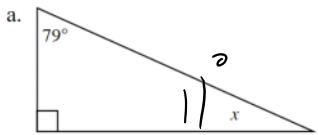


CH4 #6-11

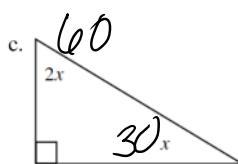
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- 4-6. Use what you know about the angles of a triangle to find the value of x and the angles in each triangle below.



b.

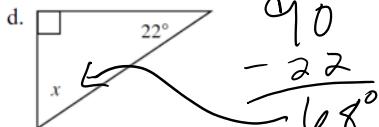
$$\frac{90}{2} = 45$$



$$2x + x = 90$$

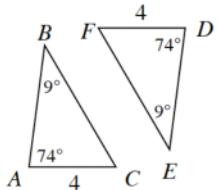
$$3x = \cancel{90}$$

$$x = \cancel{30}$$



$$\begin{array}{r} 90 \\ - 22 \\ \hline 68 \end{array}$$

- 4-7. Use the triangles below to answer the following questions. [Homework Help](#)



$\angle A = \angle D$

$\angle B = \angle E$

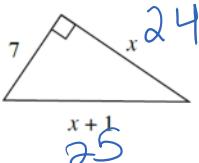
$\triangle BAC \sim \triangle FED$ AA

- a. Are the triangles at right similar? How do you know? Show your reasoning in a flowchart.

- b. Examine your work from part (a). Are the triangles also congruent? Explain why or why not.

Yes, $\frac{4}{4} = 1$ Scale factor of 1.

- 4-8. As Randi started to solve for x in the diagram below, she wrote the equation $7^2 + x^2 = (x + 1)^2$. [Homework Help](#)



- a. Is Randi's equation valid? Explain your thinking.

Yes, Pythagorean Thm

- b. To solve her equation, first rewrite $(x + 1)^2$ by multiplying $(x + 1)(x + 1)$. You may want to review the Math Notes box for Lesson 2.2.2.

- c. Now solve your equation for x .

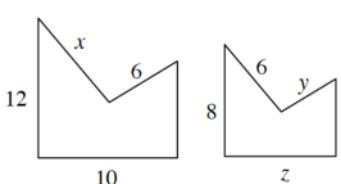
- d. What is the perimeter of Randi's triangle?

$P = 56$

$$\begin{array}{r} x + 1 \\ \times \quad \quad | \\ \hline x^2 \quad x \\ + 1 \quad \quad | \\ \hline x^2 + 2x + 1 \end{array}$$

$$\begin{array}{r} 7^2 + x^2 = x^2 + 2x + 1 \\ -x^2 -x \\ \hline 49 = 2x + 1 \\ -1 \quad -1 \\ \hline 48 = 2x \\ \frac{48}{2} = \frac{2x}{2} \\ \hline x = 24 \end{array}$$

- 4-9. Assume that the shapes below are similar. Find the values of x , y , and z .



$$\frac{B}{S} \quad \frac{12}{8} = \frac{x}{6} = \frac{6}{y} = \frac{10}{z}$$

$$\underline{72} = \underline{8x}$$

$$\underline{48} = \underline{\frac{12y}{2}}$$

$$\frac{80}{\cancel{2}} = \frac{12z}{\cancel{2}}$$

$$\begin{array}{r} 72 = 8x \\ \hline 8 \quad 8 \\ \hline x = 9 \end{array}$$

$$\begin{array}{r} 48 = 12y \\ \hline 12 \quad 12 \\ \hline y = 4 \end{array}$$

$$\begin{array}{r} 80 = 10z \\ \hline 10 \quad 10 \\ \hline z = 8 \end{array}$$



4-10. ROLL AND WIN

You begin the game *Roll and Win* by picking a number. Then you roll two regular dice, each numbered 1 through 6, and add the numbers that come up together. If the sum is the number you chose, you win a point. For example, if you choose "11," and a 6 and a 5 are rolled, you win! [4-10 HW eTool \(CPM\)](#). [Homework Help](#)

- What is the sample space, which can be thought of as the set of all the possible outcomes, when two dice are rolled and their numbers added?
- One way to analyze this situation is to make a model of all the possible outcomes like the one below. Copy and complete this table of sums on your paper. Are each of the outcomes in this table equally likely?

Dice #2	1	2	3	4	5	6
1	2	3	4	5	6	7
2	3	4	5	6	7	8
3	4	5	6	7	8	9
4	5	6	7	8	9	10
5	6	7	8	9	10	11
6	7	8	9	10	11	12

$6 \times 6 = 36$ Combos

$$P(\text{Even}) = \frac{18}{36} = \frac{1}{2}$$

$$P(10) = \frac{3}{36} = \frac{1}{12}$$

$$P(15) = 0$$

- What is $P(\text{even})$? $P(10)$? $P(15)$?

- Which sum is the most likely result? What is the probability of rolling that sum?

$$7 \rightarrow \frac{6}{36} = \left(\frac{1}{6}\right)$$

- 4-11. The temperature in San Antonio, Texas is currently 77°F and is increasing by 3° per hour. The current temperature in Bombay, India is 92°F and the temperature is dropping by 2° per hour. When will it be as hot in San Antonio as it is in Bombay? What will the temperature be? [Homework Help](#)

$$\text{SA: } y = 77 + 3x \quad \text{Bombay: } y = 92 - 2x$$

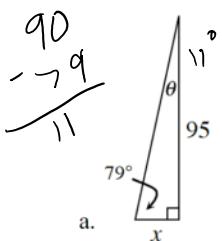
$$77 + 3x = 92 - 2x$$

$$\begin{array}{r} 77 + 5x = 92 \\ -77 \quad -77 \\ \hline 5x = 15 \end{array}$$

$$x = 3 \text{ hours}$$

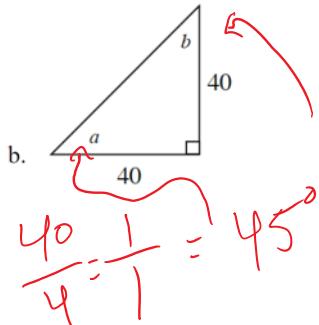
$$(88^{\circ})$$

- 4-17. Use your Trig Table Toolkit from problem 4-16 to help you find the value of each variable below.

