

Name: _____

School Team: _____

Event 1: Computations Without Calculator- 20 points total

Circle your final
answer!

Part I (2 points each)

Give all answers in simplest form.

1. $\frac{4^2 - 16x}{-5y}$ If $x = 3$, $y = 2$

2. $-6y + 2 = 3y + 11$

3. $\frac{6}{7} \div x = \frac{1}{2}$

4. $-0.12w = 2.4$

5. $(\frac{5}{6} + 2)(2 + \frac{1}{6})$

Name: _____

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Circle your final
answer!

Event 1: Computations Without Calculator

Part II (2 points each)

Give all answers in simplest form.

1. Find the number which is 9 less than the GCF (8, 10, 14)
2. Find the number which is 5 more than twice the LCM (8, 10)
3. Find 12% of 42
4. 19 is 20% of what?
5. $4^3 - 3^3 + 2^3 - 1^3 + 0^3$

Name: _____

School Team: _____

Circle your final
answer!

Event 2: Computations With Calculator- 25 points total

Consumer Math (5 points each)

1. In a store, a pair of pants which normally costs \$42 is on sale for 15% off. Find the sale price.
2. Abby made 15 baskets in 4 hours. Assuming that she always works at the same rate, how long will it take her to make 28 baskets? Round to the nearest quarter hour.
3. Brand A cereal sells for \$3.49 per box. If the price of the cereal increases to \$3.59 per box, find the percent increase of the price change. Round your answer to the nearest tenth of a percent.
4. 4 customers have the exact same items. Customer A is given a 10% discount, then a 15% discount. Customer B is given a 15% discount, then a 10% discount. Customer C is given a 25% discount. Customer D is given a 25% increase in price, then a 50% discount. Which customer spends the *least* amount of money?
5. Angela earned \$712 this month. This is 85% of what she earned last month. Find the amount of money Angela earned last month. Round your answer to the nearest whole dollar amount.

Name: _____ School Team: _____

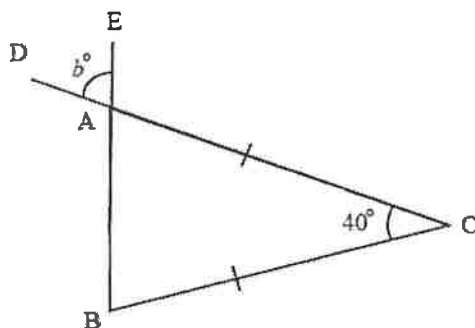
Event 3: Mathematical Reasoning With Calculator- 35 points total

Circle your final answer!

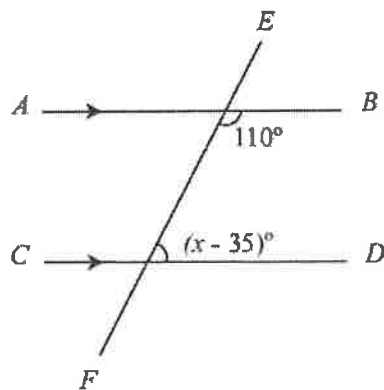
Geometry (7 points each)

Remember to use labels when appropriate

1. Find the value of b .



2. Find the value of x .



Name: _____

School Team: _____

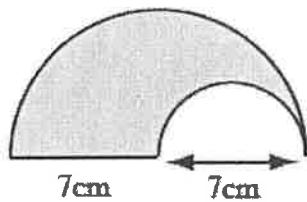
Event 3: Mathematical Reasoning With Calculator- 35 points total

Circle your final
answer!

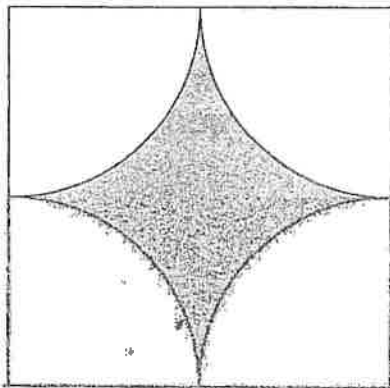
Geometry Part II (7 points each)

Remember to use labels when appropriate

3. Find the area and perimeter of the shaded region. Both arcs are half of a circle. Use 3.14 for pi.



4. A rectangular tank 60cm long and 50cm wide is $\frac{4}{5}$ full of water. When 2400cm^3 of water is added to the tank, it fills to the brim. Find the height of the tank.
5. The square seen below has a perimeter of 112cm and has 4 equal circle quadrants inscribed within. Find the area of the shaded region. Use 3.14 for pi.



