



Warm-Up 1

1. _____ months



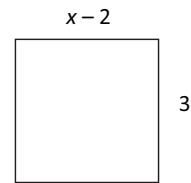
How many months are there in 35 years?

2. _____ A function exists of the form $y = x + a$ that models the data shown. What is the value of a ?

x	y
2	5
3	6
4	7

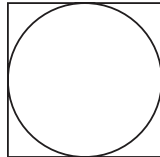
3. _____ numbers How many odd numbers are there between 20 and 158?

4. _____ The figure shown is a square. What is the value of x ?



5. _____ grapes A bowl contains 50 grapes of different colors. If 20% of the grapes in the bowl are red, how many grapes are *not* red?

6. _____ ft²



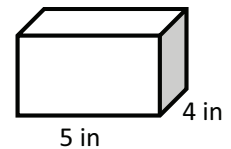
In the figure, a circle with radius 4 ft is inscribed in a square. What is the area of the square?

7. _____ mm² A triangle with an area of 120 mm² has a height of 10 mm. What is the area of a similar triangle with a height of 20 mm?

8. _____ A bookshelf is to hold 6 literature books, 3 geometry books and 7 algebra books, arranged in random order. What is the probability that the books are arranged so that the first book on the shelf is a math book? Express your answer as a common fraction.



9. _____ in The volume of a rectangular prism is 120 in³. Its length and width are 5 in and 4 in, respectively, as shown. What is the height of the prism?



10. _____ What is the greatest prime factor of 96?

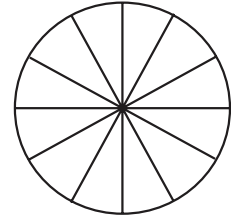


Warm-Up 2

11. _____ What is the positive difference between the value of $2 \times (3 + 4)$ and the value of $2 \times 3 + 4$?

12. _____ uniforms Manny has 5 shirts, 3 pairs of pants, 2 ties and 4 pairs of shoes. If Manny's school uniform consists of a shirt, a pair of pants, a tie and a pair of shoes, how many different uniforms can he wear to school?

13. _____ degrees A circular pizza was cut into 12 congruent slices, as shown. If 2 slices were eaten, what is the sum of the central angles of the slices that were not eaten?



14. _____ ft A tennis court with a length of 78 ft is 6 ft longer than twice its width. What is the width of the tennis court?

15. \$ _____ Sam wishes to contribute a total of \$2500 to Charity A and Charity B, in the ratio of 2:3. How many dollars should Sam contribute to Charity B?

16. _____ % A number is selected at random from the first 20 positive integers. What is the probability the number selected is an odd prime number? Express your answer as a percent.

17. _____ What is the value of $5 \times (11 + 4 \div 4)$?

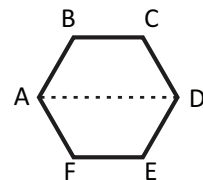
18. _____ cm The ratio of the lengths of corresponding sides of two similar decagons is 1:2. If the perimeter of the smaller decagon is 76 cm, what is the perimeter of the larger decagon?

19. _____ days



Each day a man floating on a raft paddles 3 mi north, but each night while he rests, the current of the river carries the raft 2 mi south. How many days will it take him to first reach a location 50 mi north of his starting location?

20. _____ cm Suppose ABCDEF, shown here, is a regular hexagon with sides of length 6 cm. What is the length of segment AD?





Workout 1

21. _____ minutes If it was 10:30 am 55 minutes ago, in how many minutes will it be noon?

22. \$ _____ Phara purchased four different items from the list shown. The total price of the four items, not including tax, was \$17.36. What is the positive difference in the prices of the two items that she did not purchase?

Notebook	\$2.99
Wallet	\$3.49
Puzzle	\$6.29
Photo Album	\$4.99
Card Game	\$3.89
Book	\$5.49

23. _____ unit cubes Each face of a $5 \times 5 \times 5$ cube is painted red. This cube is then cut into 125 unit cubes. How many of the unit cubes have no faces that are painted red?

24. _____ posts A rectangular yard is to be fenced with posts placed at each corner and along each side, evenly distributed so that the centers of the posts are 6 ft apart along each side. If the yard is 14 yd long and 6 yd wide, how many posts are needed to build such a fence?

25. _____ integers How many positive three-digit integers can be formed such that the hundreds digit is equal to the sum of the tens digit and ones digit?

26. _____ dentists



An advertisement states that 4 out of 7 dentists recommend Minty Fresh Mouthwash. If 1421 dentists were surveyed, how many dentists recommended Minty Fresh Mouthwash?

27. _____ ft A rectangular garden with an area of 48 ft^2 has a width equal to $\frac{1}{3}$ its length. What is the measure of the diagonal of the garden? Express your answer as a decimal to the nearest hundredth.

28. _____ cups A cookie recipe requires 4 cups of flour to make 5 dozen cookies. If Amy needs to make 15 dozen cookies, how many cups of flour will she need?



29. _____ in The length, width and height of a rectangular prism are in the ratio 3:2:1, respectively. What is the length of the prism if it has a volume of 48 in^3 ?

