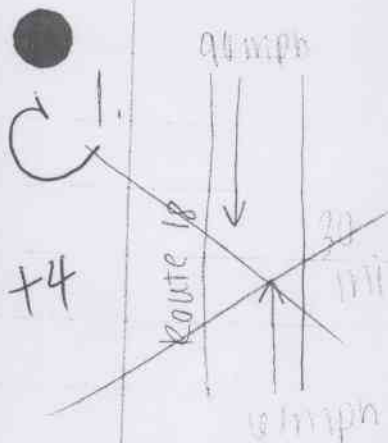


*ONLY 2 & 3

$\frac{10}{10}$

Math 467



$$1.5(x+5) + 1x = 25$$

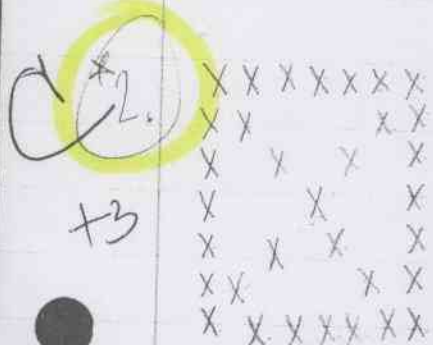
$$1.5x + 7.5 + 1x = 25$$

$$2.5x = 17.5$$

$$x = 7 \text{ min}$$

8:22

$$1.5(12) + 1(7) =$$



In a 7x7 square, there will be 33 squares.

The equation $6n - 9$ can be used because

there are 6 lines of n amount of circles. However, 9 of the circles overlap other circles and are counted twice. Therefore, you subtract 9.

The equation used is excellent and so is the explanation!

*The circled ones overlap

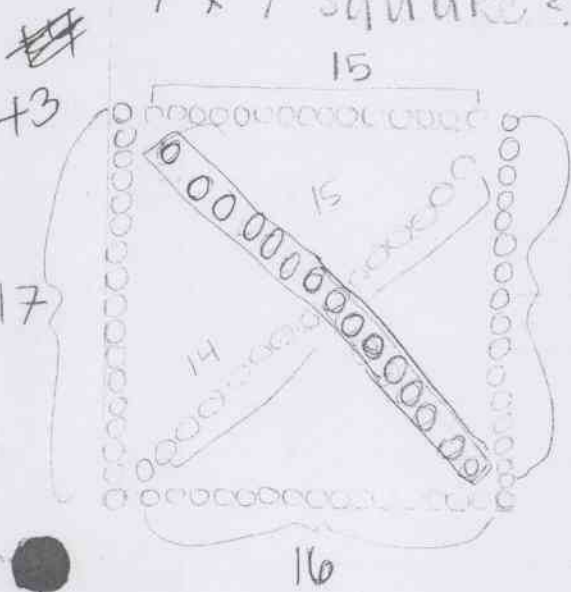


Problem Set #2

10/10

76

#2) There are 93 circles in this pattern based on a 17x17 square. How many circles would be in a 7x7 square? A nxn square? even number?



$$X = n + n - 1 + n - 1 + n - 2 + n - 2 + \dots$$

If I combine like terms:

$$X = 6n - 9$$

I found the formula:

$$X = 6n - 9$$

n=17 (side 1)
n-1 (side 2)
17-1=16

let's define the formula:

- x: # of circles total
- w: # of sides + diagonals (4s + 2d)
- n: squares we're looking for ie 17
- 9: when you combine like terms

test the formula:

$$X = 6n - 9$$

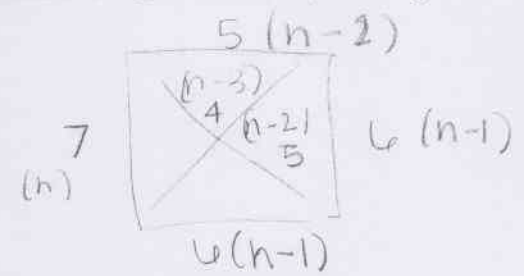
$$X = 6(17) - 9$$

$$X = 93 \checkmark$$

$$X = 6n - 9$$

$$X = 6(7) - 9$$

$$X = 33 \checkmark$$



#3.) Option #1: Initial Fee = \$100 + \$40/mth
Option #2: Initial Fee = \$300 + \$30/mth

Option #1 would be beneficial for a short term commitment because the initial fee is lower. Option #2 would be most cost effective, but for the long term. So, how long?

