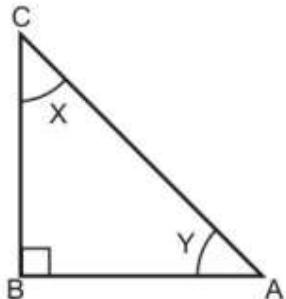


Practice Questions
Class – X Session -2021-22
TERM 1
Subject- Mathematics (Standard) 041

1. Savita has a lamp placed at the centre of her square yard, each side measuring 20 m. The light of lamp covers a circle of radius 10 m on yard. What area of the yard is NOT lit by the lamp?
 - A. 400π sq. m
 - B. 100π sq. m
 - C. $(40 - 10\pi)$ sq. m
 - D. $(400 - 100\pi)$ sq. m

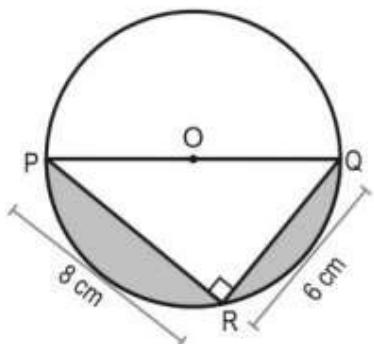
2. In the ΔABC shown below, $\angle X : \angle Y = 1:2$.



What is $\tan x$?

- A. $\frac{1}{\sqrt{3}}$
- B. 1
- C. $\frac{\sqrt{3}}{2}$
- D. $\sqrt{3}$
3. Which of the following numbers can be written as a non-terminating but recurring decimal?
 - A. 9
 - B. $\frac{43}{8}$
 - C. $\sqrt{6}$
 - D. $\frac{5}{12}$

4. In the figure given below, O is the centre of the circle. PR and RQ are chords of the circle. The radius of the circle is 5 cm. PR = 8 cm, QR = 6 cm and $\angle PRQ = 90^\circ$.

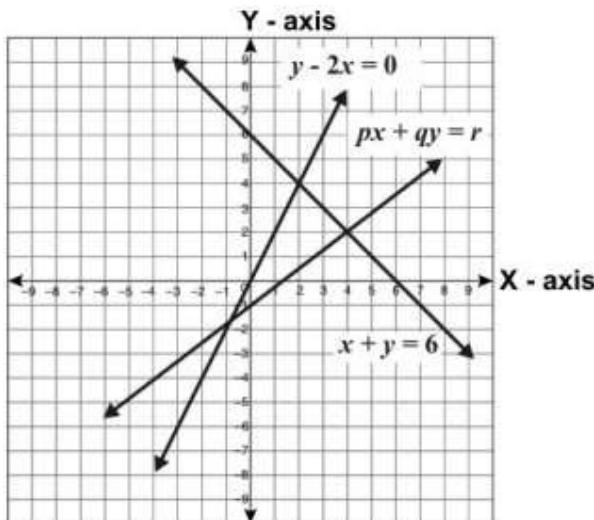


(Note: The figure is not to scale.)

What is the approximate area of the shaded region?

- A. $\left(\frac{25}{4}\pi - 24\right) \text{ cm}^2$
- B. $\left(\frac{25}{2}\pi - 24\right) \text{ cm}^2$
- C. $\left(\frac{25}{4}\pi\right) \text{ cm}^2$
- D. $\left(\frac{25}{2}\pi\right) \text{ cm}^2$

5. Shown below are the graphs of the lines $y - 2x = 0$, $x + y = 6$ and $px + qy = r$.



Which of these is the solution for the pair of equations $x + y = 6$ and $px + qy = r$.

- A. $x = 2, y = 4$
- B. $x = 4, y = 2$
- C. $x = 3, y = 2$
- D. (We cannot say for sure as the values of p and q are not known.)

6. A vessel having 30 m^3 of water is emptied through two openings, one small and the other large. Water flows out through the smaller opening at the rate of $U \text{ m}^3/\text{h}$ and through the larger one at the rate of $V \text{ m}^3/\text{h}$. Given that $3U + 2V = 70$ and that the vessel gets fully emptied in 1 hour, what is V ?

