

Poorna Foundation



Geometry

Summer Packet 1

Welcome to the Poorna Foundation Summer Packet!

At Poorna Foundation, we believe that learning is a lifelong journey that extends beyond the classroom. Summer is an excellent opportunity to continue building knowledge, strengthen essential skills, and prepare for the exciting opportunities of the coming school year.

This Summer Packet is designed to help students review and reinforce the concepts and skills they learned during the previous school year. Through engaging activities and meaningful practice, students can maintain academic progress, build confidence, and stay connected to learning throughout the summer.

Completing this packet at a steady pace can help prevent the "summer slide" and ensure a smooth transition into the next grade level. More importantly, it encourages students to develop critical thinking, creativity, perseverance, and a love of learning & skills that will benefit them in school and beyond.

We encourage students to do their best, ask questions, and take pride in their progress. Families play an important role in supporting summer learning by providing encouragement, celebrating achievements, and creating opportunities for curiosity and exploration every day.

The Poorna Foundation is honored to be part of your educational journey. We hope this summer packet inspires you to stay curious, keep learning, and begin the new school year feeling confident, prepared, and ready to succeed.

Have a safe, enjoyable, and enriching summer!

— Poorna Foundation

© 2026 Poorna Foundation. All rights reserved.

This Summer Learning Packet is the intellectual property of Poorna Foundation. No part of this publication may be reproduced, distributed, stored in a retrieval system, or transmitted in any form or by any means, electronic, mechanical, photocopying, recording, or otherwise, without prior written permission from Poorna Foundation,

except for individual classroom or personal educational use as authorized by the Foundation.

Website: poornafoundation.org

Email: contact@poornafoundation.org

Unit 1: Algebra Review and foundations of logical reasoning (Questions 1–13)

1. Solve for x : $4(6x-10)=3x+2$

- a. $x = -2$
- b. $x = -6/7$
- c. $x = 2$
- d. $x = 14/9$

2. Solve the system of equations: $y = 2x + 1$

$$y = -x + 7$$

- a. (2,5)
- b. (5,2)
- c. (-2,-3)
- d. (6,13)

3. Find the slope between the points: (-2,6) and (4,2)

- a. $3/2$
- b. 2
- c. $-2/3$
- d. $2/3$

4. Factor completely: $x^2 - 9x + 20$

- a. $(x+2)(x-10)$
- b. $(x-2)(x-10)$
- c. $(x-6)(x-2)$
- d. $(x-4)(x-5)$

5. Simplify the expression: $\sqrt{96}$

- a. $4\sqrt{6}$
- b. $4\sqrt{24}$
- c. $6\sqrt{4}$
- d. $6\sqrt{5}$

6. Solve for x : $(x-4)/10 = (x-7)/4$

- a. $x = 8$
- b. $x = 9$
- c. $x = 17/2$
- d. $x = 19/2$

7. Write the converse of this statement: If an angle measures 90° , then it is a right angle.

- a. If an angle is not a right angle, then it does not measure 90° .
- b. If an angle is a right angle, then it measures 90° .
- c. If an angle measures 90° , then it is not acute.
- d. If an angle is acute, then it measures less than 90° .

8. Determine whether this statement is true: If a figure has four sides, then it is a square.

- a. False; a triangle is a counterexample.
- b. False; a rectangle is a counterexample.
- c. True because squares have four sides.
- d. True because all four-sided figures are quadrilaterals.

9. Given:

- If two angles are complementary, then their measures add to 90° .
- $\angle A$ and $\angle B$ are complementary.

What can be concluded?

- a. $m\angle A + m\angle B = 90^\circ$.
- b. $m\angle A + m\angle B = 180^\circ$.
- c. $\angle A$ and $\angle B$ are congruent.
- d. $\angle A$ and $\angle B$ are supplementary.

10. Write this as a biconditional statement:

- If an angle is acute, then its measure is less than 90° .
- If an angle measures less than 90° , then it is acute.

What can be concluded?

- a. If an angle measures 90° , then it is right.
- b. If an angle is acute, then it is obtuse.
- c. An angle is acute if and only if its measure is less than 90° .
- d. If an angle is obtuse, then it measures more than 90° .

