

Before we begin, are there any questions from last day's work?

pp. 239-240 #5, 7, 10, 12

Today's Learning Goal(s):

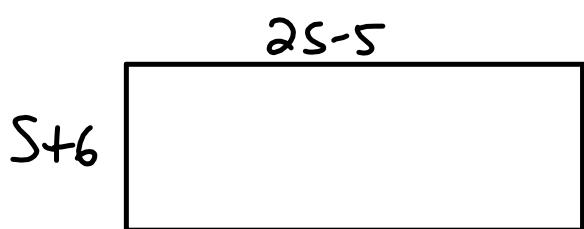
By the end of the class, I will be able to:

- a) convert a quadratic relation from vertex form to standard form.
- b) use standard form: $y = ax^2 + bx + c$

Reminder: Tomorrow SWYK on Expanding Binomials

p. 240 10. Dania's yard has dimensions $s + 6$ by $2s - 5$.

- a) Write an expression, in simplified form, for the area of Dania's yard.
- b) If $s = 10$ m, find the area of Dania's yard.



FOIL

$$\begin{aligned} \text{a) } A &= lw \\ &= (2s-5)(s+6) \end{aligned}$$

$$\begin{aligned} &= 2s^2 + \cancel{2s} - \cancel{5s} - 30 \\ &= 2s^2 + 7s - 30 \end{aligned}$$

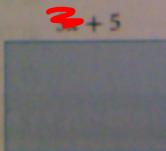
b) if $s = 10$

$$\begin{aligned} A &= 2s^2 + 7s - 30 \\ &= 2(10)^2 + 7(10) - 30 \\ &= 2(100) + 70 - 30 \\ &= 200 + 40 \\ &= 240 \text{ m}^2 \end{aligned}$$

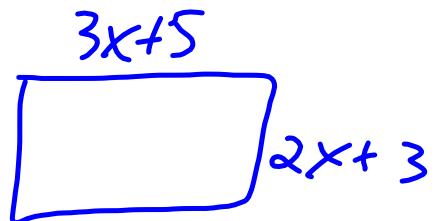
$$\begin{aligned} \text{Also } A &= (2s-5)(s+6) \\ &= [2(10)-5](10+6) \\ &= (20-5)(16) \\ &= (15)(16) \\ &= 240 \text{ m}^2 \end{aligned}$$

p. 240

12. The city planners have not confirmed the exact size of the fountain but you know that the base of the fountain will be rectangular. You have determined expressions for the dimensions of the base, in metres, as shown.



- a) Write an expression, in simplified form, to represent the area of the base of the fountain.
- b) When $x = 0$, the base of the fountain will be 5 m by 3 m, the minimum dimensions requested by the planners. The planners do not want the fountain to be too large, so you have designed it to have a maximum size when $x = 3$. How much greater in area is the base of the largest fountain than the base of the smallest fountain?
- c) The projected cost for the base, including labour and materials, is \$900/m². What are the projected costs for the bases of the smallest and largest fountains?



$$\begin{aligned} \text{a) } A &= (3x+5)(2x+3) \\ &= 6x^2 + 9x + 10x + 15 \\ &= 6x^2 + 19x + 15 \end{aligned}$$

b) If $x=0 \therefore$ minimum area

$$\begin{aligned} A &= (3)(5) \\ &= 15 \text{ m}^2 \end{aligned}$$

if $x=3 \therefore$ max area

$$\begin{aligned} A_{\max} &= 6(3)^2 + 19(3) + 15 \\ &= 6(9) + 57 + 15 \\ &= 54 + 57 + 15 \\ &= 126 \text{ m}^2 \end{aligned}$$

Difference

$$\begin{aligned} &= 126 - 15 \\ &= 111 \text{ m}^2 \end{aligned}$$

c) Costs:

