



Warm-Up 5

1 ~~61.~~ _____ ways



A burger restaurant advertises that there are 96 possible ways to order your burger, assuming you have it on a white, wheat or sourdough bun. How many ways can you order a burger on a sourdough bun?

2 ~~62.~~ _____ hours

Working together, 2 groomers can brush 8 horses in 3 hours. How many hours would it take 3 groomers to brush 12 horses at this rate?



3 ~~63.~~ _____

In a regular hexagon, what is the ratio of the length of the shortest diagonal to the length of the longest diagonal? ~~Express your answer as a common fraction in simplest radical form.~~

4 ~~64.~~ _____ students

Liz is a student in Ms. Xu's class. Liz says to her classmates, "Of all the pairs of students Ms. Xu can choose as class leaders, I am included in one-tenth of those pairs." How many students are in Ms. Xu's class?

~~65.~~ _____

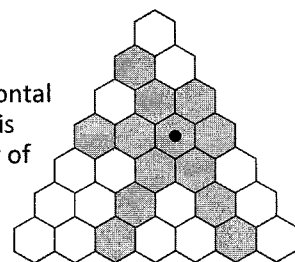
If $y = -x$ and $y \neq 0$, what is the value of $\frac{x^{2013}}{y^{2013}}$?

5 ~~66.~~ _____ minutes

During Bill's three-hour meeting, the word *global* was used, on average, once every five minutes during the first two hours. If the word *global* was used 54 times throughout the meeting, then what was the average number of minutes between uses in the third hour?

6 ~~67.~~ _____ dots

When a dot is placed in the figure shown, all cells along the dot's horizontal row and two diagonals are shaded. For instance, when the sample dot is placed in the figure, 13 cells are shaded. What is the minimum number of dots that must be placed so that all cells are shaded?



~~68.~~ (_____ , _____)

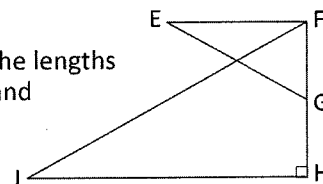
~~Given the points A(-2, 1) and B(3, 4), what are the coordinates of point C in the fourth quadrant such that $m\angle CAB = 90$ degrees and $AB = AC$? Express your answer as an ordered pair.~~

7 ~~69.~~ _____ degrees

The measure of $\angle A$ is 32 degrees. What is the positive difference between the degree measures of the complement and the supplement of $\angle A$?

8 ~~70.~~ _____ cm

In the figure shown, point G is the midpoint of \overline{FH} , $\overline{JH} \perp \overline{FH}$ and the lengths of \overline{JH} and \overline{FG} are 8 cm and 3 cm, respectively. If $\angle EGF \cong \angle JFH$ and $\angle FJH \cong \angle FEG$, what is the perimeter of $\triangle EFG$?





Warm-Up 6

- 9 71. _____ The competition scores for eight students from Descartes Middle School are listed below. What is the positive difference between the median and the range of these scores?

12, 28, 17, 8, 25, 19, 10, 22

- 10 72. _____ What is the sum of the exponents when $\frac{(3a^2b^3)(ab^2)}{3ab}$ is written in simplest form?

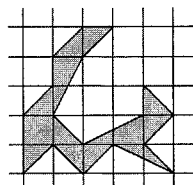
- 11 73. _____ feet What is the length of the diagonal of a rectangle with side lengths of 5 feet and 3 feet? ~~Express your answer in simplest radical form.~~

74. _____ What is the slope of the line that intersects the x-axis at $x = 91$ and intersects the y-axis at $y = 7$? ~~Express your answer as a common fraction.~~

- 12 75. _____ What is the units digit of 2013^{2013} ?

- 13 76. _____ If Russell rolls two standard dice once, what is the probability that the sum of the two numbers rolled is not a prime number? Express your answer as a common fraction.

- 14 77. _____ units² What is the area of the shaded region?



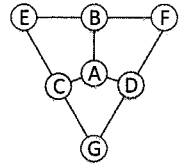
- 15 78. _____ seconds Chris and Sandy ran a half-mile race. Sandy ran the race at a steady pace of $\frac{1}{6}$ mile per minute, and Chris ran at a steady pace of $\frac{1}{5}$ mile per minute. How many seconds after Chris finished the race did Sandy cross the finish line?

- 16 79. _____ faces A regular polyhedron has 8 vertices and 12 edges. How many faces does it have?

- 17 80. _____ in² What is the area, in square inches, of the largest triangle that can fit in a 3-inch by 4-inch rectangle?



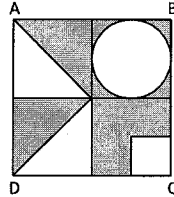
Warm-Up 17



18 241. _____

Each of the letters A, B, C, D, E, F and G in the figure shown will be replaced with a different value from the set $\{1, 2, 3, 4, 5, 6, 7\}$. If the sums of the four numbers in each of the three quadrilaterals are each 15, what is the sum of all numbers that can replace A?

