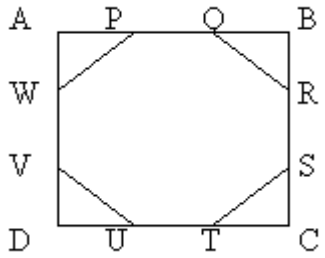
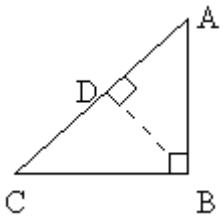
第十二套

1. The sides of a rectangular piece of card are each 10 per cent too long for a particular project. By what percentage is the area too large?

2. Andy, Mark and Sean all have their birthdays today, but Andy is more than twice as old as Mark and Mark is more than four years older than Sean. If Andy is less than 16 years old, what is one possible value for Mark's age in years ?



3. ABCD is a square. Also AP=PQ=QB=BR=RS=SC=CT=TU=UD=DV=VW=WA. The area of the octagon PQRSTUVW is what fraction of the square?



4. Triangle ABC is a right angled triangle. Also AC = 5, CB = 3 and angle ADB is a right angle.
What is the length of DB?

5. A football team has won 10 games and lost 5 games. If the team wins the remaining games of the season, it will have won 80 percent of its games. How many games in total will have been played?

6. Let the function f be defined by f(x) = x - 1
What is the value of y if y is a positive integer such that 1/3 $f(y^2) = 5$?

7. The amount of time taken to paint a wall is inversely proportional to the number of painters working on the job. If it takes 3 painters 5 days to complete such a job, how many days longer will it take if there are only 2 painters working?

8. Line l and line m lie in the same plane but have no points in common. They are both tangent to a circle of area 9π. What is the shortest distance between any point on l and any point on m?

9. A box contains 5 chocolates with soft centers, 6 with nut centers, and 11 with hard caramel centers. Three students take turns to take a chocolate at random from the box and eat it. If the probability that all three students take soft centers is 1/x, what is the value of x?

10. At one point in a game the shooting team has a ratio of hits to misses of 5:1. After the next team misses the nest three shots, which are the last in the game, its ratio of hits to misses is 5:2. What is the total number of shots taken by the team in the game?

参考答案:

1.Correct Answer: 21

Explanation:

Let each side = 110, so area = 110 x 110 = 12,100

If each side is ten per cent too long then each side should be reduced to 100.

So the correct area is 100 x 100 = 10,000.

The area is 2100 units too large. 2100 as a percentage of the correct area = (2100 /10,000)

100 = 21

2.Correct Answer: 6

Explanation:

A > 2M

M > S + 4 (where A, M and S are Andy's, Mark's, and Sean's ages today)

We can select numbers less than 16 for Andy's age and check the equations.

If A = 15, then M could be 7

(S is not needed here, but cannot be less than 1, which means that M cannot be less than 6)

3.Correct Answer: 7/9

Explanation:

The octagon is not a "regular" octagon.

But the sides of the square are divided into three equal parts.

If we let one of these parts = 1, the area of the square = 9

The octagon is the square minus four equal 45-45-90 triangles. The area of one such triangle = ½ x 1 x 1 = ½. Four triangles = 2

The octagon area = 9 - 2 = 7

The fraction = 7/9

4.Correct Answer: 2.4

Explanation:

This is another "special triangle" problem. The hypotenuse = 5, one leg = 3, so the other leg (AB) = 4

Now we can calculate the area = ½ x 4 x 3 = 6

The line segment DB is also the height of the triangle if we take AC as the base.

Area = ½ x AC x DB; 6 = ½ x 5 x DB; DB = 6/2.5 = 2.4

5.Correct Answer: 25

Explanation:

Let the total number of games to be played = n

Number lost = 5; number won = n-5

n-5 = 80/100 x n; n - 5 = 0.8n; 0.2n = 5; n = 25

6.Correct Answer: 4

Explanation:

We can find $f(y^2)$ by plugging in to get $f(y^2) = y^2 - 1$ Now we take 1/3 of this value as equal to 5; $(y^2 - 1)/3 = 5$; thus $y^2 = 16$ and $y = 4$

7.Correct Answer: 2.5

Explanation:

For inverse proportions remember the formula $x_1y_1 = x_2y_2$

Here initial painters x days = final painters x days; 3 x 5 = 2 x days

Total days taken will be 15/2 = 7.5, but there is a catch: you were asked how much **longer** it would take. Initial time was 5 days so it will take 2.5 days longer.

8.Correct Answer: 6

Explanation:

The description tells us that l and m are parallel lines with the circle lying between and touching both. Area of the circle = $\pi r^2 = 9\pi$. Radius = 3 and diameter = 6.

9.Correct Answer: 154

Explanation:

The total number of chocolates to start with is 22. The first student has a chance of 5/22 of taking a soft center. The second student has a only 21 sweets left of which 4 could be soft: his chance is therefore 4/21. Similarly the third student has a chance of 3/20

Total probability is obtained by multiplying all these chances together: (5/22)(4/21)(3/20) = 1/154 [It is best to cancel the terms down rather than using a calculator because we want a fraction not a decimal]

10.Correct Answer: 21

Explanation:

A ratio of 5: 2 means 5x: 2x. Total shots = 7x. The last three shots added one unit to the ratio, and so x = 3.