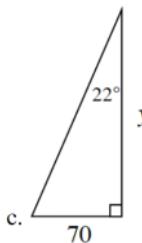


$$11^\circ = \frac{1}{5} = \frac{x}{95}$$

$x = 19$



$$\frac{40}{4} = \frac{1}{1} = 45^\circ$$

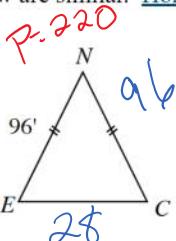
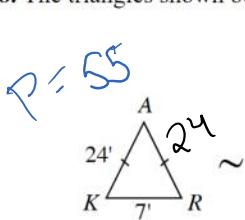


$$22^\circ = \frac{2}{5} = \frac{70}{y}$$

$$\frac{2}{5} \times 35 = \frac{70}{y}$$

$$y = 175$$

- 4-18. The triangles shown below are similar. [Homework Help](#)



$$\frac{96}{24} = 4$$

$$7 \times 4 = 28$$

a. What is the ratio of side length NE to side length AK ?

b. Use a ratio to compare the perimeters of $\triangle ENC$ and $\triangle KAR$. How is the perimeter ratio related to the side length ratio?

c. If you have not already done so, find the length of \overline{EC} .

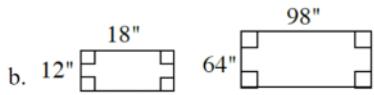
$$P = \frac{220}{55} = 4$$

Same!

- 4-19. Examine each pair of figures below. Are they similar? Explain how you know.



Yes. They have the same \angle 's.

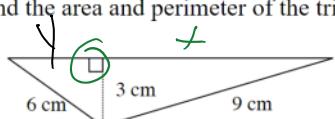


$$\frac{98}{14} \approx 7 \quad \frac{64}{12} \approx 5.3 \quad \text{Sides Not Proportional}$$



Not enough information

- 4-20. Find the area and perimeter of the triangle below.



$$2 - m^2$$

$$A = \frac{1}{2} b \cdot h = \frac{1}{2} (13.7)(3) = 20.55$$

$$z^2 + y^2 = 6^2$$

$$P = 6 + 9 + 13.7 = 28.7$$

$$3^2 + x^2 = 9^2$$

$$\sqrt{x^2} = \sqrt{72}$$

$$x = 8.5$$

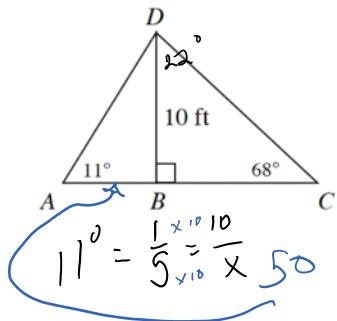
$$3^2 + y^2 = 6^2$$

$$\sqrt{y^2} = \sqrt{27}$$

$$y = 5.2 \approx 13.7$$

$$P = 6+9+13.7 \in 28.7$$

- 4-21. Examine the figure below, which is not drawn to scale. Which is longer, \overline{AB} or \overline{BC} ? Explain your answer.



$$22^\circ = \frac{2}{5} = \frac{1}{10}$$

$$(Y=4)$$

$$BC = 5$$

AB is longer...
looks can be deceiving!!

- 4-22. Joan and Jim are planning a dinner menu including a main dish and dessert. They have 4 main dish choices (steak, vegetable-cheese casserole, turkey burgers, and vegetarian lasagna) and 3 dessert choices (chocolate brownies, strawberry ice cream, and chocolate chip cookies). [Homework Help](#)



- a. Joan and Jim would like to know how many different dinner menus they have to choose from. One way to make sure you have considered the entire sample space – all the possible menu outcomes – is to make a table like the one at right. How many different menus are there?
- b. Assume the main dish choice and the dessert choice are both chosen randomly. Are all the menus equally likely?
- c. What is the probability they pick a menu without meat? What is the probability they pick a menu with chocolate?

[Show Toolbars] B. Any dessert = $\frac{1}{3}$ | (c.) $P(\text{meat}) = 2/4 = \frac{1}{2}$
Any main = $\frac{1}{4}$ | $P(\text{chocolate}) = 2/3$

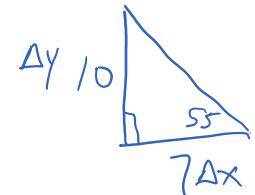
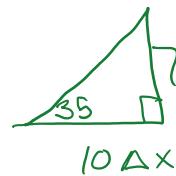
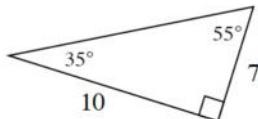
12.

	steak	vegetable casserole	turkey burgers	vegetable lasagna
chocolate brownies				
strawberry ice cream				
chocolate chip cookies				

- 4-27. Ben thinks that the slope ratio for this triangle is $\frac{7}{10}$. Carlissa thinks the ratio is $\frac{10}{7}$. Who is correct? Explain your thinking fully.

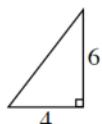
[Homework Help](#)

35° + 55° are
Complimentary
So their Slopes
are reciprocals



- 4-28. Use your observations from problem 4-26 to answer the following questions: [Homework Help](#)

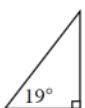
- a. Thalia did not have a tool to help her find the slope angle in the triangle below. However, she claims that the slope angle has to be more than 45°. Do you agree with Thalia? Why?



Yes, $45^\circ \rightarrow \frac{1}{1}$, Δy is bigger
So the \angle is bigger.

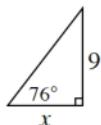


- b. Lyra was trying to find the slope ratio for the triangle at right, and she says the answer is $\frac{\Delta y}{\Delta x} = 2.675$. Isiah claims that cannot be correct. Who is right? How do you know?



19° is less than $45^\circ \rightarrow \frac{1}{1}$, So Ratio needs to be
less than 1.

- c. Without finding the actual value, what information do you know about x in the diagram at right?



