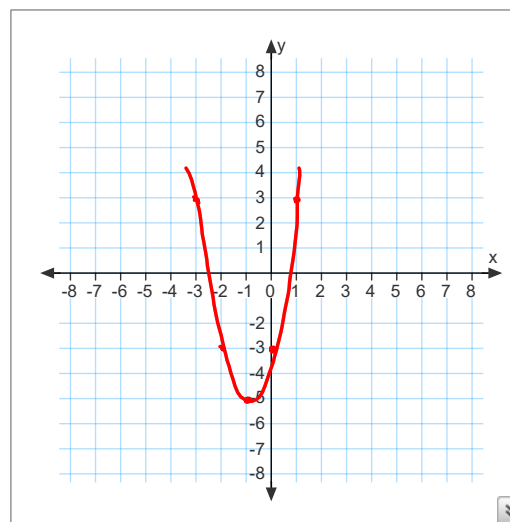
$$x = \frac{-4}{2(2)} = -1$$

• Vertex: $(-1, -5)$

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

• Graph: 1, 3, 5, 7, ...

$$\begin{array}{r} x^2 \\ \hline 2, 6, 10, \dots \end{array}$$



• Domain $(-\infty, \infty)$ Range $[-5, \infty)$

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Graph the following.
Follow each step.

3)

1. $y = -x^2 + 6x - 2$

- What transformation occurs?
flipped over x-axis

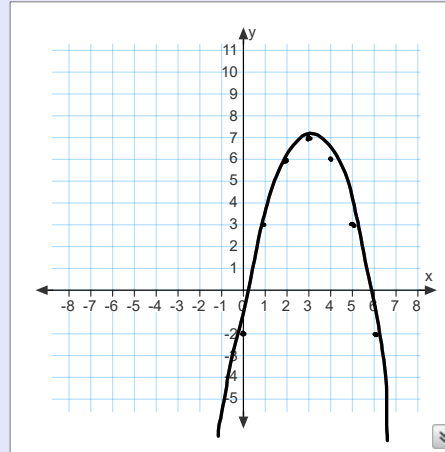
2. $a = -1$ $b = 6$ $c = -2$

3. Axis of symmetry:
 $x = \frac{-b}{2(-1)} = 3$

4. Vertex: $(3, 7)$
 $-(3)^2 + 6(3) - 2 = 7$

5. Graph: $1, 3, 5, 7$
 $\times -1$

- Domain Range
 $(-\infty, \infty)$ $(-\infty, 7]$



Erase to reveal

4) $y = \frac{1}{3}x^2 - 4$

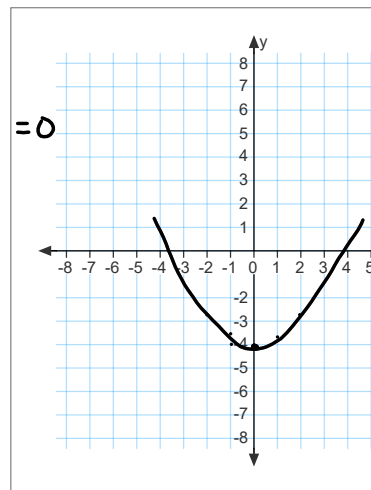
- $a = \frac{1}{3}$ $b = 0$ $c = -4$

- Axis of symmetry: $x = \frac{0}{2 \cdot \frac{1}{3}} = 0$

- Vertex: $(0, -4)$
 $y = \frac{1}{3}(0)^2 - 4 = -4$

- Graph: $1, 3, 5, 7, \dots$
 $\times \frac{1}{3}$

- Domain Range $\frac{1}{3}, 1, \frac{5}{3}$
 $(-\infty, \infty)$ $[-4, \infty)$



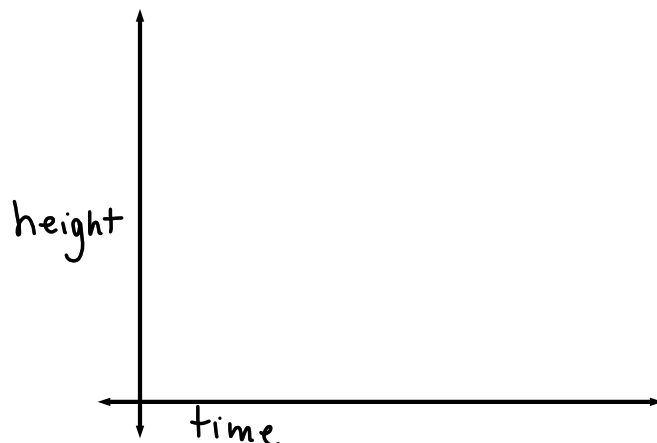
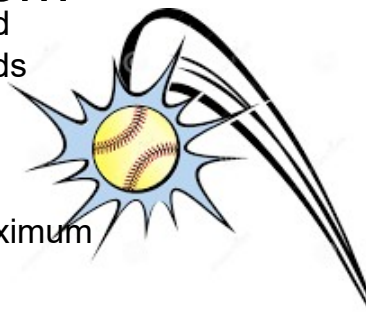
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Calculator Problem

5) A ball is thrown into the air with an initial upward velocity of 48 ft/s. Its height h in feet after t seconds is given by the function

$$h(t) = -16t^2 + 48t + 4.$$

- Label the x and y-axis.
- In how many seconds will the ball reach its maximum height?
- What is maximum height?



Oct 20-1:03 PM



GO COUGARS!