Name: _____ School Team: _____

Event 4: Mental Math (no calculator)- 20 points total
(2 points each)

Example: _____

1) _____

2) _____

3) _____

4) _____

5) _____

6) _____

7) _____

8) _____

9) _____

10) _____

Name: _____

School Team: _____

Circle your final
answer!

Event 5: Team Problems (with calculator)- 100 points total

Part 1: Logical Reasoning (12 points each)

1. An alien planet has developed a new type of currency. 7 red chips can be traded for 1 orange chip. 7 orange chips can be traded for 1 yellow chip. 7 yellow chips can be traded for 1 green chip, and 7 green chips can be traded for 1 blue chip.
 - a) Pax has 1 blue chip, 3 green chips, 2 yellow chips, 4 orange chips, and 5 red chips. He earns 2 blue chips, 5 green chips, 4 yellow chips, 5 orange chips, and 3 red chips. The bank takes all his chips and trades them so that he has the smallest number of physical chips possible. What chips does he now have?
 - b) Sham has 3 green chips, 2 yellow chips, 1 orange chip, and 5 red chips. She purchases a new spaceship for 2 green chips, 5 yellow chips, 2 orange chips, and 6 red chips. If the salesman gives her the smallest number of chips possible for change, state the chips that she has now.
 - c) Ket wants to go on vacation. The vacation package she wants will cost 4 blue chips. If Ket currently has 2 blue chips, 3 green chips, 4 yellow chips, 5 orange chips, and 6 red chips find what she needs to earn in order to afford the vacation package.

Name: _____

School Team: _____

Circle your final
answer!

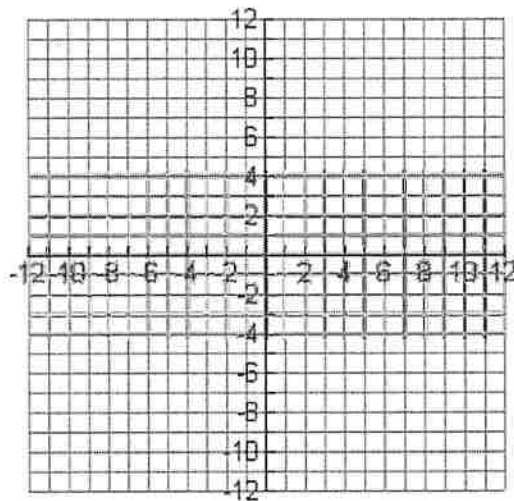
Event 5: Team Problems (with calculator)- 100 points total

Part 2: Geometry (6 points each)

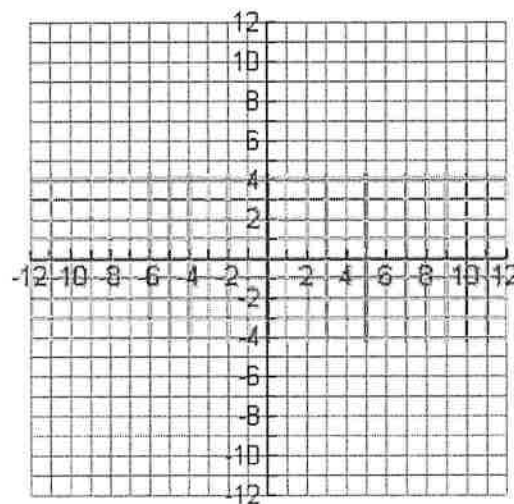
Remember to use clear labels as needed!

2. Each of the following groups of coordinates make some quadrilateral when mapped on the coordinate plane. Find the most specific name for each quadrilateral: kite, parallelogram, rectangle, rhombus, square, or trapezoid.

- a) A(0, 0), B(3, 4), C(-1, 7) and D(-4, 3)



- b) M(1, 0), A(6, 5), T(7, 12), and H(2, 7)



Name: _____

School Team: _____

Circle your final
answer!