11. Given:

- If a segment is a diameter, then it passes through the center.
- Segment AB is a diameter.

What conclusion can be made?

- a. Segment AB is a radius.
- b. Segment AB is perpendicular to a radius.
- c. Segment AB passes through the center.
- d. Segment AB has endpoints on the center.

12. Given:

- If two lines intersect, then they form vertical angles.
- If vertical angles are formed, then they are congruent.

What conclusion can be made?

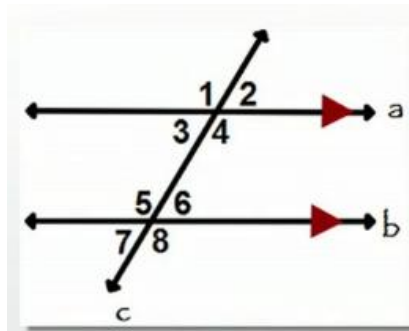
- a. If lines intersect, then they are perpendicular.
- b. If lines intersect, then they form congruent vertical angles.
- c. If angles are congruent, then lines intersect.
- d. If lines are parallel, then they form vertical angles.

13. Which is the contrapositive of this statement: If two angles are congruent, then . they have equal measures.

- a. If two angles do not have equal measures, then they are not congruent.
- b. If two angles have equal measures, then they are congruent.
- c. If two angles are not congruent, then they do not have equal measures.
- d. If two angles are congruent, then they do not have equal measures.

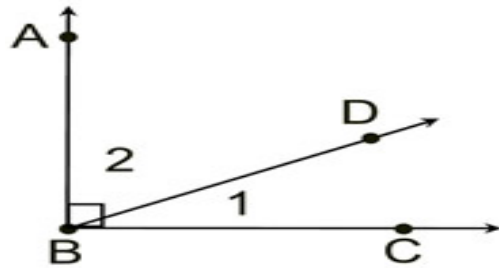
Unit 2: Angular and linear relationships (Questions 1–12)

1. If $\angle 2$ is 62° , find the measure of $\angle 4$, $\angle 6$, and $\angle 7$. (Remember to write degrees)



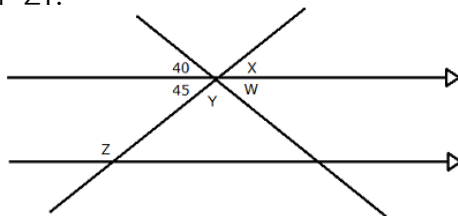
$$\angle 4 = __ \quad \angle 6 = __ \quad \angle 7 = __$$