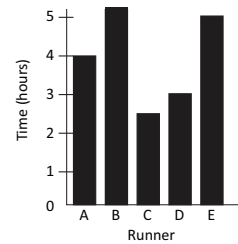
30. \$ _____ The manufacturer charges \$7.68 for a case that contains 24 cans of orange soda. If the Minute Magic Corner Store wishes to make a profit of at least \$4.40 per case of orange soda sold, what is the least amount the store should charge for a single can of orange soda?



Warm-Up 3

31. _____ cm Each side of a regular hexagon measures 6 cm. What is the perimeter of the hexagon?

32. _____ hours The graph shows the length of time it took five runners to complete a marathon. What was the median time of the five runners?




33. _____ What is the product of the greatest and least two-digit prime numbers?

34. _____ minutes It takes a mechanic 4 hours to install carburetors in 3 cars. At this rate, how many minutes will it take the mechanic to install carburetors in 5 cars?

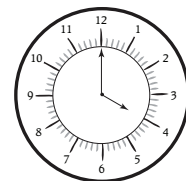
35. _____ In a certain parking lot, there are 2 black cars, 3 blue cars, 4 red cars and 3 green cars. If there are no other cars in the parking lot, what is the probability that a car randomly chosen from the parking lot is *not* green? Express your answer as a common fraction.



36. _____ in  Becca is making 20 craft projects. She has 15 yd of ribbon, and each craft project requires the same length of ribbon. What is the maximum length of ribbon each craft project can require, in inches?

37. _____ What is the value of $2 \div 4 \times 8$?

38. _____ degrees The measure of the supplement of the smaller angle formed by the hands of a clock that displays a time of four o'clock?



39. \$ _____ Marita purchased an item for 45% off the original price, plus an additional 20% off the sale price. She also had a \$5-off coupon, which the salesclerk applied after these two discounts. Marita's final purchase price for the item was \$50. Assuming she paid no sales tax, what was the original price of the item Marita purchased?

40. _____ Multiplying a number by x yields the same result as dividing the number by 0.125. What is the value of x ?



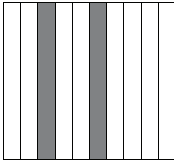
Warm-Up 4

♥	□		
	♥	□	
□		■	♥
○		♥	

41. _____ If each row and each column shown here must contain exactly one heart, square, circle and triangle, which shape must be placed in the shaded space?

42. _____ degrees Two angles of a triangle measure 7 degrees and 97 degrees. What is the degree measure of the supplement of its third angle?

43. _____ What is the positive difference between 3.75 and $\frac{7}{4}$?

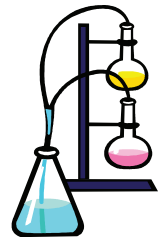
44. _____  Assuming the sections are congruent, what portion of the figure is shaded? Express your answer as a common fraction.

45. _____ If two different students are randomly selected from a class of 12 boys and 8 girls, what is the probability that both students are girls? Express your answer as a common fraction.

46. _____ degrees What is the degree measure of an interior angle of a regular pentagon?

47. _____ quarters Joe has 37 coins consisting of nickels, dimes and quarters. There are four more nickels than dimes and two more quarters than nickels. What is the total number of quarters that Joe has?

48. _____ fl.oz A pharmacist must mix 12 fl oz of cough syrup that contains 25% active ingredient with flavored syrup that contains no active ingredient. How many fluid ounces of flavored syrup must the pharmacist add to create a mixture containing 10% active ingredient?



49. _____ When writing twenty-one-and-a-half trillion in scientific notation, what is the exponent needed on the base 10?

50. \$ _____ Safir can choose how he gets paid for a job. He can be paid \$1000 all at once, or he can earn \$1 for the first day, \$2 for the second, \$4 for the third, and so on, so that each day's pay is double that of the previous day. What is the positive difference of the total amounts Samir can be paid for completing a ten-day job, based on these two compensation plans?





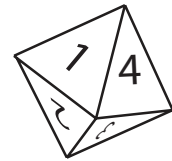
Workout 2

51. _____ % The city whose full name is El Pueblo de Nuestra Señora la Reina de Los Ángeles del Río de Porciúncula, which contains 61 letters, is typically abbreviated to Los Angeles. In terms of number of letters, what percent of the full name is the abbreviated name? Express your answer to the nearest hundredth.

52. _____ ft John is biking at a rate of 15 mi/h. There are 5280 ft in 1 mi. On average, how many feet does John travel in 1 minute?

53. _____ coins Malcolm gives a cashier two one-dollar bills to pay for a \$1.64 purchase. What is the least number of coins that Malcolm could receive as correct change?

54. _____ A fair eight-sided die with faces numbered 1 through 8 is rolled four times. What is the probability that exactly one 3 is rolled, and that the 3 is rolled on the third roll? Express your answer as a common fraction.



55. _____ ft The Livingstons' rectangular living room is 15 ft long and has an area of 195 ft². What is the width of the living room?

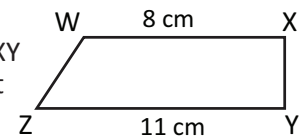
56. _____ students

I own a

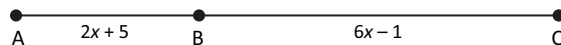
- cat
 dog

According to a survey of Ms. Jones' pre-algebra class, 11 students own a cat, 12 students own a dog, 6 students own both a cat and a dog and 3 students own neither. What is the number of students in Ms. Jones' pre-algebra class?