Event 5: Team Problems (with calculator)- 100 points total

Part 3: Geometry (6 points each)

3. You have decided to help a neighbor purchase a pool. The neighbor is trying to decide between purchasing a rectangular pool or a circular pool.
- a) The rectangular pool would measure 10 feet by 16 feet and will be five feet deep. The circular pool would have a radius of 7 feet and would also be 5 feet deep. Which pool would hold more water? Use 3.14 for pi.
- b) The tiling for the bottom of each pool will cost \$9.86 per square foot. Find the cost to tile the bottom of each pool. Round your answer to the nearest whole dollar and use 3.14 for pi.

Cost of rectangular pool: _____

Cost of circular pool: _____

- c) Cleaners Unlimited, a pool cleaning service, charges \$85 per month to clean a pool. Additionally, the service charges 5 cents per cubic foot of water each time it cleans the pool. Find the cost of cleaning each pool type for 1 year (assuming the pool is cleaned each month and not closed up for the Winter). Use 3.14 for pi and round your answer to the nearest whole dollar.

Cost of rectangular pool: _____

Cost of circular pool: _____

- d) Your neighbor wishes to add a 2-foot walkway around each pool. The walkway should be made of sand, spread 2in thick. If sand costs \$1.50 per square foot at a 1in thickness, find the cost of a walkway for each pool. Use 3.14 for pi and round your answer to the nearest whole dollar.

Cost of rectangular pool: _____

Cost of circular pool: _____

Name: _____

School Team: _____

Circle your final
answer!

Event 5: Team Problems (with calculator)- 100 points total

Part 4: Problem Solving (7 points each)

4. Find the solution for each of the given situations.

- a) If Aria would give away $\frac{1}{5}$ of her money and TK would give away \$10, then Aria would have $\frac{1}{2}$ as much money as TK. How much more money does TK have than Aria if they have \$140 altogether (without giving any money away)?
- b) Miriam gave $\frac{3}{8}$ of her money to Alex and Hannah gave Alex \$20. Alex now has \$74. How much did Miriam have to begin with?
- c) $\frac{4}{5}$ of Roseanne's savings is equal to $\frac{2}{3}$ of Libby's savings. If their total savings is \$132, how much is Libby's savings?
- d) Aziz has twice as much money as Osman does at first. After Osman spends \$31, Aziz has three times as much money as Osman. How much money does Osman have at first?

Name: _____

School Team: _____

Event 1: Computations Without Calculator- 20 points total

Circle your final answer!

Part I (2 points each)

Give all answers in simplest form.

1. $\frac{4^2 - 16x}{-5y}$

If $x = 3, y = 2$

$$\frac{16 - 16(3)}{-5(2)} = \frac{16 - 48}{-10} = \frac{-32}{-10} = \frac{16}{5} \text{ or } 3\frac{1}{5}$$

2. $-6y + 2 = 3y + 11$

$$\begin{array}{r} -6y + 2 = 3y + 11 \\ +6y - 11 \quad +6y - 11 \\ \hline \end{array}$$

$$\frac{-9}{9} = \frac{9y}{9}$$

$$y = -1$$

3. $\frac{6}{7} \div x = \frac{1}{2}$

$$\frac{6}{7} \cdot \frac{1}{x} = \frac{1}{2}$$

$$\rightarrow \frac{6}{7x} = \frac{1}{2}$$

$$\rightarrow 12 = 7x$$

$$\text{So } x = \frac{12}{7} \text{ or } 1\frac{5}{7}$$

4. $-0.12w = 2.4$

$$\begin{array}{r} 20 \\ 12 \overline{) 2.40} \\ \underline{24} \\ 0 \end{array}$$

neg, neg = pos

$$w = -20$$

5. $(\frac{5}{6} + 2)(2 + \frac{1}{6}) = 2(\frac{5}{6}) + (\frac{5}{6} \cdot \frac{1}{6}) + 2 \cdot 2 + 2(\frac{1}{6})$

$$= \frac{10}{6} + \frac{5}{36} + 4 + \frac{2}{6} = \frac{60}{36} + \frac{5}{36} + \frac{12}{36} + 4$$

$$= 1 + \frac{24}{36} + \frac{17}{36} + 4 = 5 + 1 + \frac{5}{36}$$

$$= 6\frac{5}{36}$$

(Also accept $\frac{221}{36}$)

Name: _____

School Team: _____

Circle your final
answer!**Event 1: Computations Without Calculator**

Part II (2 points each)

Give all answers in simplest form.