FORMULA:

$$S = I + RM$$

- S: Money
- I: Initial fee
- R: rate
- M: month

Great explanation and use of a equation!

$$S = I + RM$$

OP1: $S_1 = \$100 + 40M$

OP2: $S_2 = \$300 + 30M$

$$\$100 + 40M = \$300 + 30M$$

$$10M = \$200$$

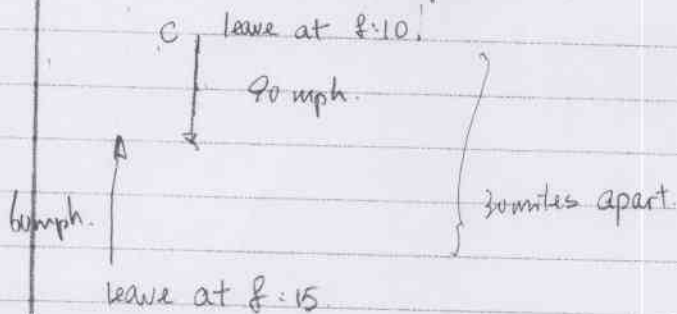
$$M = 20$$

After 20 months, option #2 would be more cost effective and beneficial. (1 yr 10 months)

10/10

Problem set #2

1) First, we draw the picture.



Convert the mph to miles per minute

$$\frac{90 \text{ miles}}{1 \text{ hr}} \times \frac{1 \text{ hr}}{60 \text{ min}} = 1.5 \text{ miles per minute}$$

$$\frac{60 \text{ miles}}{1 \text{ hr}} \times \frac{1 \text{ hr}}{60 \text{ min}} = 1 \text{ miles per minute}$$

After the criminal traveling 5 mins. the criminal travel $1.5(5) = 7.5$ miles
 The remaining distance for the police to set the roadblock,
 $30 - 7.5 - 5 = 17.5$ miles

by using the formula, $d = rt$.

$$d_c = 90t \text{ which is } 1.5t$$

$$d_t = 60t \text{ which is } 1t$$

and we knew that $d_c + d_t = 17.5$ miles.

so, solve for t.

$$1.5t + t = 17.5$$

$$2.5t = 17.5$$

$$t = 7$$

Using equations

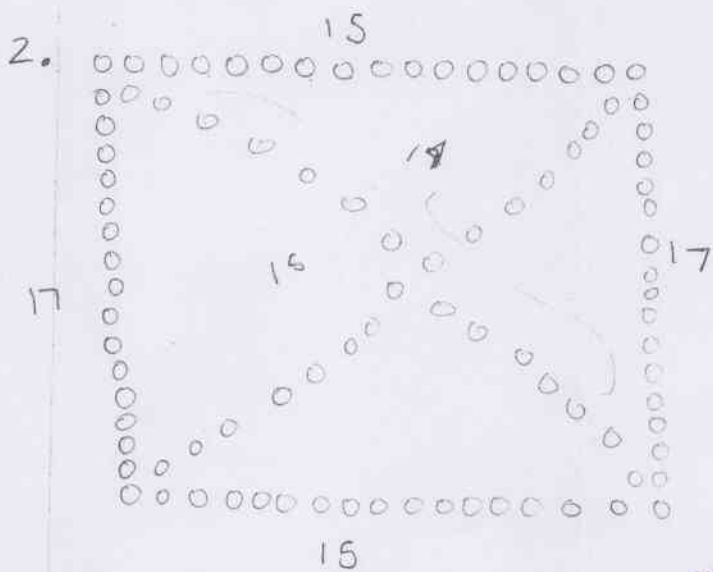
After 7 mins, the police will be 7 miles away from Brookville,
 and the criminal will be at.