57. _____ cm² In trapezoid WXYZ, shown here, WX = 8 cm and ZY = 11 cm. Segment XY is half as long as the shorter base, and $\angle WXY$ and $\angle XYZ$ are each right angles. What is the area of trapezoid WXYZ?



58. _____ cm In the figure, AC = 36 cm. What is the length of segment AB?



59. _____ If two numbers are chosen randomly, with replacement, from the set of the first five counting numbers, what is the probability that the sum of the two numbers will be 3? Express your answer as a common fraction.

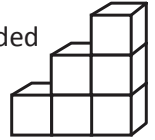
60. \$ _____ At a market, a customer who purchases 3 lb of potato salad and 4 lb of coleslaw pays a total of \$10.75. Another customer pays a total of \$4.75 to buy 1 lb of potato salad and 2 lb of coleslaw. What is the cost to purchase 2 lb of potato salad and 3 lb of coleslaw?



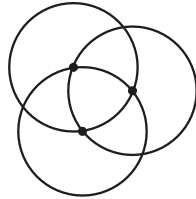
Warm-Up 5

61. _____ cubes

It takes 6 cubes to build a staircase containing 3 rows. How many cubes are needed to build a staircase that contains 11 rows?



62. _____ cm²



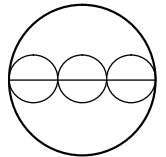
Three congruent, coplanar circles overlap so that each center lies on the other two circles. The diameter of each circle is 8 cm. What is the area of the triangle formed by connecting the centers of the circles? Express your answer in simplest radical form.

63. _____

What is the next number in the geometric sequence: $-1, 4, -16, 64, \dots$?

64. _____ units

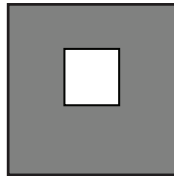
The centers of three congruent small circles are collinear, and their diameters form the diameter of the large circle, shown, whose area is 81π units². What is the circumference of one of the smaller circles? Express your answer in terms of π .



65. _____

If $2x + 3 = 4$, what is the value of $12x + 18$?

66. _____ regions



In the figure shown, what is the greatest number of nonoverlapping regions into which the shaded region can be divided with exactly two lines?

67. _____ years

Sal collected data on all her family members who were born in the last half of the 20th century. Their birth years are shown in the stem-and-leaf plot. What is the positive difference between the median and the mode of these data?

195		4	4	7	9										
196		0	2	3	3	4	4	5	5	5	6	7	8	8	9
197		0	0	4	4	4	4	8	9						
198		1	6												
199		2	4	5	7										

Key: $195|4 = 1954$

68. _____ minutes

In a game that lasts 48 minutes, exactly 6 players from each team are on the field at all times. Throughout the game, players are substituted so that 8 players on a team each play an equal amount of time. How many minutes is each of the 8 players on the field during the game?

69. _____ leaps

A dog is chasing a rabbit that has a head start of 150 ft. If their leaps are synchronized, and the dog leaps 9 ft every time the rabbit leaps 7 ft, in how many leaps will the dog catch up to the rabbit?



70. _____

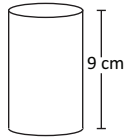
For a certain set of five numbers, the mean of all but the largest number is 80, and the mean of all but the smallest number is 90. What is the range of the set of five numbers?



Warm-Up 6

71. _____ teams How many different three-member teams can be formed from a group of six students?

72. _____ cm²



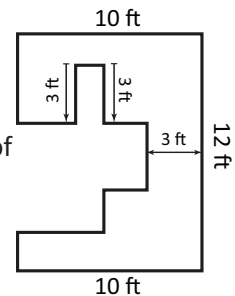
A right circular cylinder has a volume of 144π cm³ and a height of 9 cm. What is the area of its base? Express your answer in terms of π .

73. _____ The math team ordered 7 eight-slice pizzas. What fraction of the total amount of the pizza ordered is left after 41 slices are eaten? Express your answer as a common fraction.

74. _____ The square root of the quantity 3 less than twice a number is equal to 3. What is the number?

75. _____ marbles Bailey said to Kaylee, "If you gave me two of your marbles, I'd have twice as many as you'd have." And Kaylee responded, "If you gave me three of your marbles, I'd have three times as many as you'd have." What is the difference between the number of marbles that Bailey and Kaylee have?

76. _____ ft If all the angles in the figure shown are right angles, what is the perimeter of the figure?

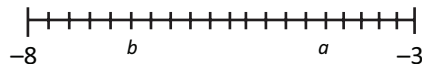


77. _____ strokes



The average of Martha's first 5 rounds of golf is 98 strokes. How many strokes would Martha need to average on her next 3 rounds to bring her average down to 92 strokes?

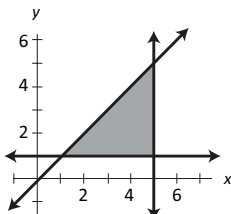
78. _____ On the number line below, the tick marks are evenly spaced. What is the value of $b - a$? Express your answer as a mixed number.



79. _____ dollars

The price of a coat that originally sold for \$80 is reduced by 20%. A different coat that originally sold for \$100 is marked down 30%, and then a 10% discount is given on the reduced price. After all of the reductions, what is the positive difference in the prices of the two coats?