$x < 9$

- 4-29. Examine each sequence below. State whether it is arithmetic, geometric, or neither. For the sequences that are arithmetic or geometric, find the equation for $t(n)$ or a_n . Refer to the Math Notes box in this lesson if you need additional help. [Homework Help](#)

a. $1, 4, 7, 10, 13, \dots$ $\begin{matrix} 1 \\ +3 \\ 4 \\ +3 \\ 7 \\ +3 \\ 10 \\ +3 \\ 13 \end{matrix}$ $y = 3x - 2$ or $t(n) = 3n - 2 \rightarrow$ Arithmetic

b. $0, 5, 12, 21, 32, \dots$ Neither, can't add or multiply to get next

c. $2, 4, 8, 16, 32, \dots$ $\begin{matrix} 2 \\ \times 2 \\ 4 \\ \times 2 \\ 8 \\ \times 2 \\ 16 \\ \times 2 \\ 32 \end{matrix}$ $2^n \rightarrow$ geometric

d. $5, 12, 19, 26, \dots$ $\begin{matrix} 5 \\ +7 \\ 12 \\ +7 \\ 19 \\ +7 \\ 26 \end{matrix}$ $y = 7x - 2$ or $t(n) = 7n - 2$

- 4-30. Edwina has created her own Shape Bucket and has provided the clues below about her shapes. List one possible group of shapes that could be in her bucket. [Homework Help](#)

$P(\text{equilateral}) = 1$

Need 1 equilateral

$P(\text{triangle}) = \frac{1}{3}$

2 other equilateral

(Square, Hexagon)

- 4-31. Renae has programmed her music player to play all five songs in her playlist in a random order without repeating songs. [Homework Help](#)

PLAYLIST	
a.	I Love My Mama (country) by the Strings of Heaven
b.	Don't Call Me Mama (country) Duet by Sapphire and Hank Tumbleweed
c.	Carefree and Blue (R & B) by Sapphire and Prism Escape
d.	Go Back To Mama (Rock) Duet by Bjorn Free and Sapphire
e.	Smashing Lollipops (Rock) by Sapphire

- a. What is the probability that the first song is a country song?

2/5

- b. If the first song is a country song, does that affect the probability that the second song is a country song? Explain your thinking.

Yes, you can't repeat; $\frac{2}{5} \rightarrow$ first ; $\frac{1}{4} \rightarrow$ 2nd

- c. As songs are playing, the number of songs left to play decreases. Therefore, the probability of playing each of the remaining songs depends on which songs that have played before it. This is an example of events that are **not independent**. If Renae has already listened to "Don't Call Me Mama," "Carefree and Blue," and "Smashing Lollipops," what is the probability that one of the singers of the fourth song will be Sapphire? Explain your reasoning.



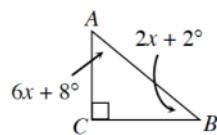
1/2 of the 2 remaining, 1 is by Sapphire

- d. To get home, Renae can take one of four buses: #41, #28, #55, or #81. Once she is on a bus, she will randomly select one of the following equally likely activities: listening to her music player, writing a letter, or reading a book. Her choice of bus and choice of entertainment are **independent events**, because the bus that Renae took did not affect which activity she chose. For example, what is the probability that Renae writes a letter if she takes the #41 bus? What is the probability that Renae writes a letter if she takes the #55 bus?

Independent
buses \rightarrow 4
options \rightarrow 3

both $\frac{1}{3}$

- 4-32. Use what you know about the sum of the angles of a triangle to find $m\angle ABC$ and $m\angle BAC$. Are these angles acute or obtuse? Find the sum of these two angles. How can you describe the relationship of these two angles? [Homework Help](#)



ADD to $90^\circ \rightarrow$ Acute

$$6x + 8 + 2x + 2 = 90$$

$$8x + 10 = 90$$

$$8x = 80$$

Complementary!

$$x = 10$$

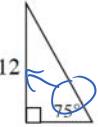
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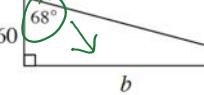
CH4 #39-44

Tuesday, November 20, 2018 8:55 PM

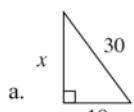
- 4-39. Find the missing side length for each triangle. Use the tangent button on your calculator to help.

a.  $82 \left(\tan 8^\circ \right) = \left(\frac{t}{82} \right) 82$ $t = 82 \tan 8^\circ = 11.5$

b.  $\tan 75^\circ = \frac{12}{p}$ $\frac{12}{\tan 75^\circ} = p \tan 75^\circ$ $p = \frac{12}{\tan 75^\circ}$ $P = 3.23$

c.  $60 \left(\tan 60^\circ \right) = \left(\frac{b}{60} \right) 60$ $b = 60 \tan 60^\circ = 148.5$

- 4-40. Use the relationships in the diagrams below to write an equation and solve for x .

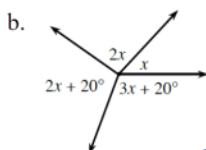


$$x^2 + 18^2 = 30^2$$

$$-18^2 -18^2$$

$$\sqrt{x^2} = \sqrt{576}$$

$$x = 24$$



$$2x + x + 3x + 20 + 2x + 20 = 360$$

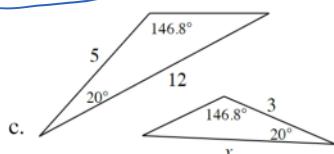
$$8x + 40 = 360$$

$$-40 -40$$

$$8x = 320$$

$$\frac{8x}{8} = \frac{320}{8}$$

$$x = 40$$



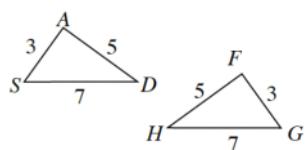
AA Similarity

$$\frac{12}{x} = \frac{5}{3}$$

$$\frac{36}{5} = \frac{5x}{3}$$

$$7.2$$

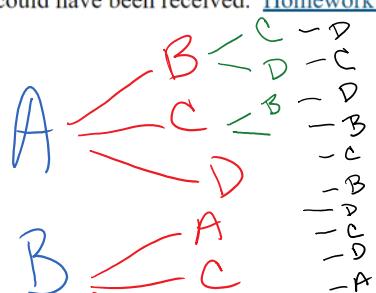
- 4-41. What is the relationship of the triangles below? Justify your conclusion using rigid transformations.



