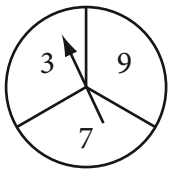
ICTM 3rd Grade Mathematics Contest
(2012–2013)—Individual (#1)

1. Kate counted breaths after bicycling. She counted 34 the first minute, 23 the second minute, and 19 the third minute. How many breaths did she take during the three minutes?

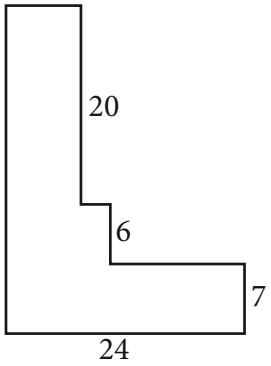
2. Colin spun the spinner two times. How many different sums are possible?



3. Three hundred tickets were printed for the school play. The boys sold 117 and the girls sold 142. How many tickets were not sold?

4. Makayla has 2100 baseball cards. She separates the cards into piles have 35 cards each. How many piles of cards does Makayla have?

5. Determine the perimeter of the figure shown.



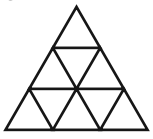
6. Alejandro's birthday is 38 days after his sister's birthday. If his sister's birthday is on a Wednesday, what day of the week will Alejandro's birthday be?

7. What is the next number in the pattern:
   2, 3, 6, 11, 18, __?

8. How many small triangles will be in the next drawing?

1 small triangle

4 small triangles

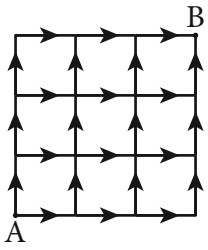


9 small triangles

ICTM 3rd Grade Mathematics Contest
(2012–2013)—Team (#1)

1. Mia rides her bike to school. Including hers, there are 18 bicycles and 37 cars in the school parking lot. How many wheels are there in the parking lot?

2. Fill in the missing number: $83 - 39 = \square - 13$



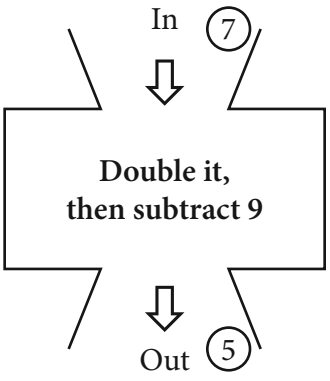
3. How many ways can Gabrielle get from A to B if she must always travel in the direction of the arrows?

4. It costs $13.50 for a train ticket to Fort Wayne. How much total money is needed for Jada and her 8 friends to ride the train to Fort Wayne?

5. Ian made a pay phone call. He used 3 quarters, 2 dimes, and 4 nickels. How much did the call cost, in cents?

6. Determine the value of $3 \times \oplus + 5 \times \nabla$ if $\oplus$ is 9 and ∇ is 7.

7. Erin has 15 red pencils each 6 inches long. Evan has 18 blue pencils that are 5 inches long. What is the perimeter of a triangle that can be formed using all of the pencils?



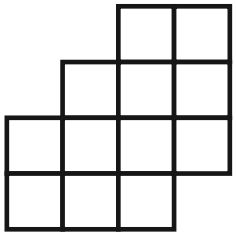
8. If 12 goes "in" to the machine, what number will come "out" of the machine?

9. Determine the sum of the first eight prime numbers.

10. Hot pink paint can be made by mixing 2 gallons of magenta paint with 1 gallon of yellow paint. If Chase made 18 gallons of hot pink paint from magenta and yellow paint, how many gallons of magenta paint did he use?

11. Adrian decided to organize his baseball cards between 8 and 11 o'clock. First, he spent 45 minutes doing his homework and then 30 minutes cleaning his room. He then organized his cards. How many minutes did he have to do this?

12. How many squares are in the figure shown?



13. Alyssa and 3 of her friends ordered pizza. The total cost was $23.80. Each person pays the same amount. What is each person's share of the cost?

14. What digit is in the hundreds place for the number 6745?

15. If yesterday was Monday, then what day will it be sixteen days from tomorrow?

16. Noah has 47 friends from school and soccer. 35 of his friends go to the same school Noah goes to. 18 of his friends play soccer in the same league that Noah plays in. How many of Noah's friends both go to the same school and play in the same soccer league?