80. _____ units²

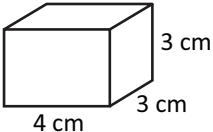


A region in the coordinate plane is bounded by $y = x$, $x = 5$ and $y = 1$. What is the area of this region?



Workout 3

81. _____ students The president of the student body estimated that 2 out of every 3 students at Creighton Middle School would attend the Spring Festival. If there are 1140 students at this school, according to the estimate, how many students will *not* attend the Spring Festival?
82. _____ shots Vinnie made 60% of the shots he attempted in Friday's basketball game. If he made 18 shots in the game, how many shots did he attempt?

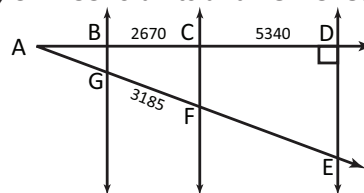
83. _____ cubes
- 
- How many $0.5 \text{ cm} \times 0.5 \text{ cm} \times 0.5 \text{ cm}$ cubes are needed to completely fill this rectangular prism measuring $4 \text{ cm} \times 3 \text{ cm} \times 3 \text{ cm}$?

84. \$ _____ Allison spent a total of \$16.20 for lunch at Burrito De-lite, including tax and a tip. She paid 8% sales tax on her purchase and then left the waiter a tip equivalent to 20% of her total bill including tax. What was the cost of Allison's meal, before tax and the tip?

85. _____ g The table below shows the weight of various coins, according to U.S. Mint specifications. Jarnail has coins worth a total of 42¢ in his pocket. What is the least number of grams the coins in Jarnail's pocket could weigh? Express your answer as a decimal to the nearest thousandth.

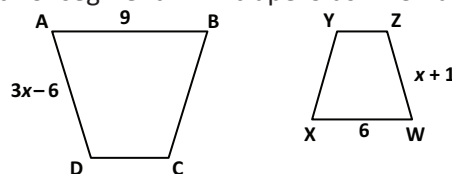
Denomination	Penny	Nickel	Dime	Quarter
Weight	2.500 g	5.000 g	2.268 g	5.670 g

86. _____ cm^2 A rectangle has a perimeter of 62 cm. If the length and width are each increased by 2 cm, by how many square centimeters does the area increase?
87. _____ units Lines BG, CF and DE are all parallel and coplanar. These three lines intersect rays AD and AE, as shown. Suppose $BC = 2670$ units, $CD = 5340$ units and $FG = 3185$ units. What is the length of segment EF?



88. _____ messages A group of 9 friends received a combined total of 233 text messages in two hours. One person received 25 messages. How many text messages did each of the other 8 friends receive if they each received the same number of messages as each other?
89. _____ units^2 The coordinates of $\triangle ABC$ are $A(1, 2)$, $B(1, 10)$ and $C(16, 2)$. What is the area of $\triangle ABC$?

90. _____ units What is the length of segment AD if trapezoids ABCD and WXYZ are similar?





Warm-Up 7

91. \$ _____ Vacations-R-Us charges \$130 a day plus a one-time, nonrefundable \$50 cleaning fee to rent a house at the beach. How much will it cost the Sanchez family to rent the house for 7 days?

92. _____ units A circle has a circumference with the same numerical value as its area. What is its radius?

93. _____ cm If the length of an insect is 4 cm, what is the length of the insect viewed under a magnifying glass that magnifies an object to three times its original size?



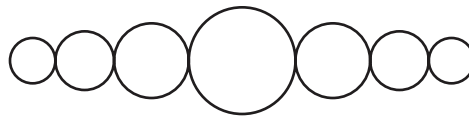
94. _____ A box contains only red, blue and green tokens. If the probability of randomly choosing a red token is $\frac{1}{5}$ and the probability of randomly choosing a blue token is $\frac{1}{3}$, what is the probability of randomly choosing a green token? Express your answer as a common fraction.

95. _____ integers How many three-digit positive integers are square numbers?

96. \$ _____ The table shows the total dollar amounts of purchases by 21 randomly selected customers at a department store. What is the median of the dollar amounts?

\$10	\$18	\$10	\$22	\$14	\$41	\$31
\$43	\$8	\$6	\$27	\$18	\$27	\$32
\$5	\$53	\$30	\$25	\$30	\$22	\$42

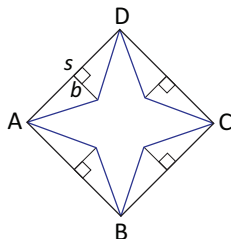
97. _____ cm A necklace is made of beads with centers that are collinear, as shown. The beads have diameters of integer lengths a, b, c and d cm such that $a:b:c:d = 1:2:3:4$. What is the smallest possible total length of the seven beads on the necklace?



98. _____ The number 6D45, where D represents a digit, is divisible by 3. What is the sum of all possible values of D?

99. _____ For what value of m does $\frac{1}{m} + \frac{1}{2m} = 6$? Express your answer as a common fraction.

100. _____ units²



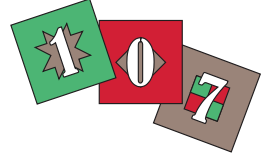
Square ABCD, shown here, has sides of length s units. A star is formed, creating four congruent isosceles triangles, each with a height of b units. What is the area of the star in terms of s and b ?



