Mathematics 306/326
REVIEW 7

1- Contents

Question	Item	Objective	Type	Skill
1	0208	PRO.01	Extended answer	Problem solving
2	0217	PRO.02	Extended answer	Applications
3	0502	GEO.03	Extended answer	Problem solving
4	0556	PRO.02	Extended answer	Problem solving
5	2070	GEO.03	Extended answer	Problem solving
6	2071	GEO.03	Extended answer	Problem solving
7	2168	PRO.02	Extended answer	Problem solving

2- Correction key

1

Work : (example)
Number of large congruent sector : 9 Number of sectors with a star : 2
These 2 sectors together form 1 large sector
Number of congruent sectors : 9 + 1 = 10
Probability of stopping on a star : $\frac{1}{10}$

Result The probability of winning a prize is $\frac{1}{10}$.

2

Work : (example)
There are 12 candies in the jar.
First draw, P(black candy) = $\frac{3}{12}$
Second draw, P(green candy) = $\frac{2}{11}$

$$\text{P(black candy and green candy)} = \text{P(black candy)} \times \text{P(green candy)}$$
$$= \frac{3}{12} \times \frac{2}{11}$$
$$= \frac{6}{132}$$

Result The probability is $\frac{6}{132}$.

3

Area of disk
$75.36 \times 6 = 452.16$
Radius of circle
$r = \sqrt{\frac{452.16}{\pi}} = 11.996...$
$r \approx 12$
Area of hexagon
$$\frac{14 \times 6 \times 12}{2} = 504$$
Area of blacken part
Area of hexagon – area of disk
$504 - 452.16 = 51.84$
Answer The area of the black part of the logo is 51.84 cm^2

4

Probability of winning soap
$$\frac{1}{3} \times \frac{1}{2} = \frac{1}{6}$$

Probability of winning cream
$$\frac{2}{3} \times \frac{1}{4} = \frac{1}{6}$$
Probability of winning a prize
$$\frac{1}{6} + \frac{1}{6} = \frac{2}{6}$$
$$= \frac{1}{3}$$

Answer The probability of winning a prize is $\frac{1}{3}$.

5 Example of an appropriate solution

Apothem of hexagon = radius of circle

$26 \text{ m} \div 2 = 13 \text{ m}$

Area of the regular hexagon

$$A = \frac{6 \times 15 \text{ m} \times 13 \text{ m}}{2}$$

$= 585 \text{ m}^2$

Area of the circle

$A = \pi \times 13 \text{ m} \times 13 \text{ m}$

$\approx 530.929 \text{ m}^2$

Shaded area

$585 \text{ m}^2 - 530.929 \text{ m}^2 = 54.071 \text{ m}^2$

Cost

$54.071 \text{ m}^2 \times \$4.25/\text{m}^2 = \$229.80$

Answer: Excluding taxes, planting the grass will cost **$229.80**.
Accept an answer in the interval [229, 231]

6 Example of an appropriate solution

Side length

$$\frac{139.2}{16} \text{ m} = 8.7 \text{ m}$$

Area of square

$A = (8.7 \text{ m})(8.7 \text{ m}) = 75.69 \text{ m}^2$

Area of 4 regular pentagons

$597.69 \text{ m}^2 - 75.69 \text{ m}^2 = 522 \text{ m}^2$

Area of 1 regular pentagon

$$\frac{522}{4} \text{ m}^2 = 130.5 \text{ m}^2$$

Length of apothem

$$130.5 \text{ m}^2 = \frac{(5 \times 8.7)a}{2}$$

$a = 6 \text{ m}$

Length of beam

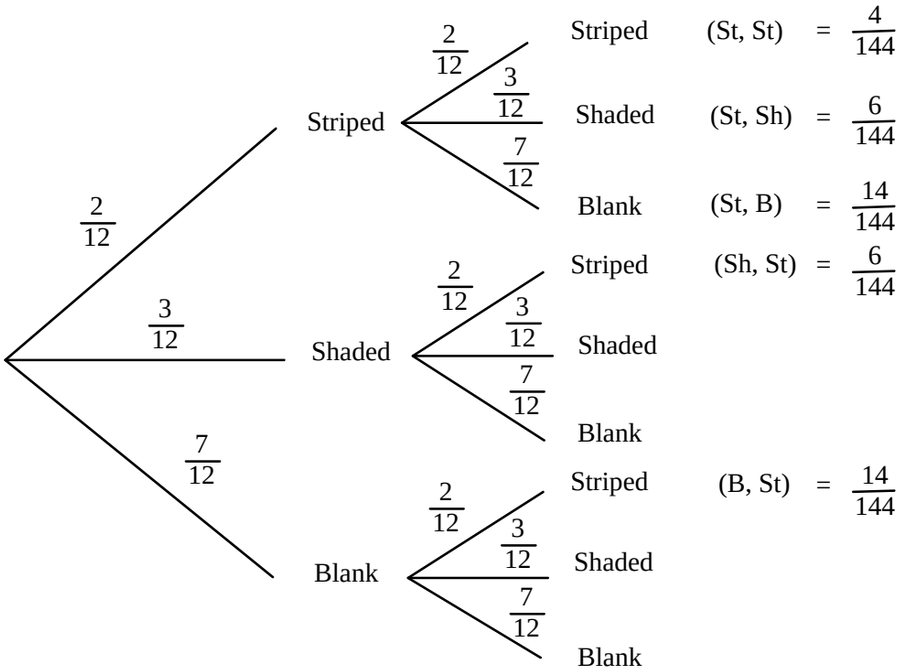
apothem + side of square + apothem

$6 \text{ m} + 8.7 \text{ m} + 6 \text{ m} = 20.7 \text{ m}$

Answer: The length of each beam is **20.7 m**.
Do not penalize students who rounded off their answers.

7 Example of an appropriate solution

Using a tree diagram



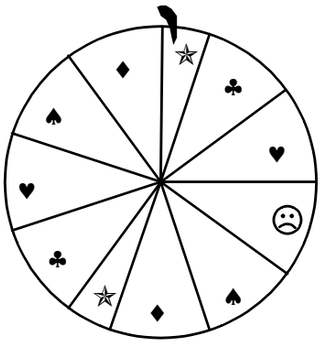
Probability of hitting at least 1 striped rectangular area

$$\frac{4}{144} + \frac{6}{144} + \frac{14}{144} + \frac{6}{144} + \frac{14}{144} = \frac{44}{144} = 30.\overline{5} \approx 31\%$$

Answer: To the nearest percent, the probability of winning a prize is **31%**.

Mathematics 306/326
REVIEW 7

1 To win a prize in a roulette game, the wheel must stop on a star.
The diagram below shows the roulette wheel used in the game.



The 2 sectors with stars are congruent. Together, their area is the same as the area of each of the other sectors.
What is the probability of winning a prize in this roulette game?

Work

Result : The probability of winning a prize is _____.

2 A jar contains 3 black candies, 2 green, 2 red, 4 yellow and 1 blue. The candies are all the same shape and size.
Lisa draws 2 candies in succession without putting the first one back into the jar.
What is the probability that she draws a black candy followed by a green one?

Work

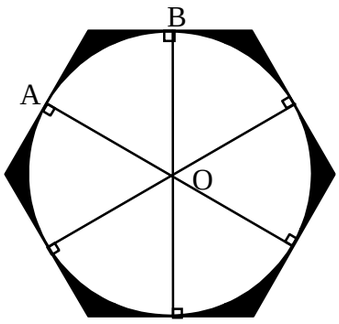
Result : The probability is _____.

3 A company's logo is shown on the right.

The area of sector AOB is 75.36 cm^2 and angle AOB measures 60°.

Each side of the regular hexagon measures14 cm.