17. How many multiples of 14 are between 1 and 90 on a number line?

quarter
25¢

18. Lucas buys a bag of chips for 85¢. He pays with a quarter, three dimes, and some nickels. How many nickels does he need to pay?

dime
10¢

19. A train has 8 cars. The average number of people in each car of the train is 18. How many people are on the train?

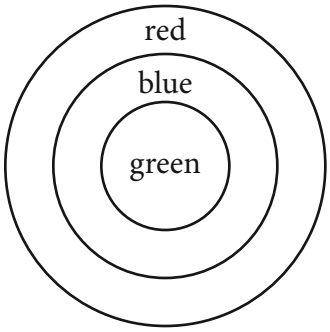
nickel
5¢

20. What is the smallest 3-digit number greater than 300 that can be formed using 3 different digits from those below?

5, 7, 2, 0, 1

ICTM 3rd Grade Mathematics Contest
(2012–2013)—Individual (#2)

1. Lunch at a particular restaurant costs $8.20 per person. How much will it cost for Olivia and 9 of her friends to have lunch at the restaurant?

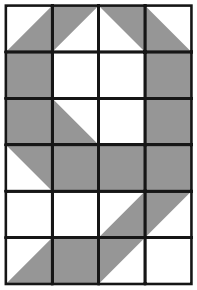


2. red = 4 points
   blue = 9 points
   green = 13 points

   Oscar threw 10 darts. Two landed in green, four landed in blue, and the rest landed in red. How many points did Oscar earn?

3. The average number of people in each car in a parade was 4. How many people were in the cars if there were 22 cars in the parade?

4. Ethan's soccer practice began at 2:05 p.m. and he practiced for 140 minutes. At what time did Ethan's soccer practice end?



5. Each small square is 4 square units. What is the total area of the shaded region?

6. How many zeros are there in seven hundred million eight thousand twenty?

7. The digits of 253 are reversed to become 352. What number will 461 − 198 become if it is reversed?

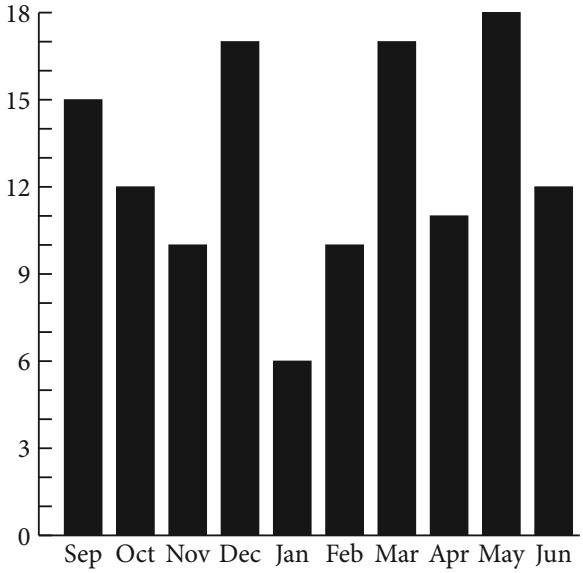
8. Mackenzie played the word "hypnotize" in a board game. Each letter is worth the number of points shown on its tile. How many points did Mackenzie score?

ICTM 3rd Grade Mathematics Contest
(2012–2013)—Team (#2)

1. A particular cereal has about 9 servings per box. About how many servings are in 25 boxes?

2. How many circles 3 inches across could best fit inside a rectangle 21 inches by 24 inches in shape if the circles cannot overlap?

3. Last school year, Dylan read 128 books. The graph shows the number of books Dylan read each month. In how many months did Dylan read more than 10 books?

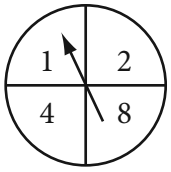


4. Jenna has $8.00 in coins. Twelve of the coins are quarters. The rest are nickels. How many coins are there?

5. $32 = 8 + (6 \times n)$. What is the value of n?

6. The Stickney Water Reclamation Plant is the largest wastewater treatment facility in the world. In 2010, it processed 1,024,000 ounces of water per second. There are 16 ounces in a pint and 8 pints in a gallon. How many gallons of water did the plant process per second?

7. Audrey spins the spinner two times. How many different products are possible?



8. The band practice started at 3:00 p.m. and lasted two and a half hours. Clara Net gave a 35 minute talk after the end of the practice. What time did Clara's talk end?

9. What is the average of the products below?

60	50	40	30	20
$\times$ 4	$\times$ 5	$\times$ 6	$\times$ 7	$\times$ 8

10. Nicholas has $8.75 in coins. Twenty-one of the coins are quarters and forty of the coins are nickels. The rest are dimes. How many dimes are there?

11. Jose has 760 racing cards. He separates the cards into piles having 40 cards each. How many piles of cards does Jose have?

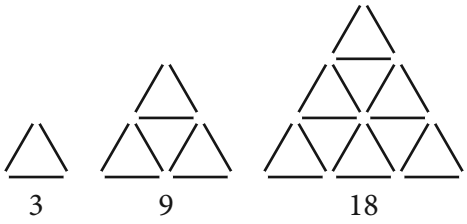
12. How many multiples of seven are between 12 and 65 on a number line?