2. If $\angle 2$ is 57° , find the measure of $\angle 1$.



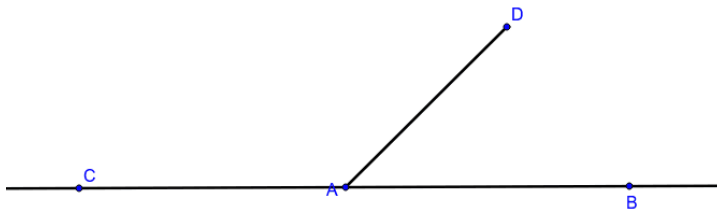
$$\angle 1 = __$$

3. Solve for $\angle Y$.



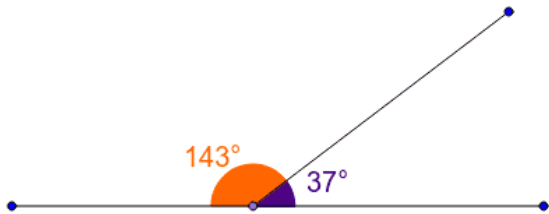
$$\angle Y = __$$

4. If $\angle CAD$ is $3x+20$ & $\angle BAD$ is $2x+10$, what is the value of $\angle CAD$?



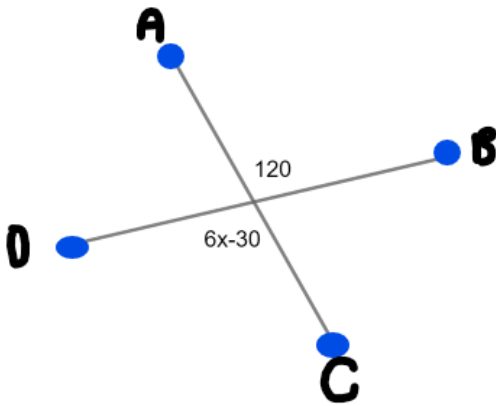
$$\angle CAD = __$$

5. The 2 angles are ____ to each other.



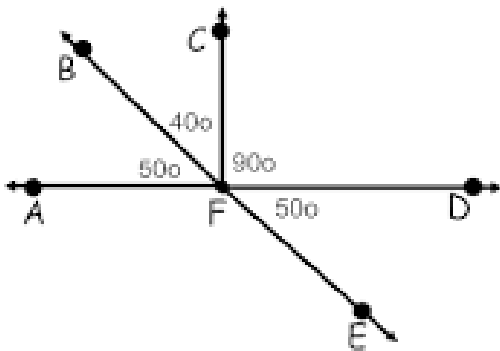
- a. Supplementary
- b. Complementary
- c. None of the above

6. Solve for x.



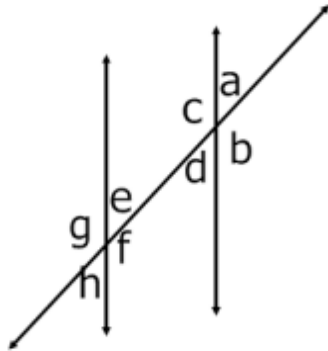
x=___

7. Find the missing angle.



Answer:___

Answer questions 8-11 using the following figure.



8. What is the sum of $\angle a$, $\angle b$, $\angle c$, $\angle d$? __

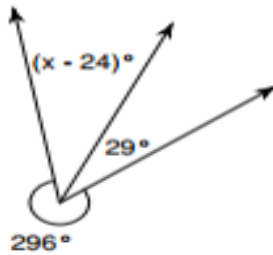
9. Name one pair of angles that are adjacent to each other.(answers may vary).

$\angle$ __ & $\angle$ __.

10. What is the sum of $\angle g$ & $\angle h$? __

11. Name one pair of vertical angles.(answers may vary). $\angle$ __ & $\angle$ __.

12. Solve for x.



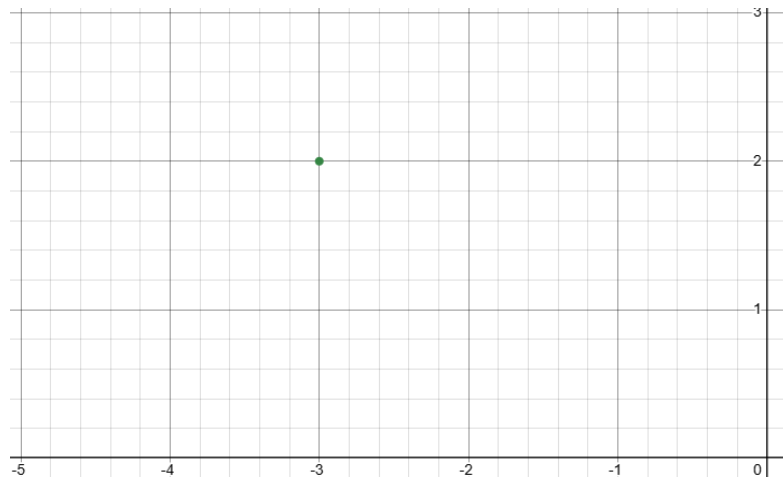
x= __

Unit 3: Properties of transformations (Questions 1–12)

1. Triangle ABC is translated 4 units right and 3 units up.

If $A=(2,-1)$, what is A'

- a. $(6,2)$
 - b. $(-2,2)$
 - c. $(5,1)$
 - d. $(6,-4)$
2. Point $R=(5,2)$ rotates 90° counterclockwise about the origin. What is the resulting point?
- a. $(2,-5)$
 - b. $(-2,5)$
 - c. $(-5,-2)$
 - d. $(5,-2)$
3. What is the resulting point of $(-3,2)$ if it has a vertical compression by $\frac{1}{2}$?