Congruent, Scale Factor = 1

A B C D

- 4-42. Alexis, Bart, Chuck, and Dariah all called in to a radio show to get free tickets to a concert. List all the possible orders in which their calls could have been received. [Homework Help](#)



ABCD
ABDC
ACBD
ACDB
ADBC
ADCB
BACD
BADC
BCAD
BCDA
BDAC
BDCA

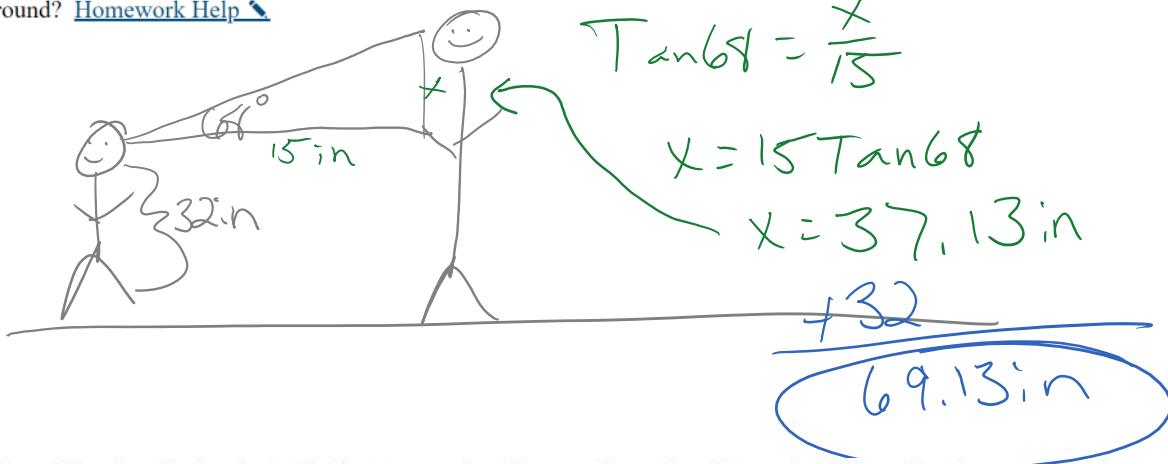


$B \overline{D} \overline{A} \overline{C}$
 $B \overline{D} \overline{C} \overline{A}$

 $C \overline{A} \overline{B} \overline{D}$
 $C \overline{A} \overline{D} \overline{B}$
 $C \overline{B} \overline{A} \overline{D}$
 $C \overline{B} \overline{D} \overline{A}$
 $C \overline{D} \overline{A} \overline{B}$
 $C \overline{D} \overline{B} \overline{A}$

 $D \overline{A} \overline{B} \overline{C}$
 $D \overline{A} \overline{C} \overline{B}$
 $D \overline{B} \overline{A} \overline{C}$
 $D \overline{B} \overline{C} \overline{A}$
 $D \overline{C} \overline{A} \overline{B}$
 $D \overline{C} \overline{B} \overline{A}$

- 4-43. When she was younger, Mary had to look up at a 68° angle to see into her father's eyes whenever she was standing 15 inches away. How high above the flat ground were her father's eyes if Mary's eyes were 32 inches above the ground? [Homework Help](#)



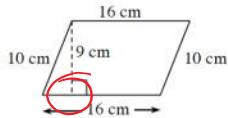
- 4-44. This problem is a checkpoint for finding areas and perimeters of complex shapes. It will be referred to as Checkpoint 4. [Homework Help](#)

For each figure below, find the area and the perimeter.



* Base & height
always meet @ 90°

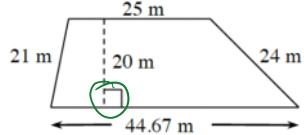
a. Parallelogram



$$A = b \cdot h$$

$$A = 16(9) = 144 \text{ cm}^2$$

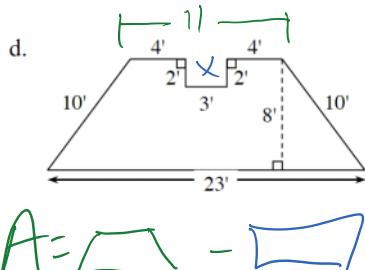
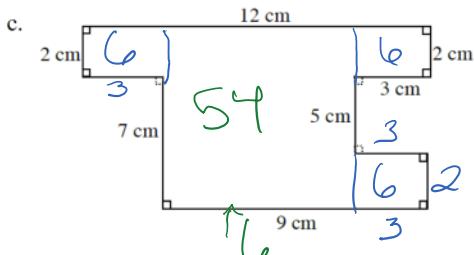
b. Trapezoid



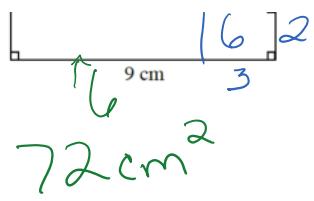
$$A = \frac{1}{2}h(b_1 + b_2)$$

$$A = \frac{1}{2}(20)(44.67 + 25)$$

$$A = 10(69.67) = 696.7 \text{ m}^2$$



$$A = \boxed{\square} - \boxed{\square}$$

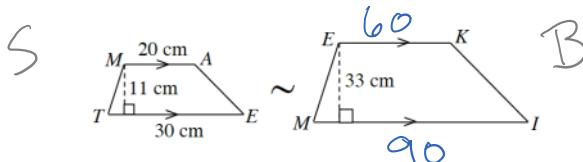


$$\text{A} = \square - \square$$
$$\square = \frac{1}{2}(8)(23+11)$$
$$= 4(34) = 144$$
$$144 - 6 = \boxed{(138)^2}$$

← → 23'

$$\square = 3 \times 2 = 6$$

- 4-47. The trapezoids below are similar. [Homework Help](#)



$$\frac{B}{S} = \frac{33}{11} = 3$$

a. What is the ratio of the heights?

$$\begin{aligned} S &= \frac{1}{2}(11)(20+30) & B &= \frac{1}{2}(33)(60+90) \\ &= 5.5(50) & &= 16.5(150) = 2475 \\ &= 275 & \frac{B}{S} &= \frac{2475}{275} = 9 \end{aligned}$$

- 4-48. For each diagram below, write an equation and solve for x , if possible.

a.

$$3x + 3 + x + 7 = 90$$

$$4x + 10 = 90$$

$$-10 \quad -10$$

$$4x = 80$$

$$\cancel{4x} \quad \cancel{80}$$

$$x = 20$$

b.

$$9x + 4 = 3x + 14$$

$$-3x \quad -3x$$

$$6x + 4 = 14$$

$$-4 \quad -4$$

$$6x = 10$$

$$\cancel{6x} \quad \cancel{10}$$

$$x = 1.6$$

- 4-49. Which of the following events are independent? Refer to the Math Notes in this lesson. [Homework Help](#)

