KEY

NAME

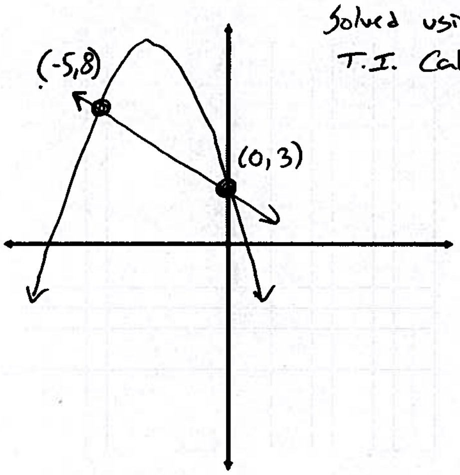
Chapter 8 Systems of Equations Questions

Determine the solution to the following system of equations graphically.

$y = -x^2 - 6x + 3$

$y = -x + 3$

Solved using T.I. Calculator.



The point (2, 5) is a solution to the following system of equations.

$y = -\frac{1}{3}(x-2)^2 + 5$

$y = 2(x-k)^2 - 3$

a) How many possible solutions are there for k? Explain how you determined your answer.

b) Determine the value(s) for k.

c) For one of these values of k, determine the other solution to the system of equations. Express your answer to the nearest hundredth. Done w/ T.I. Calculator

$y = 2(x-k)^2 - 3$ Use (2,5)

$5 = 2(2-k)^2 - 3$

$+3 \quad +3$

$8 = 2(2-k)^2$

$\div 2 \quad \div 2$

$4 = (2-k)^2$

$\pm\sqrt{4} = 2-k$

$+2 = 2-k$, $-2 \quad -2$, $0 = -1k$, $\div(-1) \quad \div(-1)$, $\boxed{0 = k}$

$-2 = 2-k$, $-2 \quad -2$, $-4 = -1k$, $\div(-1) \quad \div(-1)$, $\boxed{4 = k}$

a) Two possible values

b) $k = 0, 4$

c) If $k = 0$

$y = -\frac{1}{3}(x-2)^2 + 5$

$y = 2(x-0)^2 - 3$

Solns (2,5) and (-1.43, 1.08)

c) If $k = 4$

$y = -\frac{1}{3}(x-2)^2 + 5$

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

Solns (2,5) and (5.43, 1.08)

Determine algebraically the solution set to the following quadratic-quadratic system of equations.

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

$-\left(y = -x^2 - x + \frac{7}{4}\right)$

$0 = -x^2 - 2x + 5/4$

Calculator says zeroes at $x = \frac{1}{2}$ and $x = -5/2$

Now show algebraic work

$a = -1 \quad b = -2 \quad c = 5/4$

$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a} = \frac{-(-2) \pm \sqrt{(-2)^2 - 4(-1)(5/4)}}{2(-1)}$

$x = \frac{2 \pm \sqrt{4+5}}{-2} = \frac{2 \pm \sqrt{9}}{-2} = \frac{2 \pm 3}{-2}$

$x_1 = \frac{2+3}{-2} = \boxed{-5/2}$ $\quad$ $\boxed{\text{Soln } (-5/2, -2)}$

$x_2 = \frac{2-3}{-2} = \boxed{\frac{1}{2}}$ $\quad$ $\boxed{\text{Soln } (\frac{1}{2}, 1)}$

The dimensions of a rectangle are represented by the expressions $x - 4$ and $x - 9$.

a) If the perimeter can be expressed as $2y$ and the area represented by $3y - 9$, write equations in terms of x and y for the perimeter and the area of the rectangle.

b) Solve the system of equations to determine the values of x and y.

c) Determine the dimensions of the rectangle.

d) What are the values of the perimeter and area of the rectangle?

A) $P = L + W + L + W$

$2y = (x-4) + (x-9) + (x-4) + (x-9)$

$2y = 4x - 26$

$\boxed{y = 2x - 13}$

$A = LW$

$3y - 9 = (x-4)(x-9)$

$3y - 9 = x^2 - 13x + 36$

$3y = x^2 - 13x + 45$

$\boxed{y = \frac{1}{3}x^2 - \frac{13}{3}x + 15}$

B) Graph $y = 2x - 13$ and $y = \frac{1}{3}x^2 - \frac{13}{3}x + 15$

Solns at (12, 11) and (7, 1)

x y

This one results in negative length.