13. How many seconds are there in $5\frac{1}{3}$ minutes?

14. Aiden is thinking of a two-digit number. His number is a multiple of 9 and his number is less than 60. The tens digit of his number is greater than the ones digit. What is his number?

15. The 3rd grade at Stone City is collecting aluminum for recycling. They receive 60¢ per pound. How many dollars did they earn if they collected 450 pounds of aluminum?

16. How many toothpicks will be in the next picture?



17. How many days are there in 14 weeks?

18. Vanessa has 36 model cars. $\frac{1}{4}$ of the model cars are black. $\frac{2}{3}$ of the model cars are red. The rest are blue. How many blue model cars does she have?

19. Find the sum of the missing numbers in the pattern:
    4, 8, __, __, __, __, 28, 32

20. How many points did this team make?

Player	Number of 3-point baskets	Number of 2-point baskets	Free Throws Made	Points
A	2	5	4	
B	3	3	1	
C	0	4	0	
D	2	4	6	
E	3	5	3	

ICTM 3rd Grade Mathematics Contest
(2012–2013)—Individual (#3)

1. Determine the average of the missing numbers in the pattern:
   12, 22, 32, ____, ____, ____, ____, 82

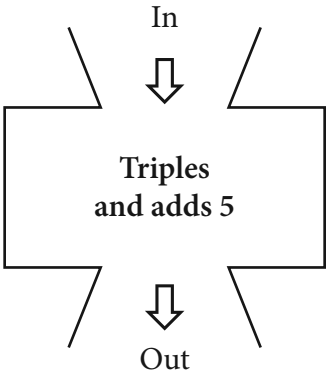
2. Morgan has a block of baseball all-star forever stamps, currently worth 45¢ each, and a strip of 85¢ birds of prey stamps:

   What is the total value, in cents, of Morgan's stamps?

3. A bag contains 30 chips numbered 1, 2, 3, 4, ..., 28, 29, 30. The multiples of 3 and the multiples of 5 are removed. What is the sum of the chips removed?

4. Benjamin is losing his marbles. At breakfast, he had 55 marbles. By lunch, he had lost 31 marbles. He lost three fourths of the remaining marbles before dinner. How many marbles did he have at dinner?

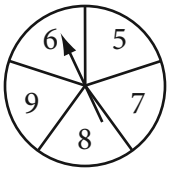
5. What number will come out of the machine if 19 goes into the machine?



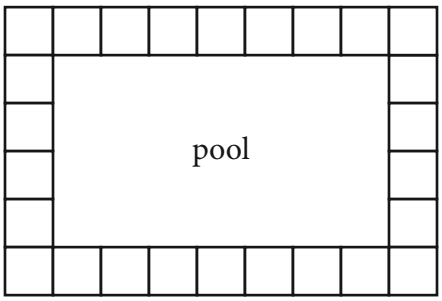
6. Aaliyah started school at 8:30 a.m. today and was there for 6 hours and 15 minutes. What time did she finish school today?

7. Joseph is thinking of a two-digit number. His number is between 3 dozen and 4 dozen. His number is a multiple of 7. What is Joseph's number?

8. The spinner is spun 5 times. A different number is spun each time. The first number spun is doubled. The other four numbers spun are added to this value. What is the smallest possible sum?



ICTM 3rd Grade Mathematics Contest
(2012–2013)—Team (#3)

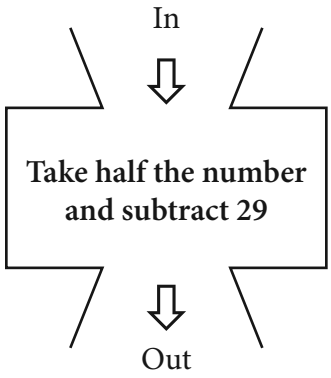


1. The swimming pool at Sophia's school has a walkway around the edge. The walkway is made up of square tiles. Each tile has area 4 square feet. What is the area of the pool? (The pool is the rectangle in the middle.)

2. How many even numbers are there between 18 and 63 on a number line?

3. Yellow Yoke has 12 dozen eggs. He cooks 10 dozen of the eggs for a school breakfast. He breaks a sixth of the remaining eggs. How many unbroken eggs are left?

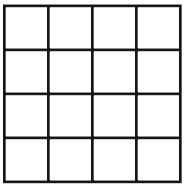
4. From noon on Monday to noon on Tuesday, how many times are all the digits of a digital clock the same?



5. What number will come out of the machine if 96 goes into the machine?

6. Austin's uncle, Alan, is 7 years older than his aunt Hailey. Alan's age is 6 times Austin's age, which is 7. How old is Hailey?