1. Find the number which is 9 less than the GCF (8, 10, 14)

$$\text{GCF}(8, 10, 14) = 2 \quad 2 - 9 = \boxed{-7}$$

2. Find the number which is 5 more than twice the LCM (8, 10)

$$\text{LCM}(8, 10) = 40 \quad 2(40) + 5 = \boxed{85}$$

3. Find 12% of 42

$$\begin{aligned} 10\% \text{ of } 42 &= 4.2 \\ 1\% \text{ of } 42 &= 0.42 \end{aligned}$$

$$0.42 + 0.42 + 4.2 = \boxed{5.04}$$

4. 19 is 20% of what?

$$19 \times 5 = 50 + 45 = \boxed{95}$$

- 5.
- $4^3 - 3^3 + 2^3 - 1^3 + 0^3 =$

$$64 - 27 + 8 - 1 = \boxed{44}$$

Name: _____

School Team: _____

Circle your final
answer!**Event 2: Computations With Calculator- 25 points total****Consumer Math (5 points each)**

1. In a store, a pair of pants which normally costs \$42 is on sale for 15% off. Find the sale price.

$$0.15 \times 42 = 6.3$$

$$42 - 6.3 = 35.7$$

\$ 35.70

2. Abby made 15 baskets in 4 hours. Assuming that she always works at the same rate, how long will it take her to make 28 baskets? Round to the nearest quarter hour.

$$15 \rightarrow 4 \text{ hrs so } 15 \rightarrow 240 \text{ min}$$

$$1 \rightarrow 16 \text{ min}$$

$$16 \times 28 = 448 \text{ min}$$

$$448 \div 60 = 7.46$$

7 1/2 hoursClosest to
7.5

3. Brand A cereal sells for \$3.49 per box. If the price of the cereal increases to \$3.59 per box, find the percent increase of the price change. Round your answer to the nearest tenth of a percent.

$$\text{went up } 10¢, \text{ so } \frac{10}{349} = .0286...$$

2.9%

4. 4 customers have the exact same items. Customer A is given a 10% discount, then a 15% discount. Customer B is given a 15% discount, then a 10% discount. Customer C is given a 25% discount. Customer D is given a 25% increase in price, then a 50% discount. Which customer spends the *least* amount of money?

$$\text{Customer A: } .85(.9) \text{ of cost} = .765 \text{ of cost}$$

$$\text{B: } .9(.85) \text{ of cost} = .765 \text{ of cost}$$

$$\text{C: } .75 \text{ of cost} = .75 \text{ of cost}$$

$$\text{D: } .5(1.25) \text{ of cost} = .625 \text{ of cost}$$

Customer D

5. Angela earned \$712 this month. This is 85% of what she earned last month. Find the amount of money Angela earned last month. Round your answer to the nearest whole dollar amount.

$$\div 17 \rightarrow \$712 \rightarrow 85\% \rightarrow \div 17$$

$$\rightarrow \$41.88235 \rightarrow 5\% \rightarrow \times 20$$

$$\times 20 \rightarrow \$837.65 \rightarrow 100\%$$

\$ 838

Name: _____ School Team: _____

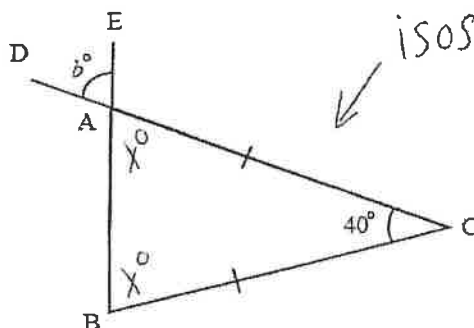
Event 3: Mathematical Reasoning With Calculator- 35 points total

Circle your final answer!