Warm-Up 8

101. _____ ha A pasture with an area of 25 hectares is enclosed using 2 km of fencing. Another pasture is to be enclosed. For the second pasture, how many hectares of land can 8 km of fencing enclose if the two fenced areas are similar?

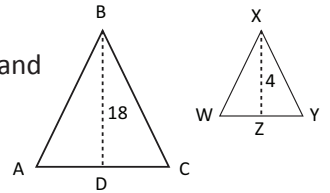
102. _____ stickers Angie is purchasing stickers to make house numbers for the houses in her neighborhood. If the houses are numbered consecutively from 101 to 250 and each sticker contains a single digit, how many stickers containing the digit 3 does Angie need to purchase?



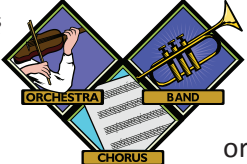
103. _____ For what value of x does $3x + 3 = 2x + 7$?

104. _____ mi Tim drove at an average rate of 30 mi/h, and Kim drove at an average rate of 40 mi/h for three times as long as Tim. Together they drove a total of 225 mi. How far did Tim drive?

105. _____ cm Triangle ABC with an area of 243 cm^2 is similar to $\triangle WXY$. If $BD = 18 \text{ cm}$ and $XZ = 4 \text{ cm}$, what is the length of segment WY ?



106. (_____ , _____) What are the coordinates of the midpoint of segment AB with endpoints $A(-2, 4)$ and $B(3, -3)$? Express the coordinates as decimals to the nearest tenth.

107. _____ students  At Euclid Middle School there are 33 students in the chorus, 45 students in the band and 21 students in the orchestra. Fifteen students are in both the band and chorus, 9 are in both orchestra and chorus, 4 are in the band and orchestra and 2 students are in all three. How many students are in the orchestra only?

108. _____ What is the positive difference between the range and the mean of the set $\{4, 5, 7, 7, 8, 8, 8, 9, 16\}$?

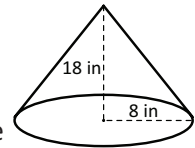
109. _____ m A rectangle measures 18 m by 24 m. What is the sum of the lengths of its diagonals?

110. _____ mi/h Blake traveled 117 mi in 2.25 hours to come home from college. What was the average speed at which Blake traveled?



Workout 4

111. _____ in The height of a solid cone, shown here, is 18 in, and its radius is 8 in. A cut parallel to the circular base is made completely through the cone so that one of the two resulting solids is a smaller cone. The radius of the small cone is 2 in. What is the height of the smaller cone? Express your answer as a decimal to the nearest tenth.



112. _____ If a is the greatest common factor of 72 and 48, and if b is the greatest common factor of 108 and 144, what is the least common multiple of a and b ?

113. _____ arr



Some radio stations have call letters that contain 4 letters. Two examples are KTOO and WFXM. The first letter must be a K or W, and the last 3 letters can be any letter except K or W. How many different 4-letter arrangements of station call letters are possible?

114. _____ m A hare is running at a rate of 1 m every minute, while a tortoise is crawling at a rate of 1 cm every second. In meters, how much farther than the tortoise will the hare travel in an hour?



115. _____ ppl Each day on Earth more people are born than die. If there is a net gain of 150 living people on the planet each minute, how many more people are there on Earth every day? Express your answer in scientific notation with three significant digits.

116. _____ % If the length of each longer side of a rectangle is increased by 75% and each shorter side is increased in length by 25%, what is the overall percent increase in the area of the original rectangle? Express your answer as a decimal to the nearest hundredth.

117. _____ mL A scientist has 50 mL of a 50% acid solution and wishes to create a 20% acid solution by adding a quantity of a 10% acid solution. How many milliliters of the 20% acid solution will she have after she mixes the weaker and stronger solutions?

118. _____ mi On a county map, the distance between Tinsel Town and Emerald City measures 3.5 in. The actual distance between the two locations is 42 mi. If the distance between Emerald City and Diamond Bluff measures 2.75 in on that same map, how many miles apart are the two cities?



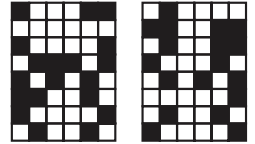
119. _____ ft After a ball is dropped, the rebound height of each bounce is 80% of the height of the previous bounce. The height of the first bounce is 5 ft. What is the height of the sixth bounce of this ball? Express your answer as a decimal to the nearest tenth.


120. _____ % If a circle with a diameter of $8\frac{1}{2}$ in is cut from an $8\frac{1}{2}$ -in by 11-in sheet of paper, what percent of the area of the sheet of paper is left over? Express your answer as a decimal to the nearest tenth.



Warm-Up 9

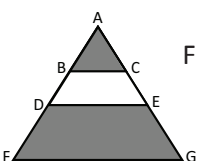
121. _____ In the two grids shown, some of the squares are black, and the remaining squares are transparent. If the grid on the left were translated so that it completely covers the grid on the right, what letter would be formed by the black squares?



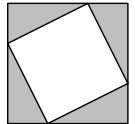
122. _____ ft  A 30-ft-long telephone pole is perpendicular to the ground, as shown. The height of the pole above ground is four times the length of the portion of the pole located below ground. How many feet above ground is the top of the pole?