7. In England before 1967, a tanner was worth 6 pence, a shilling was worth 12 pence, and a half-crown was worth 30 pence. How much money, in pence, does Caroline have if she has 5 tanners, 13 shillings, and 8 half-crowns?



8. How many squares are in the figure shown?

9. Destiny has five cards numbered 3, 5, 6, 8, and 10. She chooses the cards containing numbers which have 80 as a multiple. What is the sum of these cards?

10. One cup of chocolate chips weighs 6 ounces. There are 16 ounces in a pound. Adam has 9 pounds of chocolate chips. How many cups of chocolate chips does he have?

ICTM 3rd Grade Mathematics Contest
(2012–2013)—Team (#3)

11. Each missing digit is the same digit. What digit it is?

$$\begin{array}{r} 1\ 7\ 6 \\ -\ \square\ \square \\ \hline \square\ \square \end{array}$$

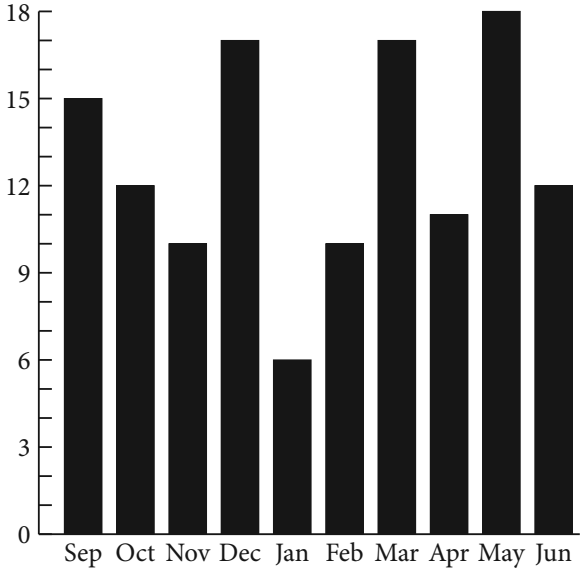
12. Carlos went to bed at 8:15 p.m. and slept 495 minutes. What time did he get up?

13. Angela wants to mail a one-ounce letter to Nowhere Else (in Tasmania, Australia), so she needs at least $1.05 in postage. She has a lot of 57¢ art-deco eagle stamps and 20¢ George Washington stamps, but nothing else. What is the smallest amount she can make with these stamps that will be enough to mail her letter?

14. If you write down all of the two-digit numbers, how many times will you write the digit 4?

15. $108 = 9 \times (n + 8)$. What is the value of n?

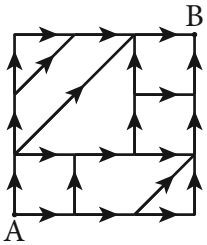
16. Last school year, Dylan read 128 books. The graph shows the number of books Dylan read each month. How many more books did he read in the month in which he read the most books than in the month in which he read the fewest books?



17. The perimeter of a square is 16. If all of the sides of the square are doubled, then what is the new perimeter of the square?

18. Daniel and his wife have two children, three dogs, four birds, and five cats in their house. Including the people, how many legs are in the house?

19. How many ways can Molly get from A to B if she must always travel in the direction of the arrows?



20. Madeline has 52 nickels and some dimes that total seven dollars and twenty cents. How many dimes does Madeline have?

ICTM 3rd Grade Mathematics Contest
(2012–2013)—Individual Solutions (#1)

1. $34 + 23 + 19 = \boxed{76}$.

2. From two spins, the possible sums are $3 + 3 = 6$, $3 + 7 = 10$, $3 + 9 = 12$, $7 + 3 = 10$, $7 + 7 = 14$, $7 + 9 = 16$, $9 + 3 = 12$, $9 + 17 = 16$, and $9 + 9 = 18$, so there are $\boxed{6}$ different sums.

3. $117 + 142 = 259$ tickets were sold, so $300 - 259 = \boxed{41}$ tickets were not sold.

4. $2100 \div 35 = \boxed{60}$.

5. The length of the left edge of the figure is $20 + 6 + 7 = 33$ and, similarly, the lengths of the three unlabeled horizontal segments add up to 24, so the perimeter is $2 \times 33 + 2 \times 24 = \boxed{114}$.

6. Five weeks is $7 \times 5 = 35$ days, so 38 days is 5 weeks and 3 days. Five weeks after Wednesday is still Wednesday; 3 more days after that Wednesday is $\boxed{\text{Saturday}}$.

7. From the first number to the second, add 1; from the second to the third, add 3; from the third to the fourth, add 5; and from the fourth to the fifth, add 7. So, to get from one number to the next, add successively larger odd numbers. To get from the fifth number to the sixth number, which is the next number, add 9: $18 + 9 = \boxed{27}$.

