Bubble in the single best choice for each question you choose to answer.

1. Allan is now twice as old as Gloria was three years ago. In three years, Gloria will be as old as Allan is now. How old is Gloria?

   (A) 3

   (B) 6

   (C) 9

   (D) 12

   (E) 15

2. In a certain family each daughter has the same number of brothers and sisters. Each son has twice as many sisters as brothers. How many children are in the family?

   (A) three

   (B) four

   (C) five

   (D) six

   (E) more than six

3. What is the sum of the exponents in the prime factorization of 2010?

   (A) 2

   (B) 3

   (C) 4

   (D) 7

   (E) 2010

4. The odds in favor of an event are 3 to 2. What is the probability of the event?

   (A) 0.2

   (B) 0.4

   (C) 0.6

   (D) 0.8

   (E) 1.5

5. An airport waiting room contains 80 people. If 15% of those people are not U.S. citizens, how many U.S. citizens are in the room? Assume exactly one nationality per person.

   (A) 12

   (B) 14

   (C) 56

   (D) 68

   (E) 70

6. Fill in the blank.

   *I think Fibonacci is fun,*
   *You start with a one and a one,*
   *Then two, three, five, _____,*
   *But don't stop there, mate,*
   *The fun has just barely begun.*

   (A) straight

   (B) seven

   (C) eleven

   (D) eight

   (E) six

7. A *tesselation* or tiling of the plane is a collection of plane figures that fills the plane with neither overlaps nor gaps. Which regular polygon can**not** tile the plane?

   (A)  Equilateral triangle

   (B)  Square

   (C)  Regular pentagon

   (D)  Regular hexagon

   (E)  All of the above can tile the plane.

8. If the natural numbers are arranged in the following pattern what is the 7th number (from the left) in the 10th row?

   $$
   \begin{array}{ccccccc}
   1 & & 2 & & 5 & & 10 & & 17 & & \vdots \\
     & & \downarrow & & \downarrow & & \downarrow & & \downarrow \\
   4 & \leftarrow & 3 & & 6 & & 11 & & 18 \\
     & & & & \downarrow & & \downarrow & & \downarrow \\
   9 & \leftarrow & 8 & \leftarrow & 7 & & 12 & & 19 \\
     & & & & & & \downarrow & & \downarrow \\
   16 & \leftarrow & 15 & \leftarrow & 14 & \leftarrow & 13 & & 20 \\
     & & & & & & & & \downarrow \\
   25 & \leftarrow & 24 & \leftarrow & 23 & \leftarrow & 22 & \leftarrow & 21
   \end{array}
   $$

   (A)  88

   (B)  94

   (C)  96

   (D)  97

   (E)  107

9. In the table the sum of each row, column, and diagonal is the same.
   What is the value of $A + B + C + D$?

   (A)  80

   (B)  64

   (C)  96

   (D)  60

   (E)  72

   | $A$ | 4  | $B$ |
   |-----|----|-----|
   | 10  | 16 | 22  |
   | $C$ | 28 | $D$ |

10. During the first three basketball games, Jordan scored an average of 18 points. After the fourth game, Jordan's scoring average dropped to 17 points. How many points did Jordan score in the fourth game?

    (A)  14

    (B)  15

    (C)  16

    (D)  17

    (E)  18

11. $\triangle ABC$ is isosceles with $AB = AC$, and $AG \perp BC$. Point $D$ is the midpoint of $AB$, point $F$ is the midpoint of $AC$, and $E$ is the point of intersection of $DF$ and $AG$. What fraction of the area of $\triangle ABC$ does the shaded area represent?