$$\begin{aligned} \text{Cost}_{\min} &= 900(15) \\ &= \$13500 \end{aligned}$$

$$\begin{aligned} \text{Cost}_{\max} &= 900(126) \\ &= \$113400 \end{aligned}$$

MBF 3C1

5.2 Change from Vertex Form [$y = a(x-h)^2 + k$] to Standard Form [$y = ax^2 + bx + c$]

Date: Apr. 25 / 17

Ex 1. Given the equation $y = 2(x-3)^2 - 8$ (in vertex form),

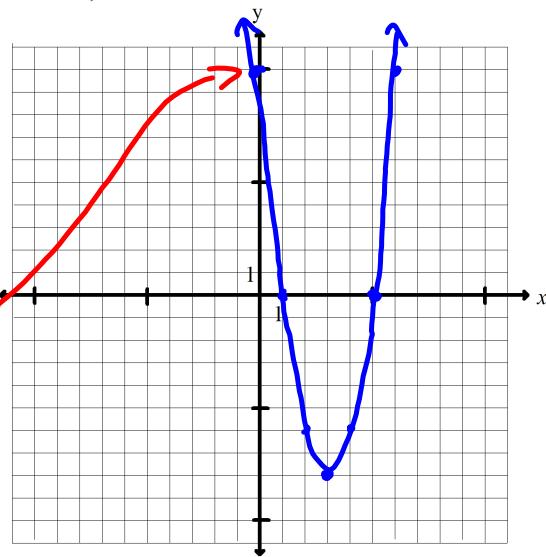
a) sketch it on the grid provided.

vertex $(3, -8)$

opens up

Step Pattern

$$\begin{array}{r} 1 \rightarrow 2 \\ 2 \rightarrow 8 \\ 3 \rightarrow 18 \end{array}$$



b) convert the equation to standard form.

$$y = ax^2 + bx + c$$

$$\begin{aligned} y &= 2(x-3)^2 - 8 \\ &= 2(x-3)(x-3) - 8 \\ &= 2(x^2 - 3x - 3x + 9) - 8 \\ &= 2(x^2 - 6x + 9) - 8 \\ &= 2x^2 - 12x + 18 - 8 \\ &= 2x^2 - 12x + 10 \end{aligned}$$

$$a=2 \quad b=-12 \quad c=10$$

c) the value of "c" in standard form represents the y-intercept on the graph.

Ex 2. Given the equation $y = -(x+2)^2 + 7$ (in vertex form),

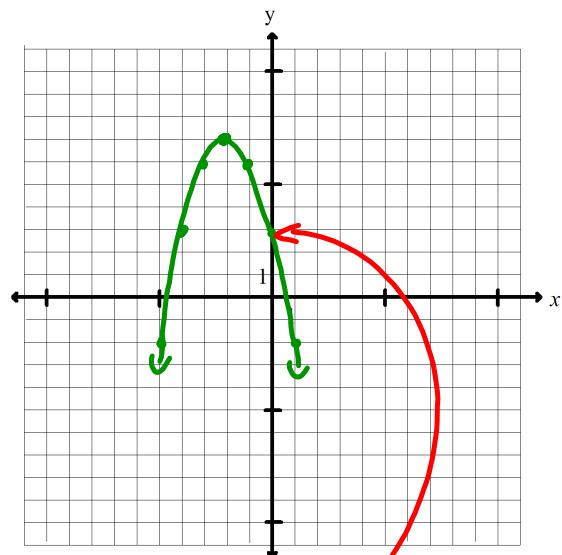
a) sketch it on the grid provided.

vertex $(-2, 7)$

opens down

Step Pattern

$1 \rightarrow 1$
 $2 \rightarrow 4$
 $3 \rightarrow 9$



b) convert the equation to standard form.

$$y = ax^2 + bx + c$$

$$\begin{aligned} y &= -(x+2)^2 + 7 \\ &= -(x^2 + 4x + 4) + 7 \\ &= -x^2 - 4x - 4 + 7 \\ &= -x^2 - 4x + 3 \end{aligned}$$

$c = 3$

c) the value of "c" in standard form represents the y -intercept on the graph.

Summary

Given a quadratic relation in vertex form, $y = a(x-h)^2 + k$, the coordinates of the vertex are (h, k) .

Given a quadratic relation in standard form, $y = ax^2 + bx + c$, the y -intercept is ' c '.

The value of ' a ' in both forms is the same.

Entertainment: pp. 245-247 #1a, 2e, 3d, 4c, 6, 7ab, 11

Challenge: #14

Exit Cards!

Each student must submit 3d and 4c before they leave.

SWYK Tomorrow on Expanding Binomials

Sample Questions for Expand and Simplify Quiz:

a) $-4(2x-1)$

$$= -8x + 4$$

b) $(x+2)(x-3)$

$$\begin{aligned} &= x^2 - 3x + 2x - 6 \\ &= x^2 - x - 6 \end{aligned}$$

c) $(5x-4)(x-2)$

$$\begin{aligned} &= 5x^2 - 10x - 4x + 8 \\ &= 5x^2 - 14x + 8 \end{aligned}$$