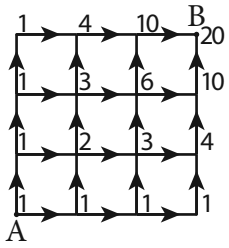
8. The next drawing will be made by adding another row of triangles along the bottom to form a big triangle with 4 small-triangle edges along each side. This requires adding 7 more triangles, for a total of $\boxed{16}$ triangles in the next drawing. (Also note that the numbers of triangles in the drawings are the squares of 1, 2, 3, and 4.)

ICTM 3rd Grade Mathematics Contest
(2012–2013)—Team Solutions (#1)

1. Each bicycle has 2 wheels and each car has 4 wheels, so there are $2 \times 18 + 4 \times 37 =$ $\boxed{184 \text{ wheels}}$.

2. $83 - 39 = 44$; to find out what number we can subtract 13 from and get 44, add 13 to 44: $13 + 44 =$ $\boxed{57}$ and $57 - 13 = 44 = 83 - 39$.

3. Label A as 1. For each intersection, label it with the sum of the labels of the intersections leading to it. The label at B is the number of ways to get there, $\boxed{20}$.



4. Jada and her 8 friends would need 9 tickets, so it would cost $9 \times \$13.50 =$ $\boxed{\$121.50}$.

5. 3 quarters, 2 dimes, and 4 nickels is $3 \times 25¢ + 2 \times 10¢ + 4 \times 5¢ =$ $75¢ + 20¢ + 20¢ =$ $\boxed{115¢}$.

6. $3 \times 9 + 5 \times 7 = 27 + 35 =$ $\boxed{62}$.

7. The perimeter of a shape formed using all of the pencils will be the total length of all the pencils, so 15×6 in. $+ 18 \times 5$ in. $= 90$ in. $+ 90$ in. $=$ $\boxed{180 \text{ in.}}$.

8. Doubling 12 gives $12 \times 2 = 24$; subtracting 9 gives $24 - 9 =$ $\boxed{15}$.

9. The first eight prime numbers are 2, 3, 5, 7, 11, 13, 17, and 19. $2 + 3 + 5 + 7 + 11 + 13 + 17 + 19 =$ $\boxed{77}$.

10. 2 gallons magenta + 1 gallon yellow = 3 gallons hot pink, so to make 18 gallons would take $18 \div 3 = 6$ times that recipe, so $2 \times 6 =$ $\boxed{12 \text{ gallons}}$ of magenta paint.

11. From 8 to 11 is 3 hours or $3 \times 60 = 180$ minutes. He used $45 + 30 = 75$ minutes already, so he had $180 - 75 =$ $\boxed{105 \text{ minutes}}$ left to organize the cards.

12. There are 12 small squares and 5 larger squares (each made up of a 2-by-2 group of small squares); there are no squares larger than those, so in total there are $12 + 5 =$ $\boxed{17}$ squares.

13. $\$23.80 \div 4 = \boxed{\$5.95}$.

14. $6\boxed{7}45$.

15. Since yesterday was Monday, today is Tuesday and tomorrow is Wednesday; 16 days is 2 weeks and 2 days, so 16 days from tomorrow will be 2 weeks and 2 days from Wednesday, which is the same as 2 days from Wednesday, which is $\boxed{\text{Friday}}$.

16. With 35 friends from school and 18 friends from soccer, that's $35 + 18 = 53$ friends, but he only has 47 friends from school and soccer, so $53 - 47 = 6$ friends must have been counted twice. $\boxed{6}$ of his friends both go to the same school and play in the same soccer league.

17. The multiples of 14 are 14, 28, 42, 56, 70, 84, 98, ..., so 14 through 84, $\boxed{6}$ of them, are between 1 and 90 on a number line.

18. A quarter and three dimes is $25¢ + 3 \times 10¢ = 25¢ + 30¢ = 55¢$, so the nickels must account for the remaining $85¢ - 55¢ = 30¢$. $30¢ \div 5¢ = \boxed{\text{6 nickels}}$.

19. $8 \times 18 = \boxed{144}$ people on the train.

20. To be greater than 300, the hundreds digit must be greater than or equal to 3, so it must be 5 or 7. For the number to be as small as possible, choose 5. Then, choose the smallest possible digit for the tens digit, 0. Finally, pick the smallest remaining digit for the ones digit, 1. The number is $\boxed{501}$.

ICTM 3rd Grade Mathematics Contest
(2012–2013)—Individual Solutions (#2)

1. Olivia and 9 of her friends make 10 people, so $10 \times \$8.20 = \boxed{\$82.00}$.

2. $10 - 2 - 4 = 4$ darts landed in red. He scored $2 \times 13 + 4 \times 9 + 4 \times 4 = 26 + 36 + 16 = \boxed{78 \text{ points}}$.