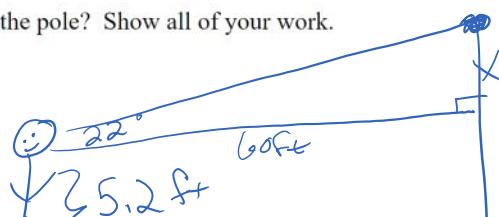


- a. Flipping a head, after flipping 5 heads in a row. I → One doesn't effect the other
- b. Drawing an Ace from a deck of playing cards, after two Aces were just drawn (and not returned to the deck). Dependent
2 not here!
- c. Having blue eyes, if you have blonde hair. I → doesn't effect.
- d. The probability of rain this weekend, if the debate team from North City High School wins the state championship. I → doesn't effect
- e. Randomly selecting a diet soda from a cooler filled with both diet and regular soda, after the person before you just selected a diet soda and drank it. I → I not there anymore

- 4-50. Leon is standing 60 feet from a telephone pole. As he looks up, a red-tailed hawk lands on the top of the pole. Leon's angle of sight up to the bird is 22° and his eyes are 5.2 feet above the ground. [Homework Help](#)

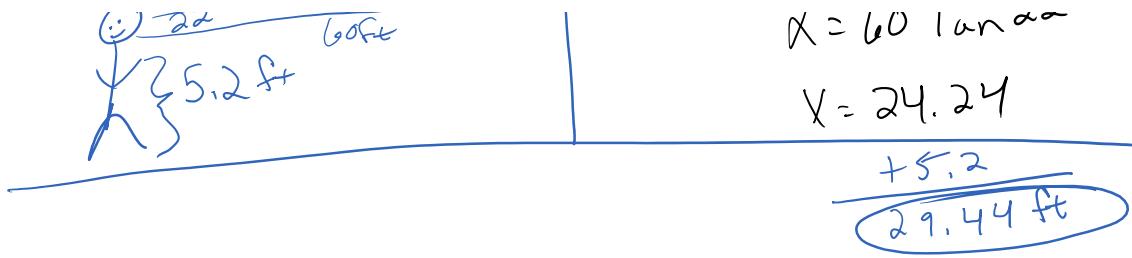
- a. Draw a detailed picture of this situation. Label it with all of the given information.

- b. How tall is the pole? Show all of your work.



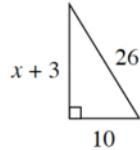
$$\tan 22 = \frac{x}{60}$$

$$\begin{aligned} x &= 60 \tan 22 \\ &\approx 24 \end{aligned}$$



4-52. Find the value of x in the triangle below. Refer to problem 4-8 for help. Show all work.

$$\begin{aligned}
 a^2 + b^2 &= c^2 \\
 (x+3)^2 + 10^2 &= 26^2 \\
 (x+3)(x+3) + 100 &= 676 \\
 x^2 + 3x + 3x + 9 + 100 &= 676 \\
 x^2 + 6x + 109 &= 676 \\
 x^2 + 6x - 676 &= 676
 \end{aligned}$$



$$\begin{aligned}
 x^2 + 6x - 567 &= 0 \\
 (x+27)(x-21) &= 0 \\
 x+27 = 0 &\quad x-21 = 0 \\
 x = -27 &\quad x = 21
 \end{aligned}$$

10 boys, 10 girls

- 4-58.** Out of the 20 contestants in the state math championships, 10 are girls. For this round, each contestant gets asked one question. The first question goes to a randomly chosen contestant. [Homework Help](#)

a. What is the probability the first contestant is a girl? $\frac{10 \text{ girls}}{20 \text{ total}} = \frac{1}{2}$

b. If the first contestant is a girl, what is the probability that the second contestant is a girl?

$$\frac{9 \text{ girls}}{19 \text{ total}}$$

$$\frac{9}{19}$$

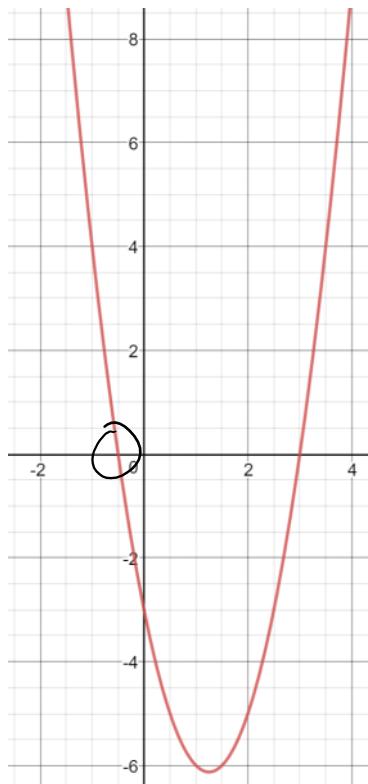
c. Is the probability that the second contestant is a girl independent of the first contestant being a girl? Refer to the Math Notes box at the end of Lesson 4.1.5.

No, 1st effects the 2nd

- 4-59.** On graph paper, graph the parabola $y = 2x^2 - 5x - 3$. [4-59 HW eTool](#) (Desmos) [Homework Help](#)

a. What are the roots (x-intercepts) of the parabola?

b. Read the Math Notes box for this lesson. Then solve the equation $2x^2 - 5x - 3 = 0$ algebraically. Did your solutions match your roots from part (a)?



Calculator \rightarrow table

X	Y
-1	4
0	-3
1	-4
2	-5
3	0

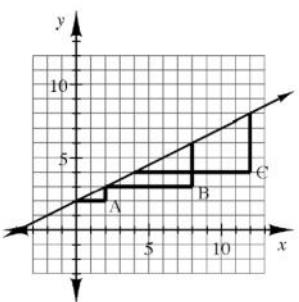
You did this
last year.

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

$$X = \frac{-(-5) \pm \sqrt{(-5)^2 - 4(2)(-3)}}{2(2)}$$

$$X = \frac{5 \pm \sqrt{25+24}}{4} = \frac{5 \pm 7}{4} = \frac{3 \pm 1.25}{2}$$

- 4-60. Examine the graph below with slope triangles A, B, and C. [Homework Help](#)



$$A = \frac{1}{2}$$

$$B = \frac{3}{6} = \frac{1}{2}$$

$$C = \frac{4}{8} = \frac{1}{2}$$

a. Find the slope of the line using slope triangle A, slope triangle B, and then slope triangle C.

b. Hernisha's slope triangle has a slope of $\frac{1}{2}$. What do you know about her line? \rightarrow Parallel

- 4-61. Francis and John are racing. Francis is 2 meters in front of the starting line at time $t = 0$ and he runs at a constant rate of 1 meter per second. John is 5 meters in front of the starting line and he runs at a constant rate of 0.75 meters per second. After how long will Francis catch up to John? [Homework Help](#)