HW5.2 p. 248 #1-17 odd, 25-29 odd
37-39 all, and #54 (calculator)

Aug 29-11:17 AM

Graph each function. pg. 248

1. $y = -x^2 + 1$ 2. $y = -x^2 - 1$ 3. $y = 2x^2 + 4$
 4. $y = 3x^2 - 6$ 5. $y = -\frac{1}{3}x^2 - 1$ 6. $y = -5x^2 + 12$
 7. $y = \frac{1}{2}x^2 + 3$ 8. $y = \frac{1}{4}x^2 - 3$ 9. $y = -2x^2 + \frac{3}{4}$

Graph each function. Label the vertex and the axis of symmetry.

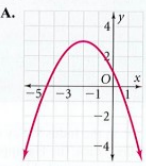
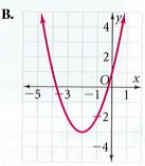
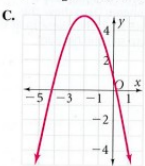
10. $y = x^2 + 2x + 1$ 11. $y = -x^2 + 2x + 1$
 12. $y = x^2 + 4x + 1$ 13. $y = x^2 + 6x + 9$
 14. $y = -x^2 - 3x + 6$ 15. $y = 2x^2 + 4x$
 16. $y = 4x^2 - 12x + 9$ 17. $y = -6x^2 - 12x - 1$
 18. $y = -\frac{3}{4}x^2 + 6x + 6$ 19. $y = 3x^2 - 12x + 10$
 20. $y = \frac{1}{2}x^2 + 2x - 8$ 21. $y = -4x^2 - 24x - 36$

Graph each function. If $a > 0$ find the minimum value. If $a < 0$ find the maximum value.

29. **Physics** The equation for the motion of a projectile fired straight up at an initial velocity of 64 ft/s is $h = 64t - 16t^2$, where h is the height in feet and t is the time in seconds. Find the time the projectile needs to reach its highest

Match each function with its graph.

37. $y = x^2 + 4x + 1$ 38. $y = -x^2 - 4x + 1$ 39. $y = -\frac{1}{2}x^2 - 2x + 1$

A.  B.  C. 

54. A rock club's profit from booking local bands depends on the ticket price. Using past receipts, the owners find that the profit p can be modeled by the function $p = -15t^2 + 600t + 50$, where t represents the ticket price in dollars.

- What price yields the maximum profit?
- What is the maximum profit?
- Open-Ended** What price would you pay to see your favorite local band? How much profit would the club owner make using that ticket price?

Aug 30-12:14 PM

EXTRA SLIDES

Oct 5-12:32 PM

Fraction WS - EVENS

- | | |
|--------------------------------------|--------------------------------------|
| 2. $x = 2/3$ | 4. $x = 7 \frac{41}{45}$ |
| 6. $x = 3/5$ | 8. $x = 2 \frac{1}{10}$ or $21/10$ |
| 10. $x = 2 \frac{19}{20}$ or $39/20$ | 12. $x = 3 \frac{6}{7}$ or $24/7$ |
| 14. $x = 8$ | 16. $x = 1 \frac{1}{2}$ or $3/2$ |
| 18. $x = 2$ | 20. $x = 1 \frac{17}{21}$ or $38/21$ |
| 22. $x = 7 \frac{1}{3}$ or $22/3$ | 24. $x = 3$ |
| 26. $x = 1 \frac{23}{32}$ or $55/32$ | 28. $x = 8 \frac{7}{12}$ or $103/12$ |
| 30. $x = 42$ | 32. $x = 2 \frac{2}{23}$ or $48/23$ |

- | | |
|-----------------|------------------|
| 34. $w = 3$ | 36. $n = -12/17$ |
| 38. $c = 8$ | 40. $x = 29/20$ |
| 42. $m = 38/7$ | 44. $x = -1$ |
| 46. $x = -10$ | 48. $n = 1$ |
| 50. $b = -35/3$ | |

Oct 6-11:02 AM

- | | | | |
|---------------------------|---------------------------|--------------------------|---------------------------|
| 1. $x = 1 \frac{2}{5}$ | 2. $x = 2/3$ | 3. $x = 6 \frac{5}{6}$ | 4. $x = 7 \frac{41}{45}$ |
| 5. $x = 10 \frac{3}{20}$ | 6. $x = 3/5$ | 7. $x = 5/21$ | 8. $x = 2 \frac{1}{10}$ |
| 9. $x = 7 \frac{3}{10}$ | 10. $x = 2 \frac{19}{20}$ | 11. $x = 3/8$ | 12. $x = 3 \frac{6}{7}$ |
| 13. $x = 38$ | 14. $x = 8$ | 15. $x = 38 \frac{1}{4}$ | 16. $x = 1 \frac{1}{2}$ |
| 17. $x = 2$ | 18. $x = 2$ | 19. $x = 2 \frac{1}{2}$ | 20. $x = 1 \frac{17}{21}$ |
| 21. $x = 11 \frac{1}{4}$ | 22. $x = 7 \frac{1}{3}$ | 23. $x = 2/9$ | 24. $x = 3$ |
| 25. $x = 4 \frac{13}{16}$ | 26. $x = 1 \frac{23}{32}$ | 27. $x = 2 \frac{1}{6}$ | 28. $x = 8 \frac{7}{12}$ |
| 29. $x = 6 \frac{7}{33}$ | 30. $x = 42$ | 31. $x = 7/12$ | 32. $x = 2 \frac{2}{23}$ |
| 33. $x = 29/20$ | 34. $w = 3$ | 35. $x = 61/4$ | 36. $n = -12/17$ |
| 37. $x = 5/8$ | 38. $c = 8$ | 39. $x = 4$ | 40. $x = 29/20$ |
| 41. $n = -49/24$ | 42. $m = 38/7$ | 43. $x = 0$ | 44. $x = -1$ |
| 45. $y = -2/21$ | 46. $x = -10$ | 47. $h = 85/12$ | 48. $n = 1$ |
| 49. $x = 13/16$ | 50. $b = -35/3$ | | |

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