    (A)  1/12

    (B)  1/6

    (C)  1/4
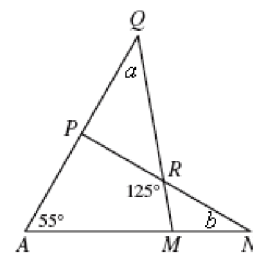
    (D)  1/10

    (E)  1/8
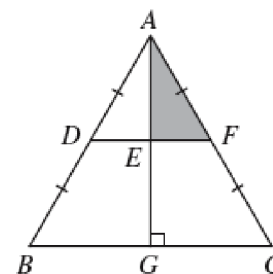
12. If $x + y = a$ and $x - y = b$, then what is the value of $2^{x^2 - y^2}$ ?

    (A)  $2^{a+b}$

    (B)  $2^{a^2 - b^2}$

    (C)  $2^{a-b}$

    (D)  $2^{a/b}$

    (E)  $2^{ab}$

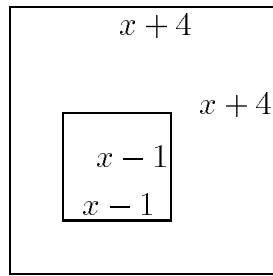13. In the diagram, all lines that look straight are. What is the value of $a + b$?

    (A)  55°

    (B)  70°
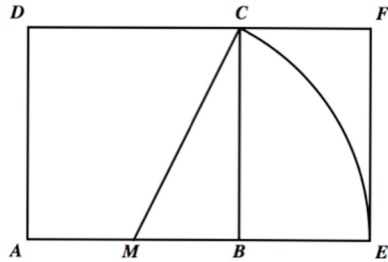
    (C)  75°

    (D)  80°

    (E)  90°

14. What is the area between the two squares if $x \geq 1$?

(A)  $10x + 15$

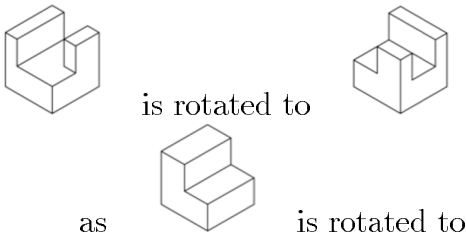(B)  $2x^2 - 4x + 16$

(C)  25

(D)  3

(E)  $x^2 + 3x - 4$



15. $\square ABCD$ is a square with side length 2, $M$ is the midpoint of $\overline{AB}$, and $\overline{MC} = \overline{ME}$. What is the length of $\overline{AE}$?

(A)  $1 + \sqrt{2}$

(B)  $1 + \sqrt{3}$

(C)  $1 + \sqrt{4}$

(D)  $1 + \sqrt{5}$

(E)  $1 + \sqrt{6}$



16.  is rotated to  as  is rotated to

(A) 

(B) 

(C) 

(D) 

(E) 

17. In working 4 hours, Frank made 24 machine parts. At this rate, how many parts will Frank make in 9 hours?
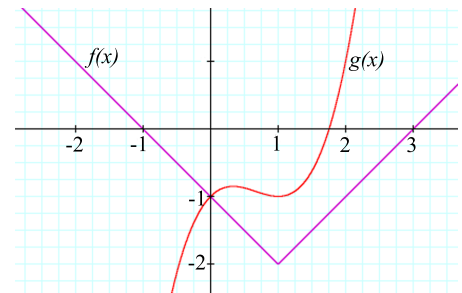
(A)  36 parts

(B)  45 parts

(C)  54 parts

(D)  72 parts

(E)  81 parts

18. What is the equation of the line perpendicular to $y = -\frac{1}{2}x + 4$ and passes through through the point $(2, 6)$?

(A)  $y = 2x + 10$

(B)  $y = \frac{1}{2}x + 5$

(C)  $y = x + 4$

(D)  $y = 2x + 2$

(E)  $y = \frac{1}{2}x + \frac{1}{4}$

19. What is $f(2) - g(1)$?

(A)  $-2$

(B)  $-1$

(C)  0

(D)  1

(E)  2



20. In the diagram, $ABCD$ is a square and $P$ is a point on the circle with diameter $CD$, $CP = 7$, and $PD = 11$. What is the area of the square?

(A)  170

(B)  220

(C)  240

(D)  310

(E)  335