

MATHCOMP 2008

Grade 6 - 60 minutes

1. A factory makes dresses and shirts. Three dresses are made for every four shirts. If the factory produced 420 dresses and shirts today, how many dresses did it make?

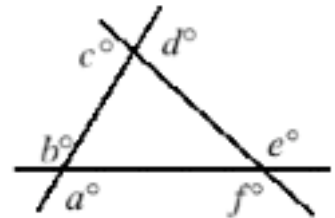
- A) 140 B) 180 C) 210 D) 240 E) 315

2. How many letters of the word **MATHCOMP** do not have any lines of symmetry?

- A) 0 B) 1 C) 2 D) 3 E) 4

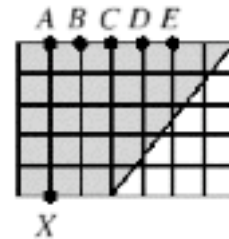
3. What is the value of $a + b + c + d + e + f$?

- A) 360 B) 540 C) 720 D) 900
E) depends on the triangle



4. Which of the following straight lines cuts the shaded area in half?

- A) XA B) XB C) XC D) XD E) XE



5. If x is a positive integer, then $x + \sqrt{x}$ **cannot** equal

- A) 20 B) 30 C) 60 D) 90 E) 110

6. The odd integers between 8 to 2008 are multiplied together. The last digit [units digit] of the product is

- A) 1 B) 3 C) 5 D) 7 E) 9

7. How many whole numbers between 99 and 999 are divisible by 4, 6, and 9?

- A) 13 B) 24 C) 25 D) 27 E) 31

8. If p is a positive integer and q is a negative integer, which of the following is the largest?

- A) $p - q$ B) $q - p$ C) $p + q$ D) $-p - q$ E) pq

9. If 70% of Texans have seen the Atlantic Ocean and 60% of them have seen the Pacific Ocean, what is the smallest possible value for the percent of Texans who have seen both oceans?

- A) 20% B) 30% C) 42% D) 60% E) 70%

10. Which one of these five numbers is the greatest?

- A) $\frac{1}{15} \div \frac{1}{18}$ B) $\frac{1}{18} \div \frac{1}{15}$ C) $\frac{1}{18} \times \frac{1}{15}$ D) $\frac{1}{18} + \frac{1}{15}$ E) $\frac{1}{15} - \frac{1}{18}$

11. A store advertises "Buy one, get the second one at half price." For this offer, the average cost per item is the same as

- A) two for the price of one B) three for the price of one C) three for the price of two
 D) four for the price of three E) five for the price of four

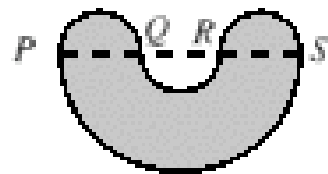
12. Take two sheets of 8 inch by 12 inch paper. Fold one sheet vertically into fourths to form the sides of a rectangular prism. Fold the other sheet horizontally into fourths to form the sides of a different rectangular



prism. What is the difference in volume, in cubic inches, between the larger prism and the smaller prism?

- A) 12 B) 18 C) 24 D) 30 E) 36

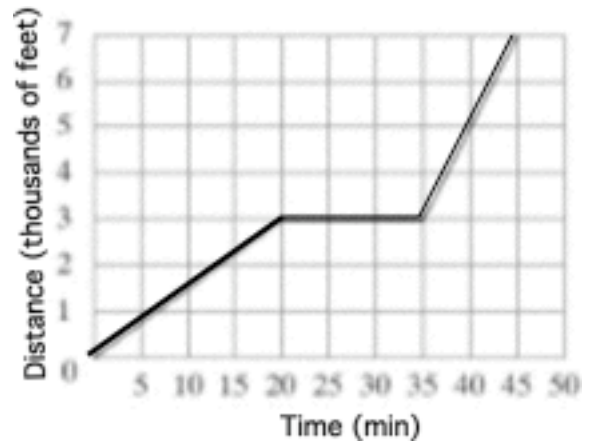
13. The points P , Q , R , and S are collinear with $PQ = QR = RS = 2$. The shape is made up of semi-circles with diameters PQ , QR , RS , and PS . The area of the [shaded] shape is



- A) 3π B) $\frac{7}{2}\pi$ C) 4π D) $\frac{9}{2}\pi$ E) 5π

14. Harry is walking along a hiking trail. The graph represents his distance from the start of the trail compared to time. Assume that he made a 15-minute stop during his walk. His average walking rate, in feet/minute, during the time he was walking was closest to

- A) 235 B) 275 C) 315 D) 355 E) 155

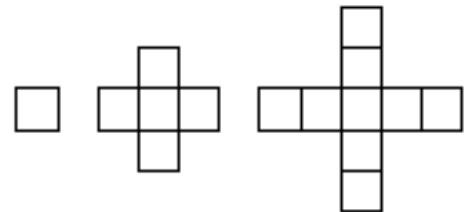


15. A lily pad doubles in size each day. If it takes 28 days for the lily pad to cover the entire pond, how many days will it take for it to cover one-eighth of the pond?