3. $4 \times 22 = \boxed{88 \text{ people}}$ in the cars.

4. $140 = 60 + 60 + 20$ minutes or 2 hours and 20 minutes. From 2:05 p.m., 2 hours is 4:05 p.m., and another 20 minutes is $\boxed{4{:}25 \text{ p.m.}}$.

5. There are 8 whole small squares shaded, each with area 4 square units, and 10 half-small-squares shaded, each with area $4 \times \frac{1}{2} = 2$, so the total shaded area is $8 \times 4 + 10 \times 2 = \boxed{52}$ square units.

6. Seven hundred million eight thousand twenty is 700,008,020, which has $\boxed{6 \text{ zeros}}$.

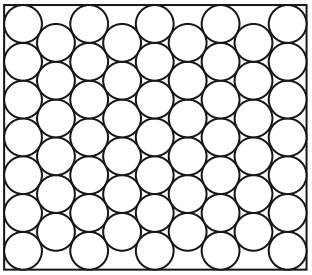
7. $461 - 198 = 263$. Reversing 263 gives $\boxed{362}$.

8. $4 + 4 + 3 + 1 + 1 + 1 + 1 + 10 + 1 = \boxed{26 \text{ points}}$.

ICTM 3rd Grade Mathematics Contest
(2012–2013)—Team Solutions (#2)

1. $9 \times 25 = \boxed{225}$ servings.

2. While one might expect that a square arrangement of $21 \div 3 = 7$ rows and $24 \div 3 = 8$ columns, for a total of 56 circles, would be the best fit, more circles can (just barely) be fit in by using offset columns, as shown, with 5 columns of 7 and 4 columns of 6, for a total of $5 \times 7 + 4 \times 6 = 35 + 24 = \boxed{59}$ (there would be an extra approximately 0.215 in. of horizontal space). It is not possible to do better using offset rows.



3. He read more than 10 books in September, October, December, March, April, May, and June (he read exactly 10 in November and February), $\boxed{\text{7 months}}$.

4. 12 quarters are worth $12 \times 25¢ = 300¢ = \$3.00$, so the nickels must be worth $\$8 - \$3 = \$5 = 500¢$ and there must be $500¢ \div 5¢ = 100$ nickels, for a total of $100 + 12 = \boxed{\text{112 coins}}$.

5. $32 - 8 = 24$, so $32 = 8 + 24$ and $6 \times n = 24$; $24 \div 6 = 4$, so $24 = 6 \times 4$ and $\boxed{n = 4}$.

6. $1{,}024{,}000 \div 16 = 64{,}000$ pints per second; $64{,}000 \div 8 = \boxed{8{,}000}$ gallons per second.

7. The possible products are $1 \times 1 = 1$, $1 \times 2 = 2$, $1 \times 4 = 4$, $1 \times 8 = 8$, $2 \times 1 = 2$, $2 \times 2 = 4$, $2 \times 4 = 8$, $2 \times 8 = 16$, $4 \times 1 = 4$, $4 \times 2 = 8$, $4 \times 4 = 16$, $4 \times 8 = 32$, $8 \times 1 = 8$, $8 \times 2 = 16$, $8 \times 4 = 32$, and $8 \times 8 = 64$. That is, the only possible products are 1, 2, 4, 8, 16, 32, and 64—there are $\boxed{7}$ different possible products.

8. Two and a half hours after 3:00 p.m. is 5:30 p.m.; another 35 minutes after that is $\boxed{\text{6:05 p.m.}}$.

9. The products are $60 \times 4 = 240$, $50 \times 5 = 250$, $40 \times 6 = 240$, $30 \times 7 = 210$, and $20 \times 8 = 160$. Their sum is 1100; their average is $1100 \div 5 = \boxed{220}$.

10. 21 quarters and 40 nickels are worth $21 \times 25¢ + 40 \times 5¢ = 525¢ + 200¢ = 725¢ = \$7.25$, so the dimes must be worth $\$8.75 - \$7.25 = \$1.50 = 150¢$. $150¢ \div 10¢ =$ 15 dimes.

11. $760 \div 40 =$ 19 piles.

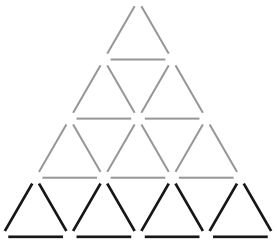
12. The multiples of 7 are 7, 14, 21, 28, 35, 42, 49, 56, 63, 70, ..., so from 14 through 63, 8 multiples of 7, are between 12 and 65 on a number line.

13. $5\frac{1}{3} \times 60 = 5 \times 60 + 60 \div 3 = 300 + 20 =$ 320 seconds.