- A. $10 \text{ m}^3/\text{h}$
- B. $20 \text{ m}^3/\text{h}$
- C. $30 \text{ m}^3/\text{h}$
- D. $50 \text{ m}^3/\text{h}$

7. The sum of the digits of a two-digit number is 9. If 27 is subtracted from the number, its digits are interchanged. Which of these is the product of the digits of the number?

- A. 8
- B. 14
- C. 18
- D. 20

8. For the given pair of equations, two statements are given below - one labelled Assertion (A) and the other labelled Reason (R). Read the statements carefully and choose the option that correctly describes statements (A) and (R).

$$\frac{2}{x} + 5y = 15$$

$$\frac{3}{x} + 6y = 7$$

Assertion (A): The given pair of equations can be reduced to a pair of linear equations in two variables.

Reason (R): In the given equations, y can be substituted by $\frac{1}{p}$.

- A. Both (A) and (R) are true and (R) is correct explanation of the (A).
- B. Both (A) and (R) are true but (R) is not the correct explanation of the (A).
- C. (A) is true but (R) is false.
- D. (A) is false but (R) is true.

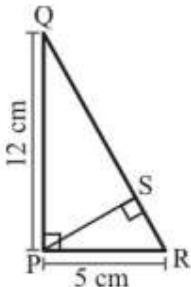
9. How many zero(es) does $(x - 2)(x + 3)$ have?

- A. zero
- B. one
- C. two
- D. three

10.
$$\frac{1}{\tan \theta + \cot \theta} =$$

- A. $\cos \theta \sin \theta$
- B. $\sec \theta \sin \theta$
- C. $\tan \theta \cot \theta$
- D. $\sec \theta \cosec \theta$

11. In the figure below, PQR is a right-angled triangle, right angled at P. A perpendicular line PS is drawn from P to QR. PR = 5 cm and PQ = 12 cm.

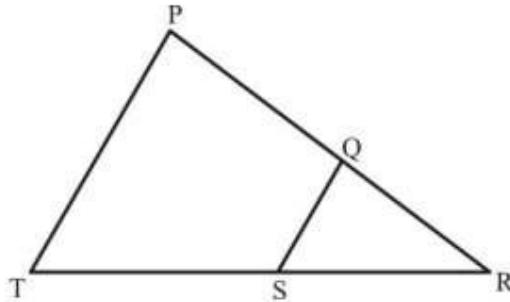


(Note: The figure is not to scale.)

What is RS:SQ?

- A. 5:12
- B. 13:17
- C. 13:60
- D. 25:144

12. In the following figure, Q is a point on PR and S is a point on TR. QS is drawn and $\angle RPT = \angle RQS$.



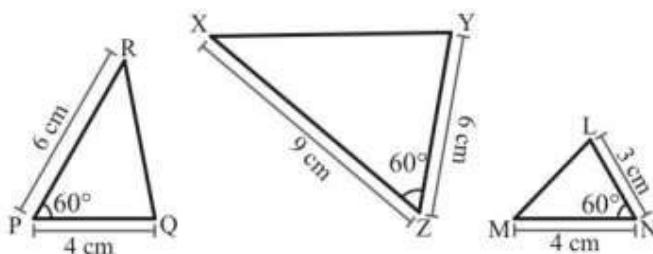
Which of these criteria can be used to prove that $\triangle RSQ$ is similar to $\triangle RTP$?

- A. AAA similarity criterion
- B. SAS similarity criterion
- C. SSS similarity criterion
- D. RHS similarity criterion

13. Which of these is a RATIONAL number?

- A. 3π
- B. $5\sqrt{5}$
- C. 0.3466666...
- D. 0.345210651372849...

14. Shown below are three triangles. The measures of two adjacent sides and included angle are given for each triangle.

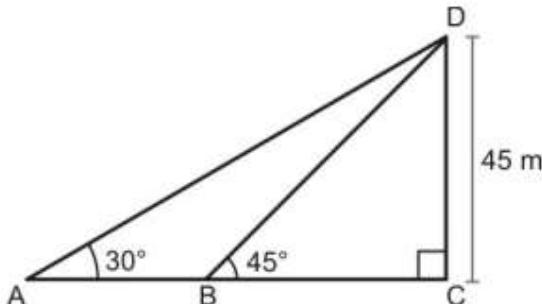


(Note: The figure is not to scale.)

Which of these triangles are similar?