Francis

$$y = 1x + 2$$

John

$$y = 0.75x + 5$$

$$\begin{aligned} x + 2 &= 0.75x + 5 \\ -0.75x &\quad -0.75x \\ \hline 0.25x + 2 &= 5 \\ -2 &\quad -2 \\ \hline 0.25x &= 3 \\ \hline &\quad 25 \\ x &= 12 \end{aligned}$$

Seconds

- 4-62. Solve each equation to find the value of x . Leave your answers in decimal form accurate to the thousandths place.

a. $\frac{3.2}{x} = \frac{7.5}{x^2}$

$$3.2x^2 = 7.5x \rightarrow$$

$$3.2x^2 - 7.5x = 0$$

$$x(3.2x - 7.5) = 0$$

$$x = 0$$

$$3.2x - 7.5 = 0$$

$$+7.5 \quad +7.5$$

$$\begin{aligned} 3.2x &= 7.5 \\ \hline 3.2 &\quad 3.2 \end{aligned}$$

$$x = 2.34$$

b. $4(x - 2) + 3(-x + 4) = -2(x - 3)$

$$4x - 8 - 3x + 12 = -2x + 6$$

$$\begin{aligned} x + 4 &= -2x + 6 \\ +2x &\quad +2x \\ \hline 3x + 4 &= 6 \\ -4 &\quad -4 \\ \hline x &= 2/3 \end{aligned}$$

c. $2x^2 + 7x - 15 = 0$

$$x = \frac{-7 \pm \sqrt{7^2 - 4(2)(-15)}}{2(2)}$$

$$x = \frac{-7 \pm \sqrt{49 + 120}}{4}$$

$$x = \frac{-7 \pm \sqrt{169}}{4}$$

$$\therefore x_1 = 1.5$$

d. $3x^2 - 2x = -1$

$$3x^2 - 2x + 1 = 0$$

$$x = \frac{2 \pm \sqrt{(-2)^2 - 4(3)(1)}}{2(3)}$$

$$x = \frac{2 \pm \sqrt{4 - 12}}{6}$$

\emptyset

Not real

$$x = \frac{-1 \pm \sqrt{169}}{4}$$

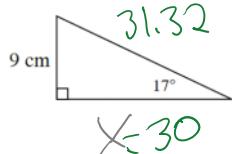
$$x = \frac{-7 \pm 13}{4} = \frac{6}{4} = 1.5$$

$$\frac{-20}{4} = -5$$

6

Not real
answers

4-63. Find the perimeter of the shape below. Clearly show all your steps.



$$9^2 + x^2 = 31.32^2$$

$$\sqrt{81 + x^2} = \sqrt{31.32^2}$$

$$c = 31.32$$

$$\tan 17^\circ = \frac{9}{x}$$

$$9 = x \tan 17$$

$$x = 9 / \tan 17$$

$$x = \frac{9}{\tan 17}$$

$$x = 30$$

$$9 + 30 + 31.32 = 70.32 \text{ cm}$$

- 4-69.** Eddie is arguing with Tana about the probability of flipping three coins. They decided to flip a penny, nickel, and a dime. [4-69 HW eTool \(CPM\)](#). [Homework Help](#)



a. Which would be better for determining the sample space, a tree diagram or an area model? Justify your answer. *Tree diagram → 3 Coins*

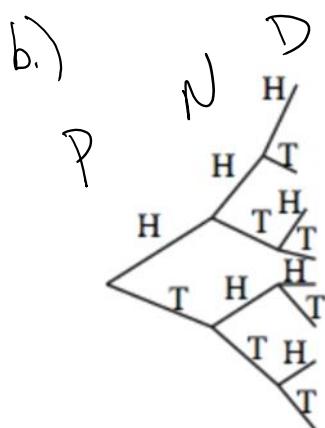
b. Make a sample space that shows all the possible outcomes. How many outcomes are there?

c. Find the probability of each of the following events occurring. Be sure to show your thinking clearly:

- i. Three heads
- ii. One head and two tails
- iii. At least one tail
- iv. Exactly two tails

d. Which is more likely, flipping at least 2 heads or at least 2 tails? Explain.

e. How would the probabilities change if Tana found out that Eddie was using weighted coins (coins that were not fair) so that the probability of getting heads for each coin was $\frac{4}{5}$ instead of $\frac{1}{2}$? Would this change the sample space? Recalculate the probabilities in part (c) based on the new information.



- HHH -	- THH -
- HHT -	- THT -
- HTH -	- TTG -
- HTT -	- TTT -

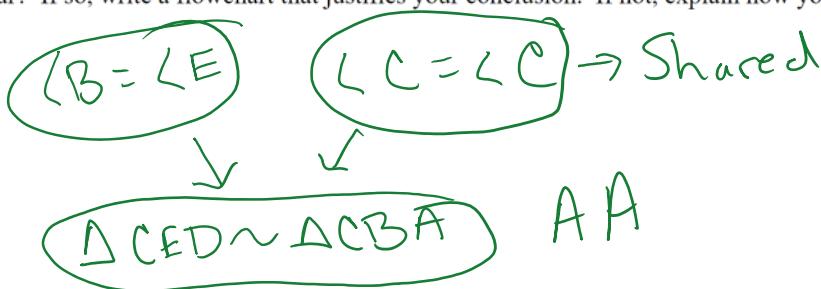
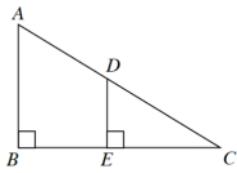
D.) They'd be the same

$$P(\text{at least 2 H}) = \frac{4}{8} = \frac{1}{2}$$

$$P(\text{at least 2 T}) = \frac{4}{8} = \frac{1}{2}$$

c.) $P(3H) = \frac{1}{8}$
 $P(1H, 2T) = \frac{3}{8}$
 $P(\text{at least 1T}) = \frac{7}{8}$
 $P(2T's) = \frac{3}{8}$

- 4-70.** Are the triangles at right similar? If so, write a flowchart that justifies your conclusion. If not, explain how you know. [Help](#)

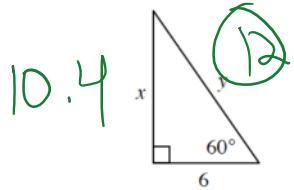


4-72. Mr. Singer made the flowchart below about a student named Brian.



- What is wrong with Mr. Singer's flowchart?
- Rearrange the ovals so the flowchart makes more sense.