19 242. _____ units²



Square ABCD, shown here, has side length 8 units and is divided into four congruent squares. One of these squares contains an inscribed circle, two other squares contain diagonals and the fourth square has perpendicular line segments drawn from the midpoints of adjacent sides to form a square in the interior. In square units, what is the total area of the shaded regions? Express your answer in terms of π .

20 243. _____

Five integers form an arithmetic sequence with a mean of 18. If the mean of the squares of the five integers is 374, what is the largest of the five original integers?

21 244. _____ whole numbers

The prime factorization of 75 is written, without exponents, as $3 \times 5 \times 5$. The sum of the prime factors is $3 + 5 + 5 = 13$. For how many whole numbers is the sum of each number's prime factors, without exponents, equal to 13?

22 245. _____ marbles

Xavier gave Yvonne and Zeena the same number of marbles as each already had. Then Yvonne gave Xavier and Zeena the same number of marbles as each already had. Then Zeena gave Xavier and Yvonne the same number of marbles as each already had. At that point, each person had 48 marbles. How many fewer marbles did Xavier have at the end than he had at the start?

23 246. \$ _____



The ratio of Barbara's cell phone bill to Tina's cell phone bill was 7:5. Barbara's bill was \$14 more than Tina's bill. How much was Barbara's bill?

24 247. _____ ways

In how many ways can four different positive integers be placed, one per box, so the sum of the integers is 13?

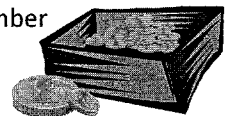


248. _____

Three numbers have a sum of 5 and the sum of their squares is 29. If the product of the three numbers is -10 , what is the least of the three numbers? Express your answer in simplest radical form.

25 249. _____

A box contains only quarters and dimes. If there were 10% more quarters, the total value of the money in the box would increase by 7.5%. What is the ratio of the number of quarters to the number of dimes in the box? Express your answer as a common fraction.



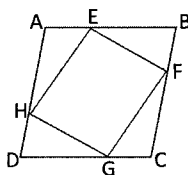
26 250. _____ units³

In trapezoid ABCD, angles A and D are right angles, and $AB = 4$ units, $DC = 16$ units and $BC = 15$ units. The trapezoid is revolved 360° around side AD to form the frustum of a cone. What is the volume of this frustum? Express your answer in terms of π .

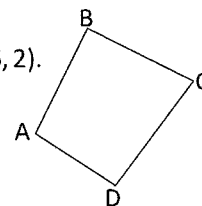


Warm-Up 18

- 27 251. _____ There are 240 pairs of numbers such as $\{7, 5318\}$ or $\{17, 358\}$ that can be formed using each of the digits 1, 3, 5, 7 and 8 exactly once. What is the largest possible product of two such numbers?
- 28 252. _____ ft If a rectangle with an area of 400 ft^2 is divided into two smaller rectangles with areas in the ratio of 3:1, what is the least possible value of the perimeter of the smaller rectangle?
- 29 253. _____ A set of seven different positive integers has a mean of 13. What is the positive difference between the largest and smallest possible values of its median?
- 30 254. _____ When written in a certain positive base b , 363 (base 10) is 123 (base b). What is the value of b ?
- 31 255. _____ units^2 Rhombus EFGH is inscribed in rhombus ABCD with point E on \overline{AB} , point F on \overline{BC} , point G on \overline{CD} and point H on \overline{AD} . If $AE:EB = BF:FC = CG:GD = DH:HA = 1:2$, and if the area of rhombus ABCD is 180 units^2 , what is the area of rhombus EFGH?

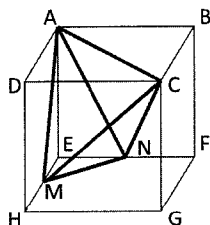


- 32 256. _____ The solutions $x = u$ and $x = v$ of the quadratic equation $rx^2 + sx + t = 0$ are reciprocals of the solutions of the quadratic equation $(2 + a)x^2 + 5x + (2 - a) = 0$ for some integer a . If the GCF of r , s and t is 1, what is the value of $r + s + t$?
- 33 257. _____ A club with 22 students is forming a committee of either 4 or 5 students. What is the ratio of the number of different 4-person committees possible to the number of different 5-person committees possible? Express your answer as a common fraction.
- 34 258. _____ Quadrilateral ABCD has vertices at points $A(-9, 4)$, $B(-7, 8)$, $C(-3, 6)$ and $D(-6, 2)$. Quadrilateral WXYZ is congruent to quadrilateral ABCD and has vertices $W(2, -3)$, $X(4, 1)$ and $Y(8, -1)$ and a fourth vertex, Z. What is the sum of the coordinates of vertex Z?



- 35 259. _____ units^2 A right triangle has integer side lengths a , b and c with $a < b < c$. If $a + c = 49$, what is the area of the triangle?

36 260. _____ units^3



The cube with vertices A, B, C, D, E, F, G, H has edges of length 2 units. Point M is the midpoint of \overline{EH} and N is the midpoint of \overline{EF} . What is the volume of the tetrahedron with vertices A, C, M, N? Express your answer as a common fraction.