- A. $\triangle RPQ$ and $\triangle XZY$
- B. $\triangle RPQ$ and $\triangle MNL$
- C. $\triangle XZY$ and $\triangle MNL$
- D. $\triangle RPQ$, $\triangle XZY$ and $\triangle MNL$ are similar to one another

15. In the figure below, what is the length of AB?



(Note: The figure is not to scale.)

- A. $45\sqrt{3}$ m
- B. $\frac{45}{\sqrt{3}}$ m
- C. $45(\sqrt{3} - 1)$ m
- D. $45(\sqrt{3} + 1)$ m

16. Which of these is the polynomial whose zeroes are $\frac{1}{3}$ and $\left(\frac{-3}{4}\right)$?

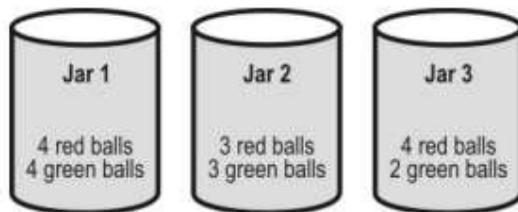
- A. $12x^2 + 5x - 3$
- B. $12x^2 - 5x - 3$
- C. $12x^2 + 13x + 3$
- D. $12x^2 - 13x - 3$

17. Which of these numbers can be expressed as a product of two or more prime numbers?

- i) 15
- ii) 34568
- iii) (15×13)

- A. only (ii)
- B. only (iii)
- C. only (i) and (ii)
- D. all - (i), (ii) and (iii)

18. Romy is blindfolded and asked to pick one ball from each of the jars.



The chance of Romy picking a red ball is same in

- A. jars 2 and 3
- B. jars 1 and 3
- C. jars 1 and 2
- D. all the three jars

19. 1245 is a factor of the numbers p and q .

Which of the following will ALWAYS have 1245 as a factor?

- (i) $p + q$
- (ii) $p \times q$
- (iii) $p \div q$

A. only (ii)
B. only (i) and (ii)
C. only (ii) and (iii)
D. all - (i), (ii) and (iii)

20. Look at the numbers shown below.

(i)	-0.5	(ii)	0.00001	(iii)	$\frac{1}{2}$
(iv)	1	(v)	1.00001	(vi)	99%

Which of the above numbers represent probabilities of events?

- A. only (i) and (iii)
- B. only (i), (ii), (iii) and (iv)

C. only (ii), (iii), (iv) and (v)
D. only (ii), (iii), (iv) and (vi)

21. A fire engine, standing near a building, extends its ladder to a length of 10 metres to reach a certain window in the building.



(Note: The figure is not to scale.)

What is the height of the window from the ground?

A. 6 m
B. 8 m
C. 9 m
D. 11 m

22. Two statements are given below - one labelled Assertion (A) and the other labelled Reason (R). Read the statements carefully and choose the option that correctly describes statements (A) and (R).

Assertion (A): $9x + 12y - 7 = 0$ and $6x + 8y - 14 = 0$ form a consistent pair of linear equations.

Reason (R): A pair of linear equations, $px + qy + r = 0$ and $fx + gy + h = 0$, has no solution if $\frac{p}{f} = \frac{q}{g} \neq \frac{r}{h}$.

A. Both (A) and (R) are true and (R) is the correct explanation of the (A).
B. Both (A) and (R) are true but (R) is not the correct explanation of the (A).
C. (A) is true but (R) is false.
D. (A) is false but (R) is true.

23. Two identical fair dice have numbers 1 to 6 written on their faces. Both are tossed simultaneously. What is the probability that the product of the numbers that turn up is 12?

A. $\frac{1}{36}$

B. $\frac{1}{9}$

C. $\frac{1}{6}$

D. $\frac{1}{3}$

24. How many zero(es) does the polynomial $293x^2 - 293x$ have?

A. 0

B. 1

C. 2

D. 3

25. What is the value of q if $\frac{p}{2} + 3q = 6$ and $2p - 2q = 10$?

A. 1

B. 4

C. 6

D. 16

26. What is the value of k such that the following pair of equations have infinitely many solutions?

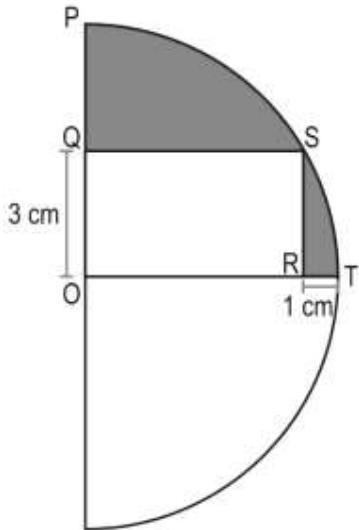
$$x - 2y = 3,$$

$$-3x + ky = -9$$

A. (-6)

B. (-3)
C. 3
D. 6

27. In the figure below $RT = 1\text{ cm}$ and $OQ = 3\text{ cm}$.



What is the area of the shaded region?

A. $(12.5\pi - 12)\text{ cm}^2$
B. $(6.25\pi - 12)\text{ cm}^2$
C. $(12.5\pi - 15)\text{ cm}^2$
D. $(6.25\pi - 15)\text{ cm}^2$

28. Shown below is a board divided into 6 identical sectors, with a pointer that can be spun on it.

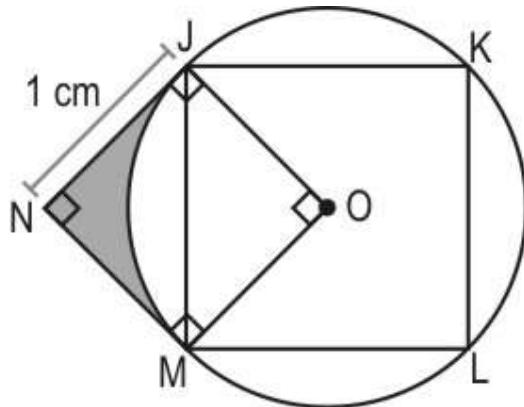


When the pointer is spun, it spins for some time and comes to a stop on a sector. The chances of it stopping on any sector are equal. Arif wants to colour some sectors green. How

many sectors should he colour green so that the probability of the pointer stopping on a green sector is $1/3$?

- A. 1
- B. 2
- C. 3
- D. 4

29. In the figure below, the square JKLM is inscribed within a circle and $\triangle JMN$ is a right-angled isosceles triangle. The point marked O is the centre of the circle.



(Note: Figure is not to scale.)

What is the area of the shaded part of the figure?

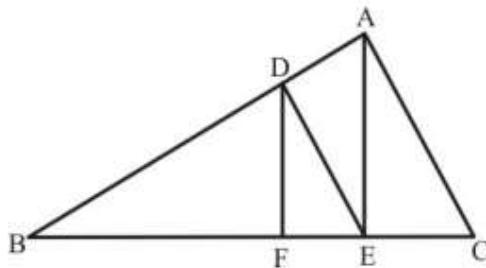
- A. $\left(\frac{\pi}{4} - \frac{1}{2}\right) \text{ cm}^2$
- B. $\left(\pi - \frac{1}{2}\right) \text{ cm}^2$
- C. $\left(1 - \frac{\pi}{4}\right) \text{ cm}^2$
- D. $(1 - \pi) \text{ cm}^2$

30. α is an acute angle.

$(\sin \alpha + \cos \alpha)$ is

- A. greater than 1.
- B. less than 1.
- C. equal to 1.
- D. (We cannot say any of these as it depends on the value of α .)

31. In the figure below, $DE \parallel AC$ and $DF \parallel AE$. Which of these is equal to $\frac{BF}{FE}$?



- A. $\frac{DF}{AE}$
- B. $\frac{BE}{EC}$
- C. $\frac{BA}{AC}$
- D. $\frac{FE}{EC}$

32. x -axis divides the join of $(2, -3)$ and $(5, 6)$ in the ratio _____.

- A. 1:2
- B. 2:1
- C. 2:5
- D. 5:2

33. A number of the form 8^n , where n is a natural number greater than 1, cannot be divisible by _____.

- A. 1
- B. 40
- C. 64
- D. 2^{2n}

34. The fraction $\frac{7}{q}$ has a terminating decimal expansion.

Which of these CANNOT be q ?

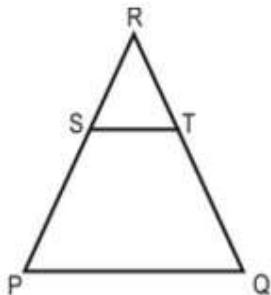
- A. 8×2
- B. 8×3
- C. 8×4
- D. 8×5

35. In the triangle PQR below,

- S and T are 2 points on the sides RP and RQ respectively such that ST is parallel to PQ.