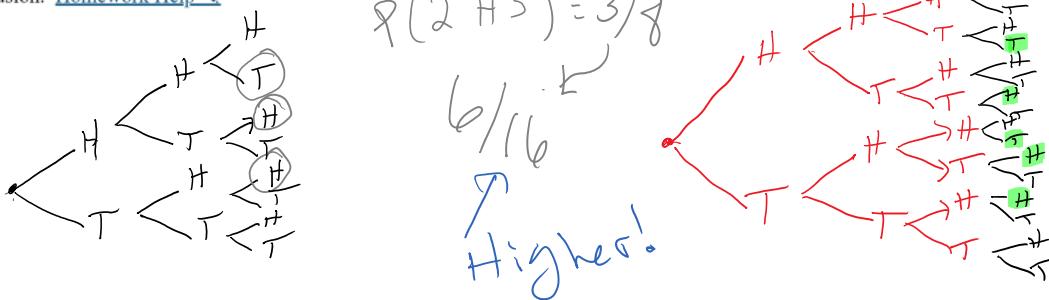
4-74. Find x and y in the diagram below. Show all of the steps leading to your answer.



$$\begin{aligned} \tan 60^\circ &= \frac{x}{6} \\ x &= 6 \tan 60^\circ \\ x &= 10.4 \end{aligned}$$

$$\begin{aligned} 10.4^2 + 6^2 &= y^2 \\ \sqrt{144.16} &= \sqrt{y^2} \\ y &= 12 \end{aligned}$$

- 4-81. Eddie told Alfred, "I'll bet if I flip three coins I can get exactly two heads." Alfred replied, "I'll bet I can get exactly two heads if I flip four coins!" Eddie scoffed, "Well, so what? That's easier." Alfred argued, "No, it's not. It's harder." Who is correct? Show all of your work and be prepared to defend your conclusion. [Homework Help](#)



$$\text{P(2H's)} = \frac{3}{16}$$

- 4-82. Find the equation of the line with a slope of $\frac{1}{3}$ that goes through the point $(0, 9)$. [Homework Help](#)

$$9 = \frac{1}{3}(0) + b$$

$$9 = 0 + b$$

$$9 = b$$

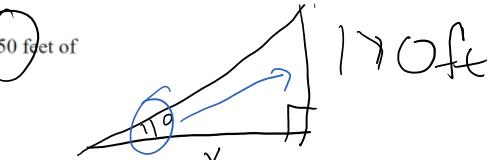
$$y = \frac{1}{3}x + 9$$

- 4-83. An airplane takes off and climbs at an angle of 11° . If the plane must fly over a 120-foot tower with at least 50 feet of clearance, what is the minimum distance between the point where the plane leaves the ground and the base of the tower? [Homework Help](#)

a. Draw and label a diagram for this situation.

b. What is the minimum distance between the point where the plane leaves the ground and the tower? Explain completely.

Next to clear 170 ft.



- 4-84. Solve each equation below for the given variable. Show all work and check your answer. [Homework Help](#)

a. $\sqrt{x} - 5 = 2$

b. $-4(-2 - x) = 5x + 6$

c. $\frac{5}{x-2} = \frac{3}{2}$

d. $x^2 + 4x - 5 = 0$

a. $\sqrt{x} - 5 = 2$
 $+5 +5$
 $\sqrt{x} = 7^2$
 $x = 49$

b. $-4(-2 - x) = 5x + 6$
 $8 + 4x = 5x + 6$
 $8 + 4x - 5x = 5x + 6 - 5x$
 $8 - 4x = 6$
 $-4x = 6 - 8$
 $2 = x$

c. $\frac{5}{x-2} = \frac{3}{2}$
 $3(x-2) = 10$
 $3x - 6 = 10$
 $+6 +6$
 $3x = 16$
 $\frac{3x}{3} = \frac{16}{3}$
 $x = 5.\bar{3}$

d. $x^2 + 4x - 5 = 0 \rightarrow x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$
 $x^2 + 4x - 5 = 0$
 $x \quad 5$
 $-1 \quad -x \quad -5$
 $(x-1)(x+5) = 0$
 $(x=1, -5)$

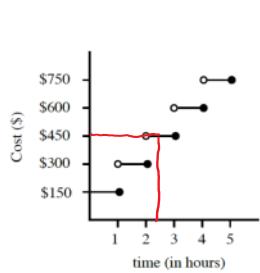
$$\begin{aligned} &= -4 \pm \sqrt{4^2 - 4(1)(-5)} \\ &= -4 \pm \sqrt{16 + 20} \\ &= -4 \pm \sqrt{36} \\ &= -4 \pm 6 \\ &= \frac{-4 \pm 6}{2} \end{aligned}$$

- 4-85. Can a triangle be made with sides of length 7, 10, and 20 units? Justify your answer. [4-85 HW eTool \(Desmos\)](#) [Homework Help](#)

$7 + 10 = 17 < 20$

No, because the two small sides added together should be greater than the 3rd side

- 4-86. According to the graph below, how much money would it cost to speak to an attorney for 2 hours and 25 minutes? [Homework Help](#)

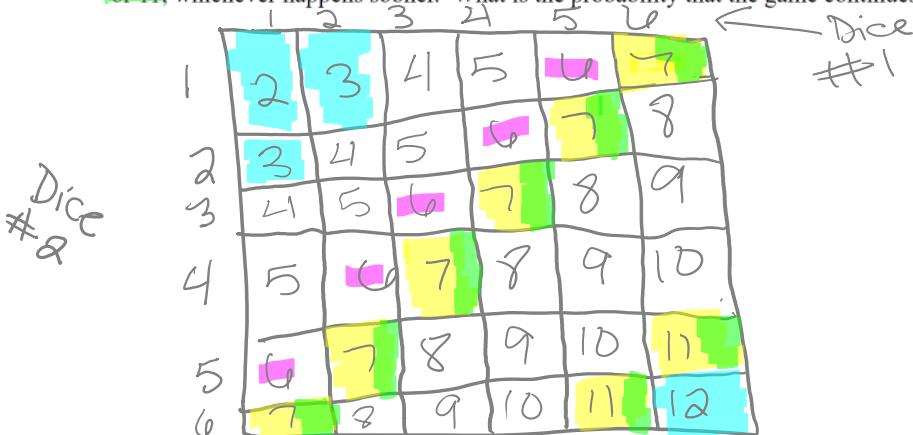


It would cost
\$450 for the attorney
to speak for 2 hours
and 25 minutes.