14. The two-digit multiples of 9 that are less than 60 are 18, 27, 36, 45, and 54. Of these, only 54 has a tens digit greater than its ones digit.

15. $450 \times 60¢ = 27000¢ =$ \$270.

16. Forming the additional row of triangles at the bottom will require an additional 12 toothpicks, as shown (each row can be thought of as being formed only by "point-up" triangles), for a total of 30 toothpicks.



17. Each week has 7 days, so 14 weeks have $7 \times 14 =$ 98 days.

18. $36 \times \frac{1}{4} = 36 \div 4 = 9$ are black; $36 \times \frac{2}{3} = 2 \times (36 \div 3) = 2 \times 12 = 24$ are red; so there are $36 - 9 - 24 =$ 3 model cars that are blue.

19. With the missing numbers filled in, the pattern is 4, 8, 12, 16, 20, 24, 28, 32 (add 4 to get from one number to the next), so the sum of the missing numbers is $12 + 16 + 20 + 24 =$ 72.

20. The players' individual point totals are $3 \times 2 + 5 \times 2 + 4 = 20$, $3 \times 3 + 3 \times 2 + 1 = 16$, $4 \times 2 = 8$, $2 \times 3 + 4 \times 2 + 6 = 20$, and $3 \times 3 + 5 \times 2 + 3 = 22$, so the team scored $20 + 16 + 8 + 20 + 22 =$ 86 points.

ICTM 3rd Grade Mathematics Contest
(2012–2013)—Individual Solutions (#3)

1. With the missing numbers filled in, the pattern is 12, 22, 32, 42, 52, 62, 72, 82 (add 10 to get from one number to the next), so the average of the missing numbers is $(42 + 52 + 62 + 72) \div 4 = 228 \div 4 = \boxed{57}$.

2. The block of baseball all-star stamps consists of 4 stamps, so it is worth $4 \times 45¢ = 180¢$. The strip of birds of prey stamps consists of 5 stamps, so it is worth $5 \times 85¢ = 425¢$. The total value of the stamps is $180¢ + 425¢ = \boxed{605¢}$.

3. The multiples of 3 are 3, 6, 9, 12, 15, 18, 21, 24, 27, and 30; the multiples of 5 are 5, 10, 15, 20, 25, and 30. The sum of the chips removed is $3 + 5 + 6 + 9 + 10 + 12 + 15 + 18 + 20 + 21 + 24 + 25 + 27 + 30 = \boxed{225}$.

4. Starting with 55 marbles and losing 31 by lunch left $55 - 31 = 24$ at lunch. Losing $\frac{3}{4}$ of the remaining marbles left $1 - \frac{3}{4} = \frac{1}{4}$ of the remaining marbles, which is $24 \times \frac{1}{4} = 24 \div 4 = \boxed{6 \text{ marbles}}$ at dinner.

5. Tripling 19 gives $19 \times 3 = 57$. Adding 5 gives $57 + 5 = \boxed{62}$.

6. 4 hours after 8:30 a.m. is 12:30 p.m.; 6 hours after 8:30 a.m. is 2 hours after 12:30 p.m., or 2:30 p.m.; 6 hours and 15 minutes after 8:30 a.m. is 15 minutes after 2:30 p.m., which is $\boxed{2{:}45 \text{ p.m.}}$.

7. 3 dozen and 4 dozen are 36 and 48. The multiples of 7 are 7, 14, 21, 28, 35, 42, 49, ..., so the only multiple of 7 between 3 dozen and 4 dozen is $\boxed{42}$.

8. Since only the first number is doubled, the smallest sum will come from having the smallest possible first number, so the first number should be 5. The remaining 4 numbers are 6, 7, 8, and 9, and the sum is $2 \times 5 + 6 + 7 + 8 + 9 = \boxed{40}$.

ICTM 3rd Grade Mathematics Contest
(2012–2013)—Team Solutions (#3)

1. Since the square tiles around the pool each have area 4 square feet, they have sides of length 2 feet. Counting tiles along the edges of the pool, the pool is a rectangle that is 4×2 ft $= 8$ ft by 7×2 ft $= 14$ ft. Its area is $8 \times 14 =$ $\boxed{112 \text{ sq ft}}$.

2. Between 18 and 63, the even numbers are 20, 22, 24, 26, ..., 56, 58, 60, and 62. That's 5 even numbers in the 20s, 5 in the 30s, 5 in the 40s, 5 in the 50s, and 2 in the 60s, or $5 + 5 + 5 + 5 + 2 =$ $\boxed{22}$ even numbers.