C) Rectangle is (12 - 4) by (12 - 9) or 8 by 3.

D) Perimeter is 2(11) = 22

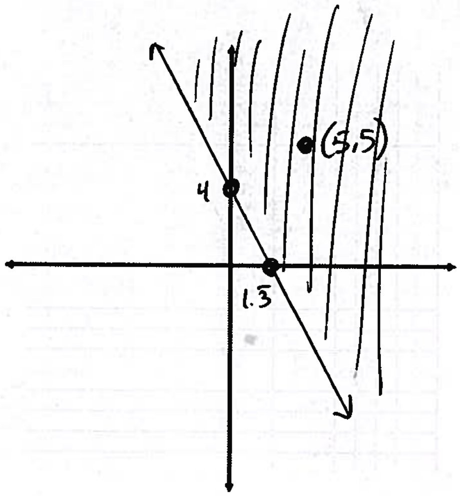
Area is 3(11) - 9 = 24.

KEY

L39 – Worksheet – Unit Review

Chapter 9 Inequalities

. Sketch the graph of the inequality $y > -3x + 4$. Use a test point to verify the solution region. Show your work.



$5 > -3(5) + 4$

$5 > -15 + 4$

$5 > -11$

Yep! (5,5) is a solution.

Determine the solution interval for the quadratic inequality $-x^2 - 6x - 7 \geq 0$.

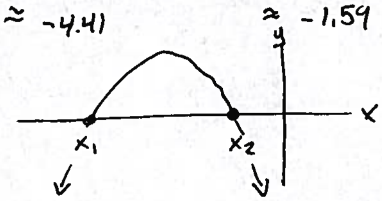
$-x^2 - 6x - 7 \geq 0$ $\quad a = -1 \quad b = -6 \quad c = -7$

$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a} = \frac{-(-6) \pm \sqrt{(-6)^2 - 4(-1)(-7)}}{2(-1)}$

$x = \frac{6 \pm \sqrt{36 - 28}}{-2} = \frac{6 \pm \sqrt{8}}{-2} = \frac{6 \pm 2\sqrt{2}}{-2}$

$x = -3 \pm \sqrt{2}$

$x_1 = -3 - \sqrt{2} \approx -4.41$ $\qquad x_2 = -3 + \sqrt{2} \approx -1.59$



$\{x \mid -3 - \sqrt{2} \leq x \leq 3 + \sqrt{2}, x \in R\}$

Pierre wants to take his extended family to a movie at an IMAX theatre. He has a budget of \$150 to spend on tickets. Tickets for children cost \$9.50, and tickets for adults cost \$13.95.

a) Write an inequality that represents the number of tickets that Pierre can afford.

b) Graph the solution region.

c) Interpret the solution set in reference to the number of tickets.

(A) Let c = number of children's tickets.
a = number of adult tickets.

$\boxed{9.50c + 13.95a \leq 150}$

or

$9.50c \leq 150 - 13.95a$

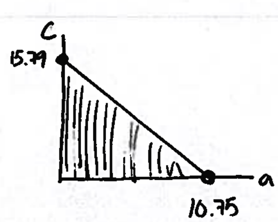
$c \leq -1.468a + 15.789$

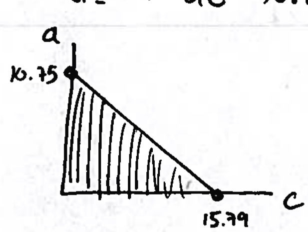
or

$13.95a \leq 150 - 9.50c$

$a \leq -0.681c + 10.753$

(B)





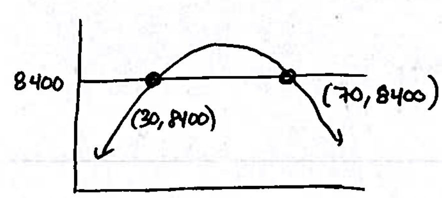
(C) Buy up to 15 child tickets, 10 adult tickets, or some combination of the two.

The royalties received by an author depend on the number of books sold and the price of each book. For a particular book, the royalties, R, in dollars, depend on the price, P, in dollars, according to the equation $R = 0.02P(20\,000 - 200P)$. For what range of prices would the author receive more than \$8400 in royalties?

Graph $R = 0.02P(20000 - 200P)$ and graph $R = 8400$

Window → x: 10 to 90
y: 0 to 20000

Calc → Intersect.



Prices should be set as more than \$30 but less than \$70.