Answer: (,)

4. What is the resulting point of $(4,4)$ if it has a horizontal dilation by 2, shifts 4 units right and 6 units down?

Answer: (,)

5. What are all the transformations occurring here?

$$y = -3f(2(x-3))+7$$

Answers:

6. Point $T=(2,5)$ is dilated from the origin by scale factor of 3. What is the resulting point?
- a. $(6,15)$
 - b. $(5,8)$
 - c. $(1,2)$
 - d. $(9,15)$

7. When a figure is turned around a fixed point without changing size, it is a _____.
 - a. Translation
 - b. Reflection
 - c. Rotation
 - d. Dilation
8. Point (8,2) reflects across $y=x$, what is the resulting point?
 - a. (-2,8)
 - b. (-8,2)
 - c. (8,-2)
 - d. (2,8)
9. Triangle ABC has side lengths 4,6,8. After dilation, the image has side lengths 10,15,20.What is the scale factor?
 - a. 2
 - b. 2.5
 - c. 3
 - d. 5
10. Point E(-5,9) is rotated 180° about the origin. What is the resulting point?
 - a. (5,-9)
 - b. (-9,5)
 - c. (9,-5)
 - d. (-5,-9)

11. What are all the transformations occurring here?

$$y = f\left(\frac{1}{3}x\right) + 6$$

Answers:

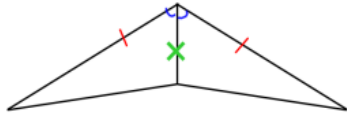
12. What are all the transformations occurring here? (Remember to factor out the negative)

$$y = \frac{3}{4}f(-x-2)-3$$

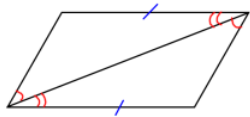
Answers:

Unit 4: Proofs of triangle congruence and similarity (Questions 1–12)

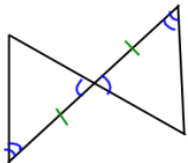
1. Which congruence postulate would be used to prove the 2 triangles are congruent?
 - a. SSS
 - b. ASA
 - c. SAS
 - d. AAS
2. Which congruence postulate would be used to prove the 2 triangles are congruent?



- a. SSS
 - b. ASA
 - c. SAS
 - d. AAS
3. Which congruence postulate would be used to prove the 2 triangles are congruent?

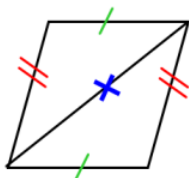


- a. SSS
 - b. ASA
 - c. SAS
 - d. AAS
4. Which congruence postulate would be used to prove the 2 triangles are congruent?



- a. SSS
 - b. ASA
 - c. SAS
 - d. AAS

5. Which congruence postulate would be used to prove the 2 triangles are congruent?

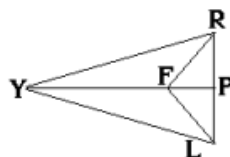


- a. SSS
- b. ASA
- c. SAS
- d. AAS

6. Fill in the reasons.

Given: $\angle YLF \cong \angle FRY$, $\angle RFY \cong \angle LFY$

Prove: $\triangle FRY \cong \triangle FLY$



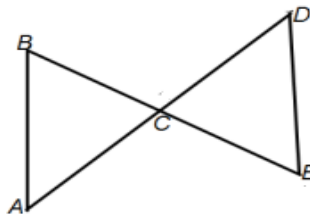
Statement	Reason
1. $\angle YLF \cong \angle FRY$	
2. $\angle RFY \cong \angle LFY$	
3. $\overline{FY} \cong \overline{FY}$	
4. $\triangle FRY \cong \triangle FLY$	

7. Fill in the reasons.

Given: $\overline{BA} \cong \overline{ED}$

C is the midpoint of $\overline{BE}$ and $\overline{AD}$

Prove: $\triangle ABC \cong \triangle DEC$

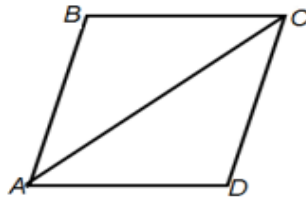


Statement	Reason
1. $\overline{BA} \cong \overline{ED}$	
2. C is the midpoint of $\overline{BE}$ and $\overline{AD}$	
3. $\overline{BC} \cong \overline{EC}$	
4. $\overline{AC} \cong \overline{DC}$	
5. $\triangle ABC \cong \triangle DEC$	