- 4-95. Use an area model, a tree diagram, or refer to the table you created in problem 4-10 that represents the sample space for the sum of the numbers when rolling two standard six-sided dice. [4-95 HW eTool \(CPM\)](#). [Homework Help](#)



- a. In a standard casino dice game the roller wins on the first roll if he rolls a sum of 7 or 11. What is the probability of winning on the first roll?
- b. The player loses on the first roll if he rolls a sum of 2, 3, or 12. What is the probability of losing on the first roll?
- c. If the player rolls any other sum, he continues to roll the dice until the first sum he rolled comes up again or until he rolls a sum of 7 or 11, whichever happens sooner. What is the probability that the game continues after the first roll?



a. $\frac{8}{36} = \boxed{\frac{2}{9}}$

b. $\frac{4}{36} = \boxed{\frac{1}{9}}$

c. $\frac{2}{9} + \frac{1}{9} = \frac{3}{9}$

$\frac{9}{9} - \frac{3}{9} = \frac{6}{9} \boxed{\frac{2}{3}}$

- 4-96. A player in the casino dice game described in problem 4-10 rolled a sum of 6 on his first roll. He will win if he rolls a sum of six on the second roll but lose if he rolls a sum of seven. If anything else happens they ignore the result and he gets to roll again. [4-96 HW eTool \(CPM\)](#). [Homework Help](#)

a. How many ways are there to get a sum of six? 5

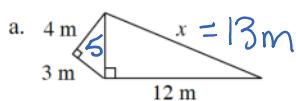
b. How many ways are there to get a sum of seven? 6

c. How many possible outcomes are important in this problem? 5 + 6 = 11

d. What is the probability of getting a sum of six before a sum of seven? $\frac{\#6}{\text{Important}} = \frac{6}{11}$

$\frac{6}{11}$

- 4-97. For each diagram below, solve for x. Name the relationship(s) you used. Show all work. [Homework Help](#)



a. $4^2 + 3^2 = c^2$

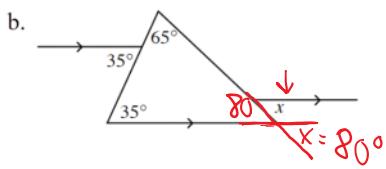
$5^2 + 12^2 = c^2$

$16 + 9 = c^2$

$25 + 144 = c^2$

$\sqrt{169} = c^2$

$c = 13$

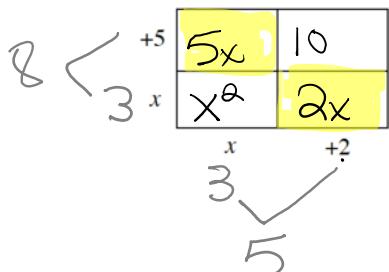


$5 = c$

$x = 13$

$$b. x = 80^\circ$$

- 4-98. The area of the rectangle shown below is **40 square units**. Write and solve an equation to find x . Then find the dimensions of the rectangle. [Homework Help](#)



$$x^2 + 7x + 10 = 40$$

$$x^2 + 7x - 30 = 0$$

$$x = \frac{-7 \pm \sqrt{7^2 - 4(1)(-30)}}{2(1)}$$

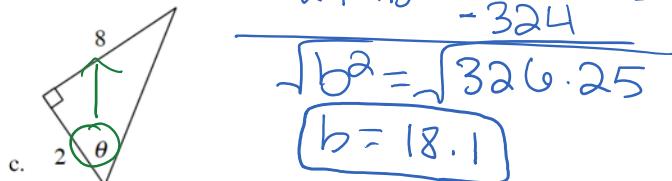
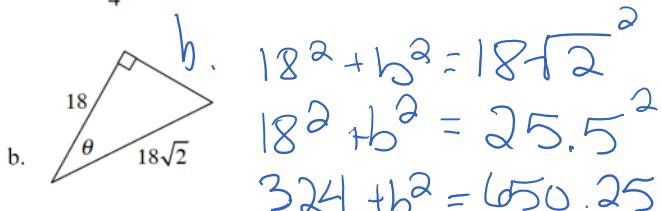
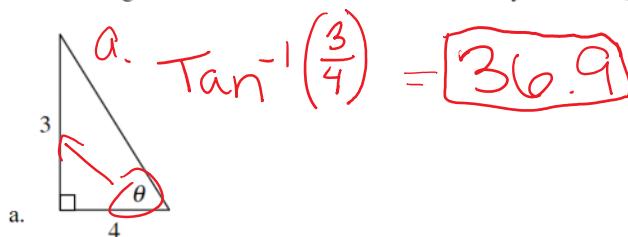
$$x = \frac{-7 \pm \sqrt{49 - 4(-30)}}{2}$$

$$x = \frac{-7 \pm \sqrt{169}}{2}$$

$$x = \frac{-7 \pm 13}{2}$$

$$\boxed{x = 3}$$

- 4-99. Based on the measurements provided for each triangle below, decide if the angle θ must be more than, less than, or equal to 45° . Assume the diagram is not drawn to scale. Show how you know. [Homework Help](#)



- 4-100. Find the slope of the line through the points $(-5, 86)$ and $(95, 16)$. Then find at least one more point on the line. [Homework Help](#)

$$\frac{16 - 86}{-5 - 95} = \frac{-70}{-100} = \frac{7}{10}$$

4-100. Find the slope of the line through the points $(-5, 86)$ and $(95, 16)$. Then find at least one more point on the line. [Homework Help](#)

1

$$\frac{16 - 86}{95 + 5} = \frac{-70}{100} = -\frac{7}{10}$$

$$86 = -\frac{7}{10}(-5) + b$$

$$86 = \frac{7}{2} + b$$

$$b = 82.5$$

$$y = -\frac{7}{10}x + 82.5$$

$$y = -\frac{7}{10}(0) + 82.5$$

$$y = 82.5$$

$$(0, 82.5)$$

4-110. When he was in first grade, Harvey played games with spinners. One game he especially liked had two spinners and several markers that you moved around a board. You were only allowed to move if your color came up on *both* spinners. [Homework](#) [Help](#)



$\frac{1}{3}$



- a. Harvey always chose purple because that was his favorite color. What was the probability that Harvey could move his marker?
- b. Is the event that Harvey wins a union or an intersection of events?
- c. Was purple the best color choice? Explain.
- d. If both spinners are spun, what is the probability that no one gets to move because the two colors are not the same?
- e. There are at least two ways to figure out part (d). Discuss your solution method with your team and show a second way to solve part (d).