- The ratio of RT to TQ is 1:2.

The area of $\Delta RST = 100$ sq. units.

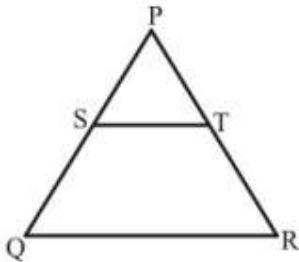


(Note: The figure is not to scale.)

What is the area of PQTS?

- A. 200 sq. units
- B. 300 sq. units
- C. 600 sq. units
- D. 800 sq. units

36. In the following figure, $ST \parallel QR$, point S divides PQ in the ratio 4:5. If $ST = 1.6$ cm, what is the length of QR?



(Note: The figure is not to scale.)

- A. 0.71 cm
- B. 2 cm
- C. 3.6 cm
- D. (cannot be calculated from the given data.)

37. P and Q are two positive integers such that $P = p^3q$ and $Q = (pq)^2$, where p and q are prime numbers.

What is $\text{LCM}(P, Q)$?

- A. pq
- B. p^2q^2
- C. p^3q^2

D. p^5q^3

38. Given that $\cos^2 \theta - \sin^2 \theta = \frac{3}{4}$.

What is the value of $\cos \theta$?

A. $\frac{\sqrt{3}}{2}$

B. $\frac{1}{2}$

C. $\frac{\sqrt{7}}{2}$

D. $\frac{\sqrt{7}}{\sqrt{8}}$

39. p and q are the zeroes of the polynomial $4y^2 - 4y + 1$.

What is the value of $\frac{1}{p} + \frac{1}{q} + pq$?

A. $\frac{-15}{4}$

B. $\frac{-3}{4}$

C. $\frac{5}{4}$

D. $\frac{17}{4}$

40. Which of the following will have the MAXIMUM number of 6's when written in decimal form?

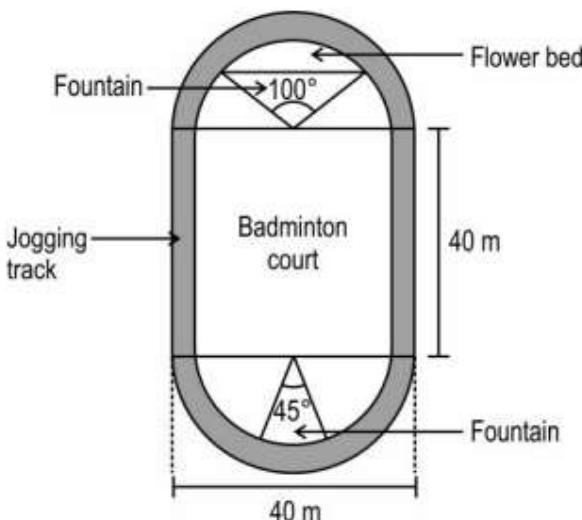
A. $\frac{666}{1000}$

B. $\frac{3}{6}$

C. $\frac{3}{5}$

Look at the information given below and answer the questions that follow.

Shown below is the top view of a stadium. There is a badminton court at the centre. The stadium is surrounded by a jogging track. The track is semi-circular in shape at the top and the bottom of the court. The fountains converge at the centre of the respective semicircles. The jogging track has a uniform width of 2 m.



(Note: The figure is not to scale.)

(Note: Use $\pi = 3.14$)

41. What is the area of the jogging track?

- A. 160 m^2
- B. 172.56 m^2
- C. 238.64 m^2
- D. 398.64 m^2

42. What is the area occupied by the fountain shown below the court in the figure?

- A. 63.59 m^2
- B. 127.17 m^2
- C. 157 m^2
- D. 282.6 m^2

43. The cost of gardening is Rs $300/m^2$ and the area of the fountain next to the flower bed is $150 m^2$.

What is the cost of gardening the flower bed?

- A. Rs 39780
- B. Rs 45000
- C. Rs 59664
- D. Rs 84780

44. If the rate of fencing is Rs $150/m$, what is the cost of fencing the flower bed ONLY on the curved portion of its boundary?