8. Fill in the reasons.

Given: $\overline{BC} \cong \overline{DA}$
 $\overline{AC}$ bisects $\angle BCD$

Prove: $\triangle ABC \cong \triangle CDA$



Statement	Reason
1. $\overline{BC} \cong \overline{DA}$	
2. $\overline{AC}$ bisects $\angle BCD$	
3. $\angle BCA \cong \angle DCA$	
4. $\overline{AC} \cong \overline{AC}$	
5. $\triangle ABC \cong \triangle CDA$	

9. Which does not prove that 2 triangles are congruent?

- A) SSS
- B) SAS
- C) SSA
- D) ASA

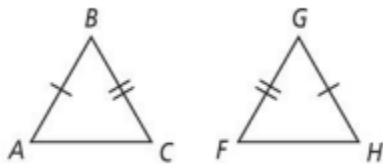
10. $\triangle BAT \cong \triangle COM$. List 3 pairs of congruent sides.

Answers:

11. $\triangle BAT \cong \triangle COM$. List 3 pairs of congruent angles.

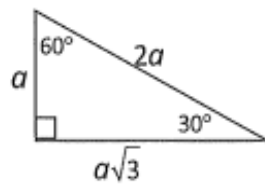
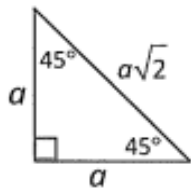
Answers:

12. What additional information is needed to prove the two triangles are congruent by SAS triangle congruence?



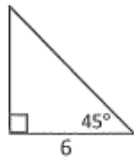
Answers:

Unit 5: Right triangle relationships (Questions 1–12)



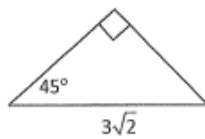
←****MUST MEMORIZE****

1. True or False, the pythagorean theorem applies for all triangles.
 - a. True
 - b. False
2. Find the missing side lengths.



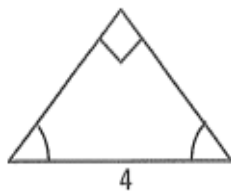
___ & ___

3. Find the missing side lengths.



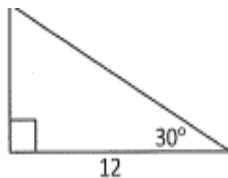
___ & ___

4. Find the missing side lengths.



___ & ___

5. Find the missing side lengths.

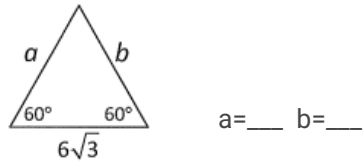


___ & ___

6. Find the missing side lengths.



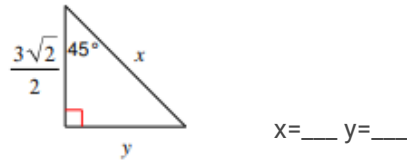
7. Find the missing side lengths.



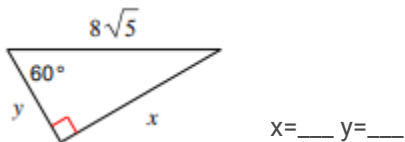
8. Find the missing side lengths.



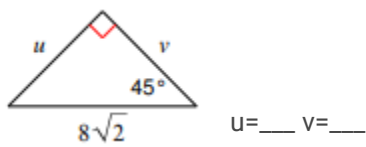
9. Find the missing side lengths.



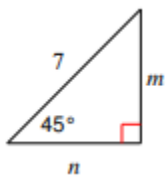
10. Find the missing side lengths.