3. After using 10 dozen of the 12 dozen, $12 - 10 = 2$ dozen are left, or $2 \times 12 = 24$ individual eggs. Breaking $\frac{1}{6}$ means breaking $24 \times \frac{1}{6} = 24 \div 6 = 4$ eggs, which leaves $24 - 4 =$ $\boxed{20}$ unbroken eggs.

4. Starting at noon, which is 12:00 p.m., the first time when all the digits are the same is 1:11 p.m., then 2:22 p.m., 3:33 p.m., 4:44 p.m., and 5:55 p.m. No times starting with 6, 7, 8, or 9 will work, since the tens digit of the minutes is never more than 5. 10 has two different digits, so no time starting with 10 will work. 11:11 p.m. is the next time that works. After that, the same times happen again, but for a.m.: 1:11 a.m., 2:22 a.m., 3:33 a.m., 4:44 a.m., 5:55 a.m., and 11:11 a.m., for a total of $\boxed{12}$ times when the digits are all the same. (The answer is the same even if seconds are included.)

5. Half of 96 is $96 \div 2 = 48$; subtracting 29 gives $48 - 29 =$ $\boxed{19}$.

6. Austin is 7. His uncle Alan is 6 times as old, so $6 \times 7 = 42$. Alan is 7 years older than Hailey, so Hailey is 7 years younger than Alan, or $42 - 7 =$ $\boxed{35}$.

7. $5 \times 6p + 13 \times 12p + 8 \times 30p = 30p + 156p + 240p =$ $\boxed{426 \text{ pence}}$.

8. There are 16 small squares, 9 2×2 squares, 4 3×3 squares, and 1 large 4×4 square, for a total of $16 + 9 + 4 + 1 =$ $\boxed{30}$ squares.

9. 80 is a multiple of 5, 8, and 10 (but not 3 or 6). The sum of these cards is $5 + 8 + 10 =$ $\boxed{23}$.

10. 9 pounds of chocolate chips is $9 \times 16 = 144$ ounces; $144 \div 6 =$ $\boxed{24 \text{ cups}}$.

ICTM 3rd Grade Mathematics Contest
(2012–2013)—Team Solutions (#3)

11. Since all the missing digits are the same, changing the subtraction problem to an addition problem gives $\square\square + \square\square = 176$ and $\square\square + \square\square = 2 \times \square\square$, so $\square\square = 176 \div 2 = 88$ and the digit is $\boxed{8}$.

12. $495 = 480 + 15 = 8 \times 60 + 15$, so he slept 8 hours and 15 minutes. 8 hours and 15 minutes after 8:15 p.m. is $\boxed{4{:}30 \text{ a.m.}}$.

13. Make a table where each row starts with a number of 57¢ stamps, then find out how many 20¢ stamps are needed and the total postage. The smallest total is $\boxed{114¢}$ with 2 57¢ stamps and no 20¢ stamps.

# of 57¢	value of 57¢	# of 20¢	value of 20¢	total value
0	0¢	6	120¢	120¢
1	57¢	3	60¢	117¢
2	114¢	0	0¢	114¢

14. In writing all of the two-digit numbers, you'll write a 4 for the ones digit once for the 10s, once for the 20s, and so on, through the 90s, so 9 times in the ones digit; you'll write a 4 for the tens digit for every number in the 40s, so 10 times in the tens digit. That's a total of $9 + 10 = \boxed{19}$ times.

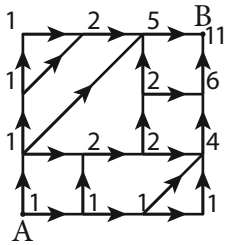
15. $108 \div 9 = 12$, so $108 = 9 \times 12$ and $12 = n + 8$. $12 - 8 = 4$, so $12 = 4 + 8$ and $\boxed{n = 4}$.

16. He read the most books in May, 18, and the fewest books in January, 6. He read $18 - 6 = \boxed{12}$ more books in May than in January.

17. Doubling the sides of a shape doubles its perimeter, so the new perimeter will be $16 \times 2 = \boxed{32}$. (It had sides of length 4 and now has sides of length 8.)

18. There are 4 humans, 3 dogs, 4 birds, and 5 cats. Humans and birds each have 2 legs; dogs and cats each have 4 legs. There are $4 \times 2 + 3 \times 4 + 4 \times 2 + 5 \times 4 = 8 + 12 + 8 + 20 = \boxed{48 \text{ legs}}$ in the house.

19. Label A as 1. For each intersection, label it with the sum of the labels of the intersections leading to it. The label at B is the number of ways to get there, $\boxed{11}$.



20. 52 nickels are worth $52 \times 5¢ = 260¢ = \$2.60$, so she has $\$7.20 - \$2.60 = \$4.60 = 460¢$ in dimes, or $460¢ \div 10¢ = \boxed{46 \text{ dimes}}$.