123. _____ The units digit of a positive three-digit integer is 0. The sum of the other two digits is 12. Interchanging the tens and hundreds digits increases the number by 540. What is the original number?

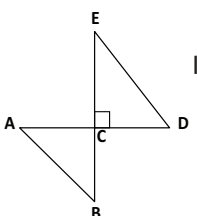
124. _____ $\frac{\text{outcomes}}{\text{comes}}$ A student rolls three standard, six-sided dice (one red, one blue and one green). How many possible outcomes are there for the three values showing on the top faces of the dice?

125. _____ $^\circ$  From a piece of striped material, Tanya cut out the isosceles triangle shown here. If the measure of the vertex angle of this large isosceles triangle is 50° and $\overline{BC} \parallel \overline{DE} \parallel \overline{FG}$, what is the measure of $\angle BCE$?

126. _____ % If the vertices of the smaller square divide each side of the larger square in the ratio of 2:1, in the figure shown, what percentage of the larger square is shaded? Express your answer to the nearest whole number.



127. _____ If the probability that Christoph will get an A on a test is 0.25, what is the probability that he will get an A on the next two tests? Express your answer as a common fraction.

128. _____ units  In the figure shown, point C is the midpoint of segment AD, and $BC = \frac{2}{3} EC$. If $AD = 10$ units, and the area of $\triangle CDE$ is 30 units², how long is segment AB? Express your answer in simplest radical form.

129. _____ $\frac{\text{milk balls}}{\text{balls}}$ Mandy had a box of chocolate malted milk balls. She ate 5 and gave her brother 3. Then she passed around the remaining milk balls to the 8 members of the math team. The first team member took 1, the second took 3, the third took 5, and so on, with each team member taking the next higher odd number of milk balls. There were just enough milk balls in the box for the last team member to take her correct amount. What was the original number of milk balls in Mandy's box?

130. (_____ , _____) Point P(3, 2) lies on the graph of the equation $y = 3x - 7$. What are the coordinates of the image of point P after the line is reflected across the y-axis and translated up 4 units?



Warm-Up 10

131. _____ Each pair of numbers below can be combined using one of the operations addition, subtraction, multiplication or division to obtain the same result. What is the common result for the three pairs?

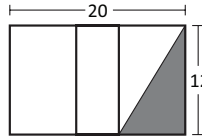
Pair A: 6, 4

Pair B: 16, 8

Pair C: 36, 12

132. \$ _____ Grandpa has 18 coins in his pocket. Three of the coins are quarters and the rest are dimes and nickels. There are twice as many dimes in his pocket as nickels. What is the total value of the nickels and dimes in his pocket?

133. _____ units²



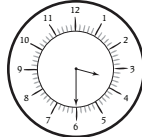
Two squares of side length 12 units overlap to form a 20×12 rectangle, as shown. What is the area of the shaded triangle?

134. _____ The product of a set of distinct, positive integers greater than 1 is 84. What is the least possible sum of these integers?

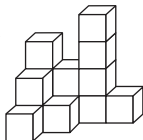
135. _____ pics An artist draws 20 pictures, one after the other, in 240 minutes. If she draws 3 times as fast, how many pictures will the artist draw in 6 hours?



136. _____ ° What is the degree measure of the smaller angle formed by the minute hand and the hour hand of a clock at 3:30?



137. _____ cm²

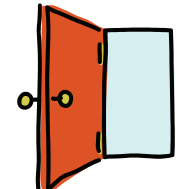


Gerard glues together 14 bricks to form the solid shown. Each brick is a cube with edge length 1 cm. Adjacent bricks are glued together so that faces entirely overlap. What is the surface area of Gerard's solid, including the bottom face?

138. _____ points A line contains the points P(1, 3) and Q(17, 43). How many points on this line lie strictly between points P and Q and have two integer coordinates?

139. _____ ways In how many ways can the numeral 20 be written as the sum of three distinct positive integers? (Note: $3 + 4 + 13$ and $13 + 3 + 4$ are to be considered the same.)

140. _____ ways If a room has 7 doors, in how many ways can a person enter through one door and exit through a different door?



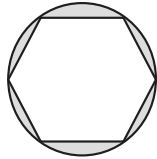


Workout 5

141. _____ What number is 75% of the positive difference between 40% of 80 and 32% of 75?

142. _____ phone numbers A telephone number consists of a three-digit area code followed by a seven-digit local code. Neither the area code nor the local code may have a first digit of 0 or 1. If the codes 800, 888, 877 and 866 are toll-free codes and are not used as area codes, how many ten-digit telephone numbers are possible? Express your answer in scientific notation with four significant digits.

143. _____ in² A regular hexagon is inscribed in a circle with a radius of 2 in, as shown. What is the area of the shaded region? Express your answer as a decimal to the nearest hundredth.

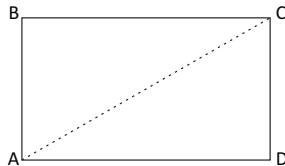


144. _____ Paulo bought and then sold two bikes. He made a 30% profit on the sale of the first bike and a 50% profit on the second one. If Paulo's total profit was 45%, what was the ratio of his cost for the first bike to his cost for the second bike? Express your answer as a common fraction.



145. _____ If each of the digits 2, 3, 4, 6, 7 and 8 is used exactly once to construct two three-digit numbers m and n , what is the smallest possible positive value of the difference $m - n$?