$30 - 7.5 - 7(1.5) = 30 - 7.5 - 10.5 = 12$ miles away from Brookville. The distance between the police and criminal is only 5 miles away. The time will be 8:22 at 7 miles north of Brookville.

+4

problem set #2

Great!
I like the
written
explanation.
(11)



17×17 square = 93 circles

- * deriving a formula
- * Using ~~the~~ formula

I first figured out that automatically in any square, there are going to be 4 corner circles and one middle square. Two of the sides have 17 circles each and then the other 2 sides are going to have 15 circles. This is because the 2 corners were already counted in the sides with 17 circles. Then one diagonal will have 15 circles because the 2 corners were already counted. The other diagonal will have 14 circles. ($17 - 2 \text{ corners} = 15 - 1 \text{ middle circle} = 14$) Therefore we can make an equation using these facts. 2 of the sides are going to be the number in the $n \times n$ square.

$2(n)$

Then 3 of the sides are all going to subtract 2 of the corners that \rightarrow

were already counted. (In this problem,
3 of the sides have 15 circles)

$$3(n-2)$$

Finally, one of the sides must subtract
the corners and the middle circle.

$$1(n-3)$$

Therefore the formula is

$$2n + 3(n-2) + 1(n-3)$$

Let's check the formula with this problem
to see if it works.

$$2(17) + 3(17-2) + 1(17-3)$$

$$34 + 45 + 14 = 93$$

For a 7×7 box, the formula would be

$$2(7) + 3(7-2) + 1(7-3)$$

$$14 + 15 + 4 = 33 \text{ circles}$$

$$n \times n \text{ circle} = 2n + 3(n-2) + 1(n-3)$$

- 3 To show the benefits and negatives
of each plan I decided to show
how much they would be per
years.

* Calculating the costs
of each plan at different
months*

The first plan is:

$$6 \text{ months: } 100 + 40(6) = \$240.00$$

$$12 \text{ months: } 100 + 40(12) = \$580.00$$

$$24 \text{ months: } 100 + 40(24) = \$1,060.00$$

$$60 \text{ months: } 100 + 40(60) = \$2,500.00$$

$$72 \text{ months: } 100 + 40(72) = \$2,980.00$$

→

Breaks down problem & finds when

3. 2 options:

- 1) one time initial fee of \$100 plus a membership fee of \$40 / month
- 2) one time initial fee of \$300 plus a monthly membership fee of \$30

Using equations

$$100 + 40x \quad \text{vs} \quad 300 + 30x$$

$$\hookrightarrow 100 + 40x - 300 + 30x$$

$$10x = 200$$

$$x = 20 \text{ months}$$

So at 20 months, both plans equal.

$$100 + 40(20) \\ 100 + 800 = 900$$

$$300 + 30(20) \\ 300 + 600 = 900$$

After 20 months, we can see that Plan #1 is more expensive.

Plan 1	{	$100 + 40(21)$	Plan 2	{	$300 + 30(21)$
		$100 + 840 = \underline{940}$			$300 + 630 = \underline{930}$

$$1 \text{ yr} \rightarrow 100 + 40(12) = \$580$$

$$300 + 30(12) = \$660$$

x 3

*from anywhere from 1 month to ~19 months, the first option is the cheapest. at month 20, it is the "breaking point." After 20 months the 2nd option is the cheapest.

Problem Set #2

Using a chart

3)

month	Plan A	Plan B
	Initial fee \$100 monthly \$40	Initial fee \$300 monthly \$30
0	100	300
1	140	330
2	180	360
3	220	390
4	260	420
5	300	450
6	340	480
7	380	510
8	420	540
9	460	570
10	500	600
11	540	630
12	580	660
13	620	690
14	660	720
15	700	750
16	740	780
17	780	810
18	820	840
19	860	870
20	900	900
21	940	930
22	980	960
23	1,020	990

