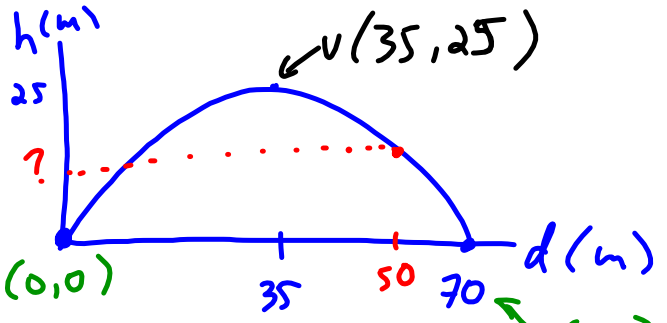
From Yesterday:

p.228

9. A soccer ball is kicked from ground level. When it has travelled 35 m horizontally, it reaches its maximum height of 25 m. The soccer ball lands on the ground 70 m from where it was kicked.

a) Model this situation with a relation in the form $y = a(x - h)^2 + k$.

b) What is the soccer ball's height when it is 50 m from where it was kicked?



a) $y = a(x-35)^2 + 25$

$0 = a(70-35)^2 + 25$

$0 = a(35)^2 + 25$

$0 = 1225a + 25$

$-25 = 1225a$

$\frac{-25}{1225} = a$

$a = \frac{-1}{49}$

$\therefore y = \frac{-1}{49}(x-35)^2 + 25$ is the equation.

b) if $x = 50$

$y = \frac{-1}{49}(50-35)^2 + 25$

$= \frac{-1}{49}(15)^2 + 25$

$= \frac{-1}{49}(225) + 25$

$\doteq 20.408$

$\doteq 20.4$ m

From Friday:

p.415

10. The remaining mass of a drug in a person's bloodstream is modelled by $M = 500\left(\frac{1}{2}\right)^{\frac{t}{2}}$, where M is the remaining mass in milligrams, and t is the time, in hours, that the drug is in the bloodstream.

a) What is the half-life of the drug?

b) What was the dosage of the drug?

c) What will be the concentration of the drug in the bloodstream

i) after 2 h?

ii) after 6 h?

a) the half-life is 2 hours.

b) the dosage is 500 mg

c i) if $t = 2$ hours

$M = 500\left(\frac{1}{2}\right)^{\frac{2}{2}}$

$= 500\left(\frac{1}{2}\right)^{1}$

$= 250$ mg

ii) 6 h

$M = 500\left(\frac{1}{2}\right)^{\frac{6}{2}}$

$= 500\left(\frac{1}{2}\right)^{3}$

$= 62.5$ mg

From Monday:

For each of the following parabolas: i) determine if there is a maximum or a minimum and ii) state the max/min value and when it occurs.

a) $y = 2(x-4)^2 + 1$ v(4,1)

b) $y = -(x+2)^2 + 21$

c) $y = -3(x+5)^2 + 14$

d) $y = (x-16)^2 - 35$

e) $y = x^2 - 6x + 5$

f) $y = -x^2 - 4x - 4$

g) $y = 3x^2 - 21x + 30$

h) $y = -4x^2 - 8x - 4$

a) minimum ("a" is positive ∴ a = 2)

∴ min. value is 1 and occurs when x = 4

g) $y = 3x^2 - 21x + 30$

$= 3(x^2 - 7x + 10)$

$0 = 3(x-2)(x-5)$

$x = 2$ or $x = 5$

(Axis) $x = \frac{2+5}{2}$

$= \frac{7}{2}$

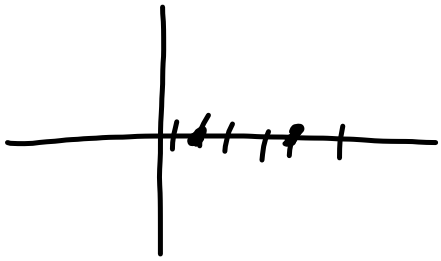
$= 3.5$

$y = 3(x-2)(x-5)$

$= 3(3.5-2)(3.5-5)$

$= 3(1.5)(-1.5)$

$= -6.75$



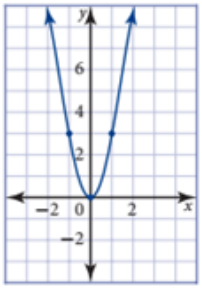
∴ v(3.5; -6.75)

∴ the min value is -6.75 and occurs when x = 3.5.

Relations: Cycle 4 Review

For each parabola: a) identify if 'a' is positive or negative
b) state the maximum value and when it occurs

a)

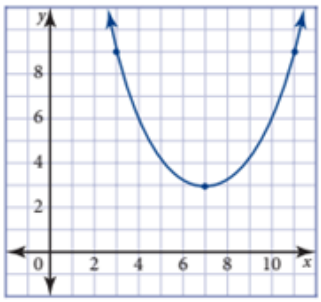


'a' is positive

Max/min value is 0

and occurs when x = 0

b)

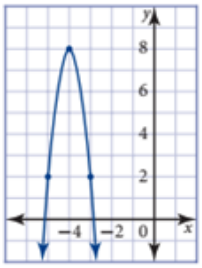


'a' is positive

Max/min value is 3

and occurs when x = 7

c)

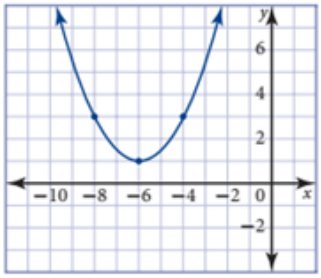


'a' is _____

Max/min value is _____

and occurs when x = _____

d)



'a' is _____

Max/min value is _____

and occurs when x = _____

2. For each parabola:

i) identify if it opens up or down

ii) identify if there is a vertical stretch or a vertical compression

iii) state the maximum/minimum value and when it occurs

a) $y = 4(x - 6)^2 + 10$

b) $y = -0.25(x + 4)^2 - 2$

c) $y = 0.8(x + 1)^2 + 9$

d) $y = -2.5(x - 9)^2 - 5$

e) $y = 0.2(x - 3)^2 - 7$

f) $y = 5(x + 7)^2 + 3$

g) $y = 6(x + 2)^2 - 1$

h) $y = -0.5(x - 10)^2 + 6$

a) i) opens up (a is positive, a = 4)
ii) vertical stretch (a > 1)
iii) min value is 10 and occurs when x = 6.

Textbook review questions: p. 226 #2, 9, 12; p. 228 # 11
p. 286 #5, 12, 15; p. 288 #11, 12
p. 414 #7, 8, 11