Geometry (7 points each)

Remember to use labels when appropriate

1. Find the value of b .

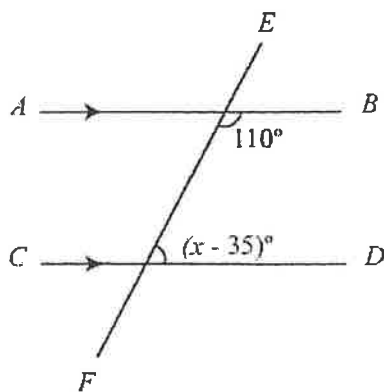


isosceles \triangle : base \angle s same
 180° in a \triangle
 $2x = 180 - 40$
 $2x = 140$
 $x = 70$

$b = x$
 (vertical \angle s)

$b = 70^\circ$

2. Find the value of x .



$\leftrightarrow \leftrightarrow$
 $AB \parallel CD$, so $110^\circ + x^\circ - 35^\circ = 180^\circ$

$$x - 35 = 70$$

$$x = 105$$

$x = 105^\circ$

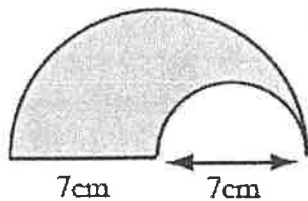
Name: _____ School Team: _____

Event 3: Mathematical Reasoning With Calculator- 35 points totalCircle your final
answer!

Geometry Part II (7 points each)

Remember to use labels when appropriate

3. Find the area and perimeter of the shaded region. Both arcs are half of a circle. Use 3.14 for pi.



$$\frac{1}{2} \text{ large } \bigcirc - \frac{1}{2} \text{ small circle}$$

$$\text{Area: } \frac{1}{2} (3.14) (7\text{cm})^2 - \frac{1}{2} (3.14) (3.5\text{cm})^2$$

$$76.93\text{cm}^2 - 19.2325\text{cm}^2$$

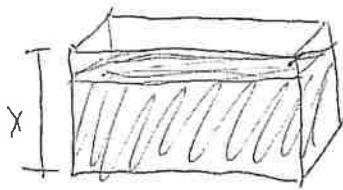
$$57.6975\text{cm}^2$$

$$\left[\frac{1}{2} (3.14) (14) + \frac{1}{2} (3.14) (7) + 7 \right] \text{cm}$$

$$[21.98 + 10.99 + 7] \text{cm}$$

$$39.97\text{cm}$$

4. A rectangular tank 60cm long and 50cm wide is $\frac{4}{5}$ full of water. When 2400cm^3 of water is added to the tank, it fills to the brim. Find the height of the tank.



$$\frac{1}{5} (60\text{cm}) (50\text{cm}) (x\text{cm}) = 2400\text{cm}^3$$

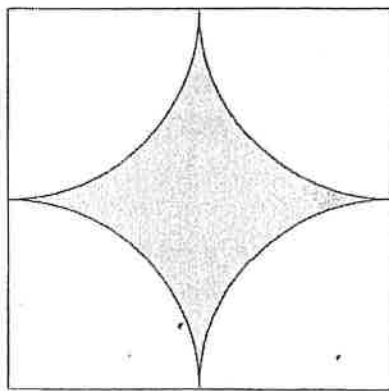
$$(60)(50)(x)\text{cm}^3 = 12000\text{cm}^3$$

$$50x = 200$$

$$x = 4$$

$$4\text{cm}$$

5. The square seen below has a perimeter of 112cm and has 4 equal circle quadrants inscribed within. Find the area of the shaded region. Use 3.14 for pi.



$$\text{Area } \square - \text{Area } \bigcirc$$

$$\frac{112\text{cm}}{4} = 28\text{cm}$$

Side length of \square

$$\frac{28\text{cm}}{2} = 14\text{cm}$$

radius of \bigcirc

$$(28\text{cm})^2 - (3.14)(14\text{cm})^2 =$$

$$784\text{cm}^2 - 615.44\text{cm}^2 =$$

$$168.56\text{cm}^2$$

Name: _____ School Team: _____

Event 4: Mental Math (no calculator)- 20 points total
(2 points each)

Example: 23 (no points)

1) 30

2) 209

3) -11

4) 228

5) -53

6) 170%

7) 4.26

8) 4.5 or $4\frac{1}{2}$ or $\frac{9}{2}$

9) -80

10) 30

Name: _____

School Team: _____

Circle your final
answer!**Event 5: Team Problems (with calculator)- 100 points total****Part 1: Logical Reasoning (12 points each)**

1. An alien planet has developed a new type of currency. 7 red chips can be traded for 1 orange chip. 7 orange chips can be traded for 1 yellow chip. 7 yellow chips can be traded for 1 green chip, and 7 green chips can be traded for 1 blue chip.