146. _____ mm²



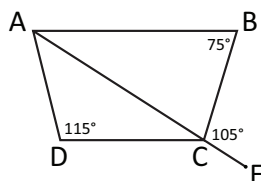
In rectangle ABCD, shown here, $\angle ACB$ measures 30° and $CD = 40$ mm. What is the area of rectangle ABCD? Express your answer as a decimal to the nearest tenth.

147. _____ points In the game of Smitch, a quitch and two gritches are worth 20 points, whereas a gritch and two quitches are worth 25 points. How many points is each gritch worth?

148. _____ mi Sam leaves home at the same time each morning and drives directly to work. If his travel speed averages 30 mi/h, he will be 18 minutes late for work. If his travel speed averages 45 mi/h, he will arrive 8 minutes early. What is the total number of miles between Sam's home and work?

149. _____ sub-sets How many subsets containing an odd number of elements does a set with 10 elements have?

150. _____ °



In trapezoid ABCD, shown here, diagonal \overline{AC} is extended to point E. What is the degree measure of $\angle DAC$?



Warm-Up 11

1	2	3	4	5
6	7	8	9	10
11	12	13	14	15
16	17	18	19	20
21	22	23	24	25
26	27	28	29	30
31	32	33	34	35

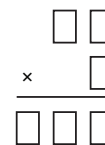
151. _____ On the number grid shown, Mara colored all of the positive multiples of n . Once completed, there was exactly one colored square in each column. What is the sum of all possible values of n ?

152. _____ Two standard, six-sided dice are rolled. What is the probability that the positive difference between the numbers rolled is 1? Express your answer as a common fraction.

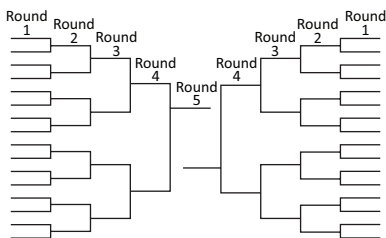


153. _____ What is the slope of a line perpendicular to the segment AB, which has endpoints A(-8.1, 4.9) and B(-7.6, 2.9)? Express your answer as a common fraction.

154. _____ Each of the digits 1 to 6 is placed in one of the boxes shown here to correctly complete the multiplication problem. What is the three-digit product?



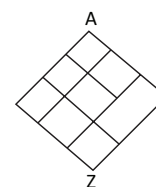
155. _____ points A jousting tournament has 32 competitors in a single elimination bracket, shown here. The table shows the number of points awarded for each correctly predicted match outcome in the tournament. What is the maximum number of points that can be earned?



Round 1	1 pt
Round 2	2 pts
Round 3	4 pts
Round 4	8 pts
Round 5	16 pts

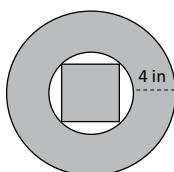
156. _____ The circumference of the base of a cone is triple the circumference of a cylinder with the same height. What is the ratio of the volume of the cylinder to the volume of the cone? Express your answer as a common fraction.

157. _____ paths How many paths from A to Z can be traced following line segments on this drawing if paths must be traced in a downward direction, with no retracing?



158. _____ If $\frac{x-y}{z-y} = -2$, what is the value of $\frac{x-z}{y-z}$?

159. _____ in² In the figure, the square is inscribed in the smaller circle, which has a radius of 4 in. The radius of the larger circle is 8 in. What is the total area of the shaded regions? Express your answer in terms of π .



160. _____ players In a tennis tournament, each of the 10 competitors plays each other player once. What is the maximum number of players who could end the tournament with a record of 7 or more wins?



Warm-Up 12



161. _____ ft A rectangular swimming pool, shown here, is surrounded by a concrete deck that is 5 ft wide. The length of the pool is 1.5 times its width, and its area is 216 ft^2 . What is the outside perimeter of the deck?

162. _____ : _____ pm A subway arrives at the station every 25 minutes. A train arrives at the station every 45 minutes. If the subway and the train each arrive at noon, at what time will they next arrive at the station together?

163. _____ hours



Working together, Tom and Dick can dig 3 holes in 6 hours. Knowing Tom digs twice as fast as Dick, how many hours would it take Tom, working alone, to dig 12 holes?

164. _____ times The pages in a book are numbered from 1 to 363. How many times does the digit 3 appear as part of a page number of this book?

165. _____ squares



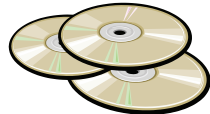
How many squares can be formed on a 16-pin rectangular geoboard?

166. _____ In a sequence of five positive integers, each term after the first term is determined by multiplying the preceding term by 1.5. If the median of the five terms is 36, what is the mean of the five terms? Express your answer as a decimal to the nearest tenth.

167. _____ years
old

The sum of Madison's age and 3 times Harper's age is 47 years. In 2 years Madison will be twice as old as Harper. How old is Harper?

168. _____ dollars

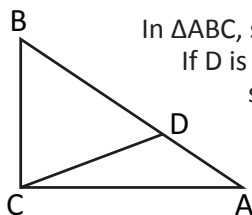


Andie bought 3 oldies CDs and 2 current CDs for \$78. Deanne bought 2 oldies CDs and 3 current CDs for \$82. What is the positive difference in the price of an oldie CD and the price of a current CD?