11. Find the missing side lengths.



12. Find the missing side lengths.



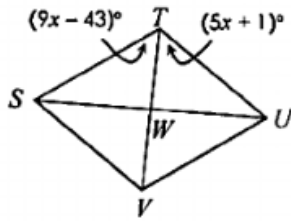
Unit 6: Exploration of polygon and quadrilateral properties (Questions 1–12)

1. In quadrilateral AORN, $AO \parallel RN$. What additional information is needed to prove that AR bisects ON?
 - a. $AO \parallel OR$
 - b. $AN \parallel OR$
 - c. $OR = AN$
 - d. $ON = AR$
2. The diagonals of a certain quadrilateral are *NOT* congruent. Which term could be used to describe the quadrilateral?
 - a. square
 - b. rectangle
 - c. rhombus
 - d. isosceles trapezoid
3. Find the sum of the measures of the exterior angles in a dodecagon.
 - a. 540°
 - b. 720°
 - c. 1020°
 - d. 360°
4. Given that the sum of interior angles in a polygon is 1080° , how many sides does the polygon have?
 - a. 8
 - b. 12
 - c. 16
 - d. 14
5. Find the measure of an exterior angle of a regular hexagon.
 - a. 60°
 - b. 80°
 - c. 120°
 - d. 100°
6. Find the measure of an interior angle of a regular dodecagon.
 - a. 120°
 - b. 150°
 - c. 160°
 - d. 110°
7. A diagonal of a parallelogram bisects one of its angles. What special kind of parallelogram *must* it be?

Answer:

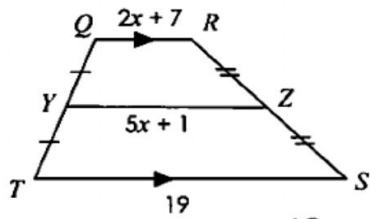
8. Determine the quadrilateral that the following coordinates create (the most specific) L(-2,5), M(4,1), G(0,-5), H(-6,-1)
 - a. Parallelogram
 - b. Square
 - c. Rectangle
 - d. None of the above

9. If STUV is a rhombus, find $m\angle STU$



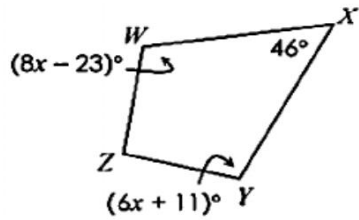
Answer:

10. Find QR



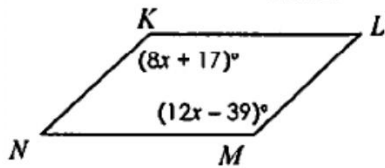
Answer:

11. If WXZY is a kite, find $m\angle W$



Answer:

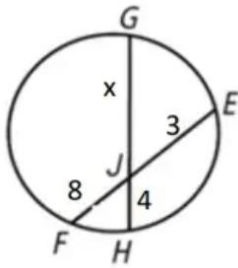
12. NKLM is a parallelogram. Find $m\angle L$



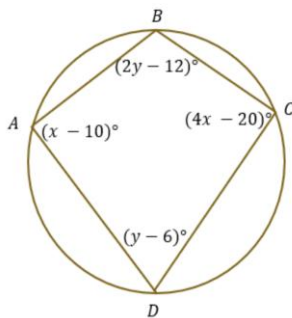
Answer:

Unit 7: Circle relationships (Questions 1–12)

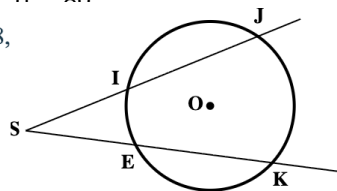
1. Find the length of GH



- 5
 - 7
 - 11
 - 10
2. A carousel has an area of $49\pi \text{ m}^2$. What is the circumference of the carousel?
- 14π
 - 7π
 - 24.5π
 - 7
3. What is the value of x?



- 66°
 - 74°
 - 42°
 - 20°
4. Given: $SI = 8$,



$$IJ = 12,$$

$$SE = 10$$

Find SK.

Answer:

5. Write $3\pi/2$ radians as a measure in degrees. Round your answer to the nearest degree.

Answer:

6. Write 100° as a measure in radians. Express your answer as a decimal rounded to the nearest hundredth.

Answer:

7. What is the center and radius of the circle $(x+2)^2+(y-1)^2=36$?

Center: (__,__) Radius:

8. What is the standard equation of a circle with the center $(1,-3)$ that passes through the point $(-2,4)$?

Answer:

9. A chord of a circle is 10 inches long and is 12 inches from the center of the circle. Find the length of the radius.

Radius:

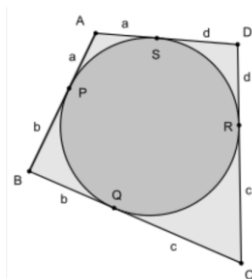
10. The diameter of a circle is 20 cm long and a chord is 16 cm long. Find the distance between the chord and the center of the circle.