- a) Pax has 1 blue chip, 3 green chips, 2 yellow chips, 4 orange chips, and 5 red chips. He earns 2 blue chips, 5 green chips, 4 yellow chips, 5 orange chips, and 3 red chips. The bank takes all his chips and trades them so that he has the smallest number of physical chips possible. What chips does he now have?

$$\begin{array}{r}
 1 \text{ blue } 3 \text{ green } 2 \text{ yellow } 4 \text{ orange } 5 \text{ red} \\
 + 2 \text{ blue } 5 \text{ green } 4 \text{ yellow } 5 \text{ orange } 3 \text{ red} \\
 \hline
 \cancel{8} \text{ blue } \cancel{8} \text{ green } \cancel{6} \text{ yellow } \cancel{9} \text{ orange } \cancel{8} \text{ red} \\
 \begin{array}{l}
 \leftarrow 4 \text{ blue} \quad \leftarrow 2 \text{ green} \quad \leftarrow 3 \text{ orange} \quad \leftarrow 1 \text{ red}
 \end{array}
 \end{array}$$

4 blue
2 green
3 orange
1 red

- b) Sham has 3 green chips, 2 yellow chips, 1 orange chip, and 5 red chips. She purchases a new spaceship for 2 green chips, 5 yellow chips, 2 orange chips, and 6 red chips. If the salesman gives her the smallest number of chips possible for change, state the chips that she has now.

$$\begin{array}{r}
 \begin{array}{l}
 \overset{2}{\cancel{3}} \text{ green } \overset{5}{\cancel{2}} \text{ yellow } \overset{12}{\cancel{1}} \text{ orange } \overset{12}{\cancel{5}} \text{ red} \\
 - 2 \text{ green } 5 \text{ yellow } 2 \text{ orange } 6 \text{ red} \\
 \hline
 3 \text{ yellow } 5 \text{ orange } 6 \text{ red}
 \end{array}
 \end{array}$$

3 yellow
5 orange
6 red

- c) Ket wants to go on vacation. The vacation package she wants will cost 4 blue chips. If Ket currently has 2 blue chips, 3 green chips, 4 yellow chips, 5 orange chips, and 6 red chips find what she needs to earn in order to afford the vacation package.

$$\begin{array}{r}
 \begin{array}{l}
 \overset{3}{\cancel{2}} \text{ blue } \overset{4}{\cancel{3}} \text{ green } \overset{5}{\cancel{4}} \text{ yellow } \overset{6}{\cancel{5}} \text{ orange } 6 \text{ red} \\
 + 1 \text{ blue } + 3 \text{ green } + 2 \text{ yellow } + 1 \text{ orange } + 1 \text{ red}
 \end{array}
 \end{array}$$

1 blue
3 green
2 yellow
1 orange
1 red

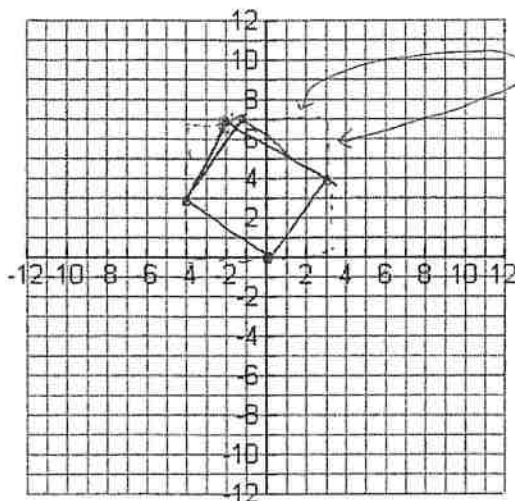
Name: _____

School Team: _____

Circle your final
answer!**Event 5: Team Problems (with calculator)- 100 points total****Part 2: Geometry (6 points each)****Remember to use clear labels as needed!**

2. Each of the following groups of coordinates make some quadrilateral when mapped on the coordinate plane. Find the most specific name for each quadrilateral: kite, parallelogram, rectangle, rhombus, square, or trapezoid.