169. _____ intgrs

For how many positive integers containing no digit of zero is the sum of the digits equal to 5?

170. _____ units



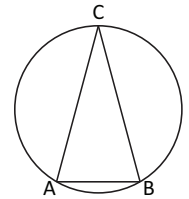
In $\triangle ABC$, shown here, the measure of $\angle BCA$ is 90° , $AC = 12$ units and $BC = 9$ units. If D is a point on hypotenuse \overline{AB} , such that $AD = 5$ units, what is the length of segment CD ? Express your answer in simplest radical form.



Workout 6

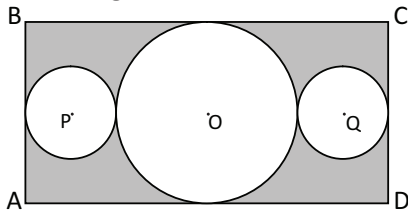
171. _____ pennies Mollie has fewer than 100 pennies. If she puts the pennies in stacks of five, there are three pennies left over. If Mollie puts them in stacks of seven, there is one penny left over. If she puts them in stacks of three, there are no pennies left over. What is the total number of pennies Mollie has?

172. _____ degrees Isosceles triangle ABC, shown here, is inscribed in a circle, and base AB of the triangle is equal in length to the radius of the circle. What is the degree measure of $\angle C$?



173. \$ _____ The price of a shirt was reduced by 20%. Including the 5% sales tax, Cyndi paid \$15.54 for the shirt. What was the original price of the shirt before the discount was applied?

174. _____ in² In the figure shown, circles P and Q are congruent, and the radius of circle O is twice that of each of the smaller circles. Circle P is tangent to rectangle ABCD at the midpoint of \overline{AB} , and circle Q is tangent to rectangle ABCD at the midpoint of \overline{CD} . Circle O is tangent to each of the smaller circles and is tangent to two sides of rectangle ABCD. If the radius of circle O is 4 in, what is the total area of the shaded regions? Express your answer as a decimal to the nearest tenth.



175. _____ The four positive integers P, Q, P + Q and P - Q are all prime and their sum is S. What is the value of S?

176. _____ mi/h A square measures 80 yd on a side. Bob and Rob begin running from the same corner. Bob runs along a side to an adjacent corner, and Rob runs along a diagonal to an opposite corner. They arrive at their respective corners at the same time. If Bob's speed was 8 mi/h, what was Rob's speed? Express your answer as a decimal to the nearest tenth.

177. _____ intrgs For how many positive integers n is the mean of the set $\{9, 5, 10, 12, n\}$ equal to its median?

178. _____ Students were asked to vote for one of the five choices listed for the new school mascot. Based on this data, what is the probability that a student selected at random from those who voted will be a student who did not vote in favor of Grizzly Bear as the school mascot? Express your answer as a common fraction.

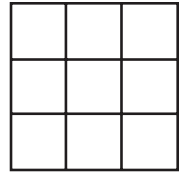
Mascot	Number of Votes
Grizzly Bear	68
Bull Dog	12
Bald Eagle	24
Wildcat	44
Panther	52

179. _____ factors How many positive integer factors does 96 have?

180. _____ units² What is the area of the quadrilateral whose vertices are $(4, -4)$, $(-4, 2)$, $(6, 7)$ and $(10, -1)$?



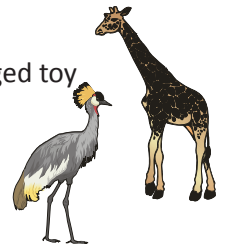
Warm-Up 13



181. _____ The figure shown consists of a large square divided into nine smaller, congruent squares. If a rectangle is chosen at random from this figure, what is the probability that it is a square? Express your answer as a common fraction.
182. _____ cm^2 An isosceles triangle has two congruent sides of length 13 cm and a height of 5 cm. What is the area of the triangle?
183. _____ If n is an even integer such that $0 < n < 10$, what is the sum of all possible unit fractions of the form $\frac{1}{n}$? Express your answer as a common fraction.
184. _____ units The area of a particular rectangle is $2a^2 - ab - b^2$ units². If its width can be represented by the expression $a - b$, what is the length of the rectangle, in terms of a and b ?
185. _____ mi/h If Mike travels for 3 hours at a rate of 20 mi/h and then travels for 2 hours at a rate of 30 mi/h , what is his average speed, in miles per hour?



186. _____ ints How many different, positive four-digit integers, with no repeated digits, can be formed using the digits 0 through 9?
187. _____ cm^3 A right circular cylinder has a surface area of $160\pi \text{ cm}^2$. If the height of the cylinder is twice the diameter of the base, what is the volume of the cylinder? Express your answer in terms of π .
188. _____ $\frac{\text{toy animals}}{\text{animals}}$ Ben and Jerry each have a collection of toy animals. Ben collects only two-legged toy animals and Jerry collects only toy animals with four legs. Jerry has 10 more toy animals than Ben. There are 220 legs in their combined collections. How many toy animals does Jerry have?



189. _____ Five blue marbles and five green marbles are randomly arranged in a row. What is the probability that the marbles alternate in color? Express your answer as a common fraction.



190. _____ % If the volume of an enlarged cube is 8 times the volume of the original cube, by what percent has the length of each edge increased?