Distance:

11. Points A,B, and C lie on a circle. AB is a diameter, and the measure of arc AC is 110° . What is the measure of $m\angle BAC$?

Answer:

12. The circle is tangent to each side of ABCD. $DC=20$. $AB=14$, and $AD=11$. Let $QC=x$ and find BC



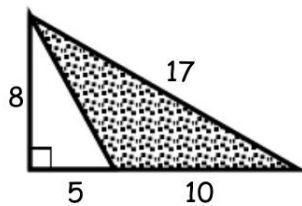
Answer:

Unit 8: Dimensional analysis of 2D figures (Questions 1–12)

1. What is the area of an equilateral triangle with perimeter 36?

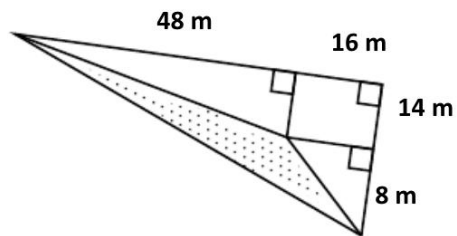
A) $36\sqrt{3}$
B) 36
C) 12
D) $12\sqrt{3}$

2. What is the area of the shaded region?



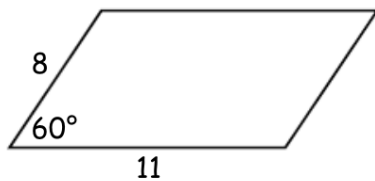
Answer:

3. Mitch wanted to blacktop the shaded portion of this building site. How much will it cost if blacktopping costs \$5 per square meter?



Answer:

4. What is the area of this parallelogram?



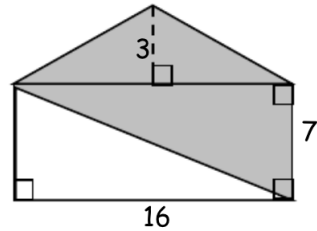
- A) 88
B) $44\sqrt{3}$
C) 44
D) 66
5. One side of a rectangle is 12 and the perimeter is 50. What is the area?

Answer:

6. The hypotenuse of a right triangle is 9 cm longer than one leg and 2 cm longer than the other. What is the perimeter of the triangle?

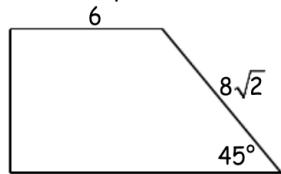
Answer:

7. Find the area of the shaded region.



Answer:

8. Find the area of the trapezoid.



Answer:

9. A sidewalk 36 in wide surrounds a rectangular grass plot 22 ft and 12 ft wide. Find the area of the sidewalk.

Answer:

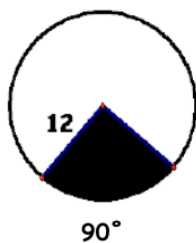
10. The area of a rhombus is 96 sq. in. and one of the diagonals is 1 ft long. Find the length of the other diagonal.

Answer:

11. The sides of a parallelogram are 4m and 10m long. The height corresponding to the 10m side is 30 cm. Find the height corresponding to the 4 m side.

Answer:

12. Find the area of the shaded sector in terms of pi.



Answer:

Unit 9: Dimensional analysis of 3D figures (Questions 1–12)

1. A right pyramid has a square base with a perimeter of 40 cm. The slant height of the pyramid is 13 cm. Find the volume.

Answer:

2. The volumes of two similar figures are 2 yd^3 and 250 yd^3 . If the surface area of the smaller figure is 13 yd^2 , find the surface area of the larger figure.

Answer:

3. Water runs into a right cylindrical tank at a rate of 7 ft^3 per minute. How long will it take to fill a tank 12 ft in diameter that is 8 ft high? (round your answer to the nearest minute)

- A) 130 min
- B) 128 min
- C) 129 min
- D) 96 min

4. A right rectangular container is 5 cm wide and 12 cm long and contains water to a depth of 7 cm. A stone is placed in the water and the water rises 1.7 cm. Find the volume of the stone.