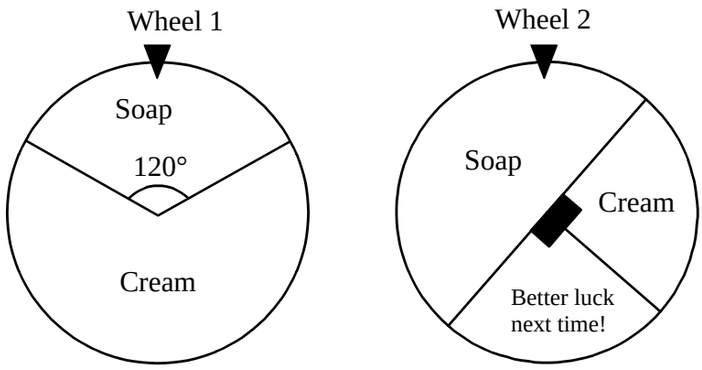
What is the area of the black part of the logo?



Show all your work.

Answer Area of the shaded part of the logo is _____ cm^2.

4 Customers at a local pharmacy can win a prize by spinning the wheels shown below.



If both wheels stop on the same prize, the customer wins that particular prize.
What is the probability of winning a prize?

Show your work

Answer The probability of winning a prize is _____.

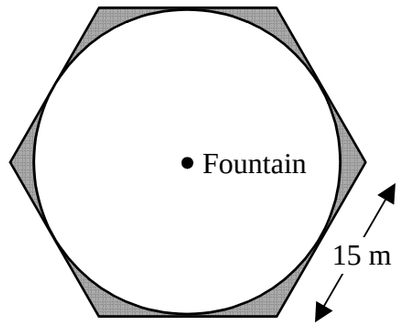
5 A circular pool with a fountain in the centre has been installed in a town park.

A fence in the form of a regular hexagon is constructed so that the pool touches each side of the hexagon, as shown in the diagram on the right.

The pool has a diameter of 26 m.

The length of each side of the regular hexagon is 15 m.

The town wants to plant grass in the areas that are shaded in the diagram.

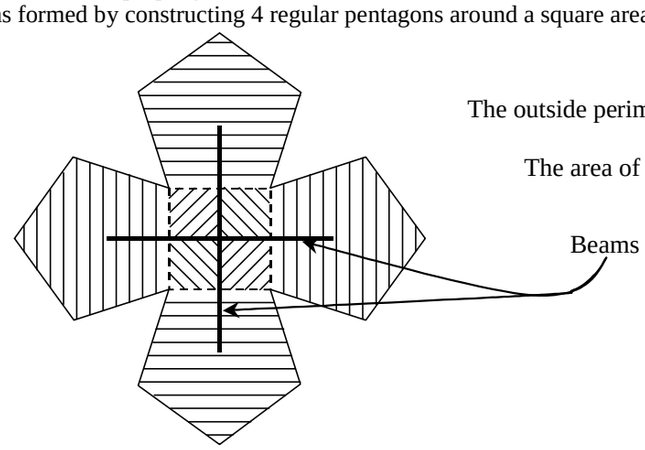


The cost of the grass is $\$4.25/m^2$.
Excluding taxes, what will it cost the town to plant the grass around the pool?

Show all your work.

Answer: Excluding taxes, planting the grass will cost $_____.

6 A hotel has a deck on its property.
The deck was formed by constructing 4 regular pentagons around a square area, as shown in the diagram below.



The outside perimeter of the deck is 139.2 m.

The area of the deck is 597.69 m^2.

A building inspector told the hotel owners that 2 beams must be installed under the deck for more support.
These beams are to run from the centre of one regular pentagon to the centre of the opposite regular pentagon.
How long is each beam?
Show your work.

7 A contest at a fair consists of tossing a dart at the board shown in the sketch below. Each rectangle on the board is the same size.

To win a prize, the dart must land inside one of the striped rectangles at least once in two throws.

Rounded to the nearest percent, what is the probability that a person will win a prize after tossing a dart twice?

Show all your work.

Show all your work.

Answer: To the nearest percent, the probability of winning a prize is _____.