- a) A(0, 0), B(3, 4), C(-1, 7) and D(-4, 3)



All sides same length

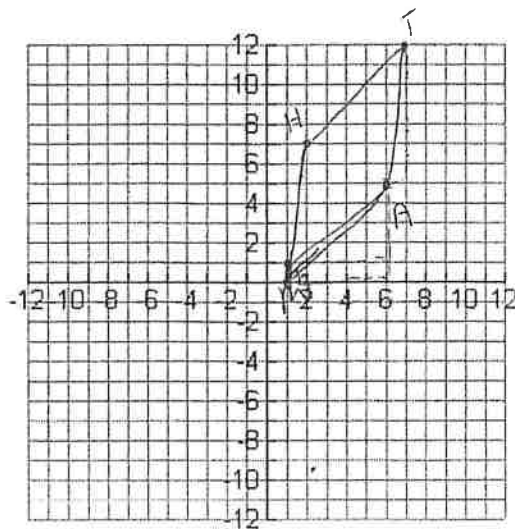
$$\frac{-4-1}{3-7} = \frac{-3}{-4} = \frac{3}{4}$$

$$\frac{-1-3}{7-4} = \frac{-4}{3}$$

Slopes opposite
and reciprocal
so right \angle

Square

- b) M(1, 0), A(6, 5), T(7, 12), and H(2, 7)



$$1^2 + 7^2 = 50$$

$$\sqrt{50} \text{ length}$$

$$5^2 + 5^2 = 50$$

$$\sqrt{50} \text{ length}$$

all sides same
length

$$\frac{12-7}{7-2} = \frac{5}{5} = 1$$

slopes not
opposite, reciprocal

$$\frac{12-5}{7-6} = \frac{7}{1} = 7$$

slopes same \rightarrow parallel

$$\frac{7-0}{2-1} = \frac{7}{1} = 7$$

Rhombus

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Circle your final
answer!**Event 5: Team Problems (with calculator)- 100 points total****Part 3: Geometry (6 points each)**

3. You have decided to help a neighbor purchase a pool. The neighbor is trying to decide between purchasing a rectangular pool or a circular pool.

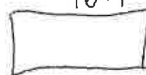
- a) The rectangular pool would measure 10 feet by 16 feet and will be five feet deep. The circular pool would have a radius of 7 feet and would also be 5 feet deep. Which pool would hold more water? Use 3.14 for pi.

rect
 $5 \times 10 \times 16 = 800$

circle
 $5 \times 3.14 \times 7^2 = 769.3$

The rectangular pool

- b) The tiling for the bottom of each pool will cost \$9.86 per square foot. Find the cost to tile the bottom of each pool. Round your answer to the nearest whole dollar and use 3.14 for pi.

16ft
 10ft
 $160 \times 9.86 = 1577.60$



$7^2 \times 3.14 \times 9.86 = 1517.0596$

Cost of rectangular pool: \$1578Cost of circular pool: \$1517

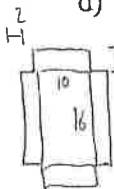
- c) Cleaners Unlimited, a pool cleaning service, charges \$85 per month to clean a pool. Additionally, the service charges 5 cents per cubic foot of water each time it cleans the pool. Find the cost of cleaning each pool type for 1 year (assuming the pool is cleaned each month and not closed up for the Winter). Use 3.14 for pi and round your answer to the nearest whole dollar.

$[\$85 + \$0.05(800)] \times 12$

$[\$85 + \$0.05(769.3)] \times 12$

Cost of rectangular pool: \$1500Cost of circular pool: \$1482

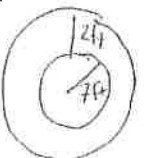
- d) Your neighbor wishes to add a 2-foot walkway around each pool. The walkway should be made of sand, spread 2in thick. If sand costs \$1.50 per square foot at a 1in thickness, find the cost of a walkway for each pool. Use 3.14 for pi and round your answer to the nearest whole dollar.



$[2 \times 10 + 2 \times 10 + 2 \times 16 + 2 \times 16 + 4(2 \times 2)] \times \3

Cost of rectangular pool: \$360

$[3.14 \times 9^2 - 3.14 \times 7^2] \times 3$

Cost of circular pool: \$301

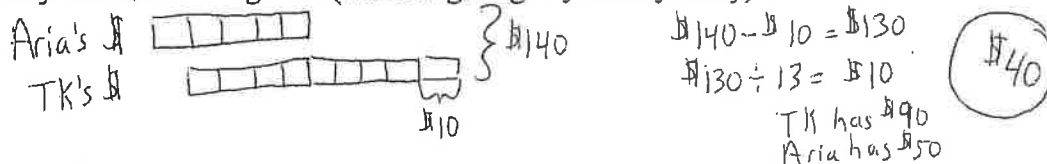
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School Team: _____

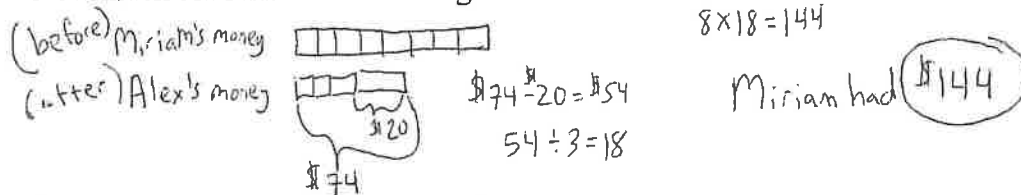
Circle your final
answer!**Event 5: Team Problems (with calculator)- 100 points total****Part 4: Problem Solving (7 points each)**

4. Find the solution for each of the given situations.

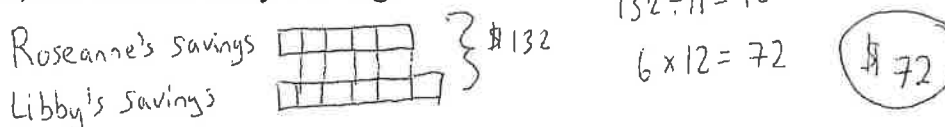
- a) If Aria would give away $\frac{1}{5}$ of her money and TK would give away \$10, then Aria would have $\frac{1}{2}$ as much money as TK. How much more money does TK have than Aria if they have \$140 altogether (without giving any money away)?



- b) Miriam gave $\frac{3}{8}$ of her money to Alex and Hannah gave Alex \$20. Alex now has \$74. How much did Miriam have to begin with?



- c) $\frac{4}{5}$ of Roseanne's savings is equal to $\frac{2}{3}$ of Libby's savings. If their total savings is \$132, how much is Libby's savings?



- d) Aziz has twice as much money as Osman does at first. After Osman spends \$31, Aziz has three times as much money as Osman. How much money does Osman have at first?

Osman has x dollars

$$2x = 3(x - 31)$$

$$2x = 3x - 93$$

$$-x = -93$$

$$x = 93$$

Osman has **\$93**

Name: _____ School Team: _____

Circle your final
answer!**TIE BREAKER (with calculator)**

- 1) Find the largest possible 5-digit number which is divisible by 3 and 5 but not by 9.

99,975

9 9 9 7 5
 Use largest digits possible

Must add to something divisible by 3 but not 9.
 Want the largest possible.

Possible last 2

95
 90 → div by 3
 85
 80
 75 → div by 3
 70

- 2) Find the smallest possible 3-digit number which is divisible by 8 and 6 but not by 10.

Start w/ 104 6 8 10
 no yes no
 112 no yes no
 120 yes yes yes
 128 no yes no
 136 no yes no

1 4 4

6 8 10
 144 yes yes no

144

- 3) Find the smallest possible 4-digit number which is divisible by 3, 4, and 5 but not by 8.

1020

Try

Want sum of digits div by 3

1110 → not div by 4

1200 → is div by 8

1020 → is smallest div by 4, 5

1002 → not div by 4

1011 → not div by 4