- A) 60 cm^3
- B) 40 cm^3
- C) 102 cm^3
- D) 84 cm^3

5. Find the lateral area of a regular hexagonal right prism with the base edges 10 and the height 12.

Answer:

6. Find the surface area of a regular pyramid with the slant height 17 cm and altitude 8 cm.

Answer:

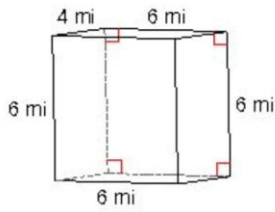
7. The total surface area of a cylinder is $60\pi\text{ in}^2$ and the radius is 3 in. Find the height of the cylinder.

- A) 15 in
- B) 8 in
- C) 12 in
- D) 7 in

8. A square based pyramid has base edges 5 cm and surface area 80 cm^2 . Find the slant height.

Answer:

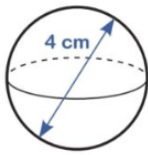
9. Find the total surface area and volume.



Surface Area:

Volume:

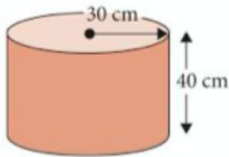
10. Find the volume and surface area of the figure in terms of pi.



Surface Area:

Volume:

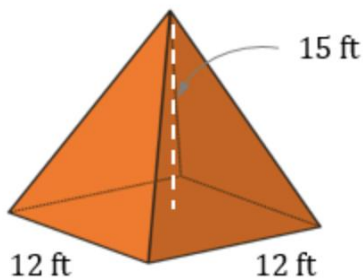
11. Find the volume and lateral surface area in terms of pi.



Lateral Surface Area:

Volume:

12. Find the total surface area and volume of the figure. Round your answers to the nearest tenth.



Surface Area:

Volume:

Unit 10: Applications of probability (Questions 1–12)

1. A skier has 2 pairs of skis, 2 pairs of boots, and 2 different pairs of gloves to choose from for a day of skiing. If she buys another pair of gloves, how many more combinations will be possible?

Answer:

2. A student wants to put 3 songs on her MP3 player from a collection of 25 songs. How many different ways can she do this?

Answer:

3. A bag contains 3 red marbles, 4 green marbles, 5 blue marbles, and 4 yellow marbles. If a marble is selected at random, what is the probability that it is red or green?

Answer:

4. Alexandra made 35 of 60 free throws during practice last week. Based on her practice results, if Alexandra attempts 120 free throws during the season, how many will she likely make?

Answer:

5. Of the students at Clements High School, $\frac{5}{16}$ are juniors, $\frac{2}{3}$ buy lunch at school, and $\frac{1}{4}$ are juniors that buy their lunch at school. If a student is chosen at random, what is the probability they are a junior, given they buy their lunch at school?

Answer:

6. Of the 120 members of the marching band, 48 are in chorus, 74 play a sport, and 32 are both in chorus and play a sport. If a member of the marching band is chosen at random, what is the probability that they are in chorus, given that they do not play the sport?

Answer:

7. In Mrs. Jackson's class of 24 students there are 4 boys with blond hair, 6 boys with brown hair, 1 boy with red hair, 5 girls with blond hair, and 8 girls with brown hair. If a student is selected at random, what is the probability that the student will be a boy or have brown hair?

Answer:

8. A team of 12 players is chosen from the 20 people that tried out for the team. How many different teams can be chosen?

Answer:

9. There are 12 math teachers, 9 science teachers, 3 music teachers, and 6 social studies teachers at a conference. If a teacher is selected random, find:

P(not music):

10. A bag contains 1 red marble, 3 green marbles, 1 blue marbles, and 1 yellow marbles. Suppose one marble is picked at random. Find:

Odds of selecting blue: $1/5$

11. Two standard dice are rolled. Find:

$P(\text{a sum equal to } 3)$:

12. Suppose you rolled 5 strikes and 7 non-strikes in a bowling game. Based on these results, what is the experimental probability that you will roll a strike?

Answer: