

Advanced Algebra - Semester I Exam Review #4

1. At a sale, Sara bought 4 T-shirts and 3 pairs of jeans for \$181. Jenna bought 1 T-shirt and 2 pairs of jeans for \$94. Write a system of equations to represent the problem.

x = cost of t-shirt
 y = cost of jeans

$$\begin{aligned} 4x + 3y &= 181 \\ x + 2y &= 94 \end{aligned}$$

if solving

$$\begin{aligned} 4x + 3y &= 181 \\ -4x - 8y &= -376 \\ \hline -5y &= -195 \\ y &= 39 \end{aligned}$$

$$\begin{aligned} x + 2(39) &= 94 \\ x &= 16 \end{aligned}$$

$(\$16, \$39)$

2. Prices for a school carnival were \$5 for regular admission, \$3 for students and \$1 for children. 210 people attended the carnival and \$710 was collected. The number of regular tickets sold was 10 more than twice the number of children's tickets sold.

Write a system of equations to represent the problem.

x = # of regular ad.

y = # of student ad.

z = # of child ad.

① $x + y + z = 210$

② $5x + 3y + z = 710$

③ $x = 2z + 10$

if solving

$$2z + 10 + y + z = 210$$

④ $y + 3z = 200$

$$5(2z + 10) + 3y + z = 710$$

$$10z + 50 + 3y + z = 710$$

⑤ $3y + 11z = 660$

$$-3y - 11z = -660$$

$$3y + 11z = 660$$

$$2z = 60$$

$$z = 30$$

$$y + 3(30) = 200$$

$$y + 90 = 200$$

$$y = 110$$

$$x + 110 + 30 = 210$$

$$x + 140 = 210$$

$$x = 70$$

$(70, 110, 30)$

3. A professional pyrotechnician shoots fireworks vertically into the air from the ground with an initial velocity of 192 feet per second. The height in feet of the fireworks is given by $h(t) = -16t^2 + 192t$.

Find vertex

- a. How long does it take for the fireworks to reach the maximum height?

$$t = \frac{-b}{2a} = \frac{-192}{2(-16)} = \frac{-192}{-32} = 6$$

(6 seconds)

- b. What is the maximum height reached by the fireworks?

$$h(6) = -16(6)^2 + 192(6)$$

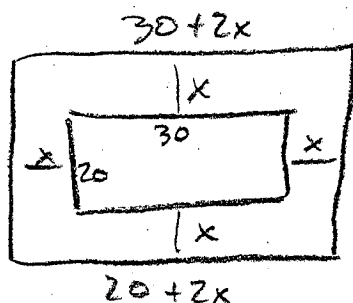
$$= -16(36) + 192(6)$$

$$= -576 + 1152$$

$$= 576$$

(576 ft)

4. A landscape architect built a brick walkway of uniform width around a rectangular pool which is 30 feet long and 20 feet wide. The area of the walkway is 276 sq ft. Determine the width of the walkway to the nearest foot.



Area of whole = Area of Pool + Area of Walkway

$$(30+2x)(20+2x) = 30 \cdot 20 + 276$$

$$600 + 60x + 40x + 4x^2 = 600 + 276$$

$$4x^2 + 100x + 600 = 876$$

$$\frac{4x^2}{4} + \frac{100x}{4} - \frac{276}{4} = 0$$

$$4(x^2 + 25x - 69) = 0$$

Doesn't Factor,
use quad Formula

$$x^2 + 25x - 69 = 0$$

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

$$x = \frac{-25 \pm \sqrt{25^2 - 4(1)(-69)}}{2(1)}$$

$$x = \frac{-25 \pm \sqrt{625 + 276}}{2}$$

$$x = \frac{-25 \pm \sqrt{901}}{2}$$

$$x = \frac{-25 \pm 30.02}{2}$$

$$\frac{-25 + 30.02}{2} = \frac{5.02}{2} = 2.51$$

$$\frac{-25 - 30.02}{2} = \frac{-55.02}{2} = -27.51$$

2.51 ft