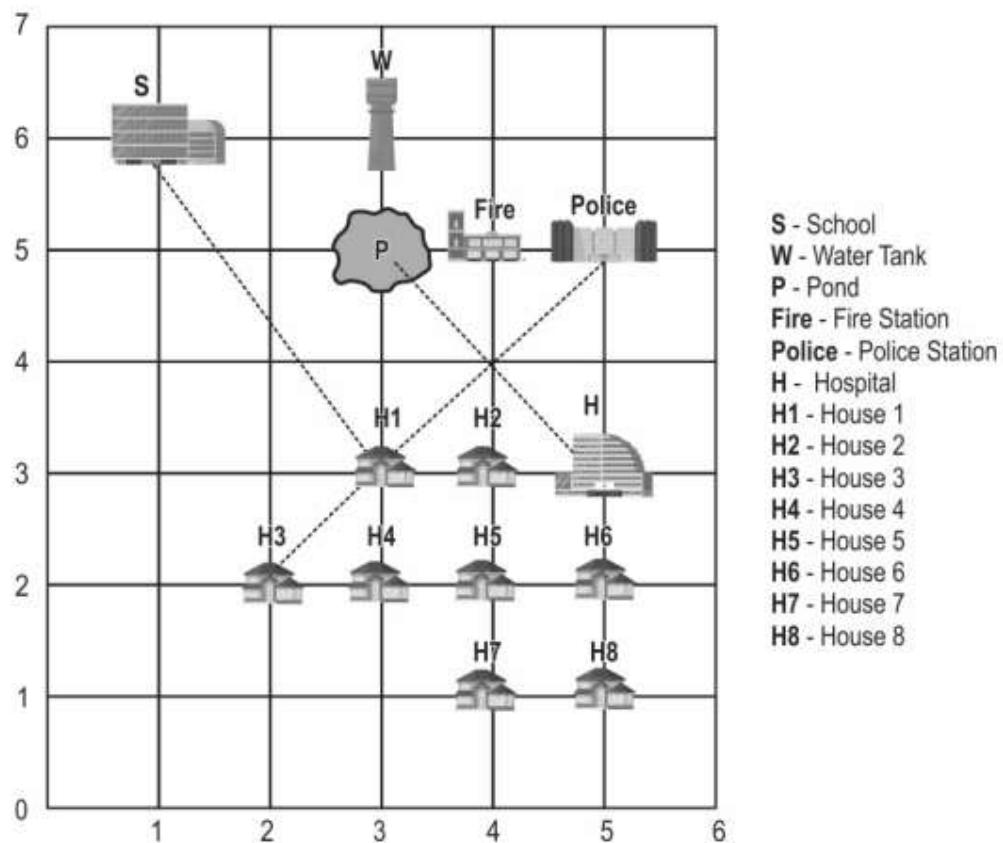
- A. Rs 2355
- B. Rs 4710
- C. Rs 5233
- D. Rs 10110

45. What is the length of the boundary of the stadium?

- A. 62.8 m
- B. 125.6 m
- C. 160 m
- D. 205.6 m

Study the given information and answer the questions that follow.

Shown below is a town plan on a coordinate grid, where 1 unit = 1 km. Consider the co-ordinates of each building to be the point of intersection of the respective grid lines.



(Note: Consider the horizontal axis as the x-axis and the vertical axis as the y-axis.)

46. Which of the following pairs of houses has the same abscissa (or x-coordinate)?

- A. House 5 and House 6
- B. House 5 and House 7
- C. House 5 and House 8
- D. House 5 and House 1

47. What is the distance between the school and House 1 along the path shown?

- A. $\sqrt{13}$ km
- B. $\sqrt{97}$ km
- C. 13 km
- D. 97 km

48. A well is dug at a point along the path joining the pond and the hospital. The ratio of the distance between the pond and the well to that of the well and the hospital is 4:1 respectively.

What is the x -coordinate of the well?

- A. 3.4
- B. 4.25
- C. 4.6
- D. 5.75

49. What is the ratio in which House 1 divides the path joining House 3 and the Police station?

- A. $1:2\sqrt{2}$
- B. $1:\sqrt{2}$
- C. $1:3$
- D. $1:2$

50. Which of the following pair of buildings are separated by the same distance as that of School and Police station?

- A. Pond and House 8
- B. School and House 1
- C. Water tank and House 3
- D. Fire station and House 3