- A) 3.5 B) 7 C) 14 D) 20 E) 25

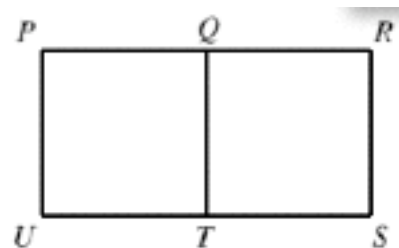
16. It takes four toothpicks to build the first figure in this set. How many toothpicks are needed to build the tenth figure?

- A) 112 B) 118 C) 120 D) 124 E) 136



17. The figure shows rectangle PRSU and segment QT that divides the rectangle into two congruent squares. How many right-angled triangles can be drawn using three of the points {P, Q, R, S, T, U} as vertices?

- A) 8 B) 9 C) 10 D) 12 E) 14



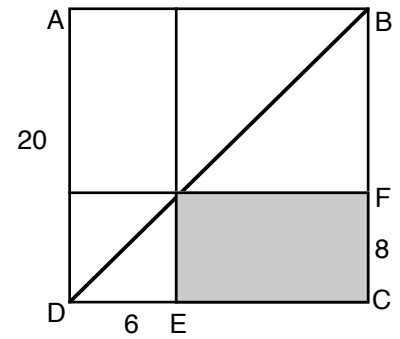
18. Between 1875 – 1878, there was a 20¢ U.S. coin which will be called a *twent*. A jar of coins has many nickels (worth 5 cents), dimes (worth 10 cents), and *twents*. You pick out three coins. How many possibilities are there for the total value of the three coins?

- A) 7 B) 8 C) 9 D) 10 E) 27

19. A set of seven different positive integers has its mean and its median both equal to 20. What is the largest possible integer that this set can contain?

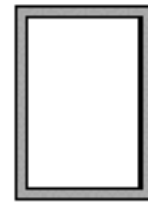
- A) 65 B) 67 C) 71 D) 73 E) 77

20. Rectangle ABCD is divided into four smaller rectangles by two straight lines parallel to its sides, so that the lines intersect on the diagonal of the rectangle, as shown on the diagram. If $AD = 20$, $DE = 6$, $CF = 8$, the area of the shaded rectangle is



- A) 64 B) 72 C) 80 D) 88 E) 96

21. A 30cm by 40 cm page of a book includes a 2 cm margin on each side. What percent of the page is occupied by the margin?



- A) 14% B) 16% C) 18% D) 20% E) 22%

22. The units [ones] digit of $7^{2008} + 2008^7$ is A) 1 B) 3 C) 5 D) 7 E) 9

23. A basket contains red and green candies. If one third of the green candies are removed, it is found that the number of red and green candies remaining in the basket is now the same. What was the original percentage of red candies in the basket?

- A) 25 B) $33\frac{1}{3}$ C) 40 D) 60 E) $66\frac{2}{3}$

24. Adolph Monk had a difficult year in 2007. A crime wave in London meant he had 20% more cases to solve in 2007 than in 2006, but his success rate dropped. In 2006, he solved 80% of his cases but in 2007 he solved only 60% of them. What was the percent change in the number of cases he solved in 2007 compared to 2006?

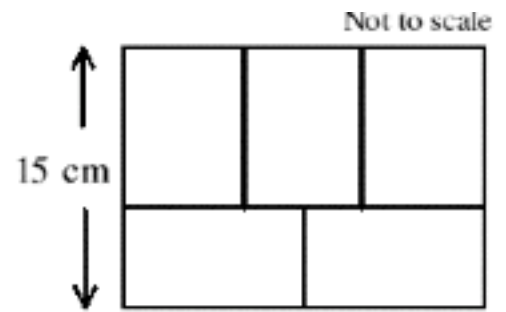
- A) down 10% B) down 8% C) no change D) up 8% E) up 10%

25. In the diagram, $PT = QT = TS$; $QS = SR$; and $\angle PQT = 20^\circ$. What is the value of x ?

- A) 20 B) 25 C) 30 D) 35 E) 40



26. Five identical rectangles fit together inside a larger rectangle as shown. What is the area, in cm^2 , of the larger rectangle?



- A) 270 B) 300 C) 330 D) 360 E) 450

27. The manager of the Sherbet Shoppe wants to construct a circle graph showing the popularity of the various sherbet flavors he offers. Here is the tally of the favorite flavors of his first 30 customers on Saturday. The measure of the angle in the sector for lemon sherbet is closest to

Favorite Sherbet Flavors

Pineapple	I
Lime	
Lemon	I
Raspberry	
Orange	

- A) 30° B) 45° C) 60° D) 75° E) 90°

28. A solid wooden cube is painted red on the outside. The cube is then cut into 8 smaller cubes of equal size. What fraction of the total surface area of these 8 cubes is painted red?

- A) $\frac{1}{8}$ B) $\frac{1}{3}$ C) $\frac{3}{8}$ D) $\frac{1}{2}$ E) $\frac{3}{4}$

29. Seven people are sitting in a theater in a row containing exactly seven seats. After the intermission they return to the same row and randomly choose a seat. What is the probability that neither of the people sitting in the two aisle seats sat in them before the intermission?

- A) $\frac{3}{7}$ B) $\frac{10}{21}$ C) $\frac{11}{21}$ D) $\frac{4}{7}$ E) $\frac{13}{21}$

30. In the diagram on the right, how many squares, of any size, are there whose entries have an even sum?

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

- A) 12 B) 20 C) 32 D) 36 E) 45