

Drill Problems: Week 2.3

*Author: Jaehoon Song (Lecturer)**Release: 2025-06-19 00:37:16-04:00***Purpose and Usage:**

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Written by Jaehoon Song (Lecturer)

1. Arc Length Calculation (10 points)

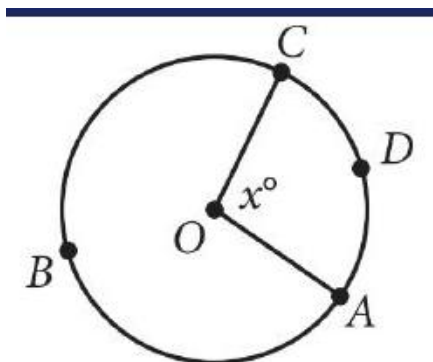


Figure 1: Circle with center O and arcs

The circle above has center O , the length of arc \overline{ADC} is 5π , and $x = 100$. What is the length of arc \overline{ABC} ?

- (A) 9π
- (B) 13π
- (C) 18π
- (D) $\frac{13}{2}\pi$

Answer:



2. Circle Radius from Equation (10 points)

The graph of $x^2 + x + y^2 + y = \frac{199}{2}$ in the xy -plane is a circle. What is the length of the circle's radius?

Answer:



3. Circle Center Coordinates (10 points)

The equation above defines a circle in the xy -plane. What are the coordinates of the center of the circle?

- (A) $(-20, -16)$
- (B) $(-10, -8)$
- (C) $(10, 8)$
- (D) $(20, 16)$

Answer:



4. Arc Length with Angle (10 points)

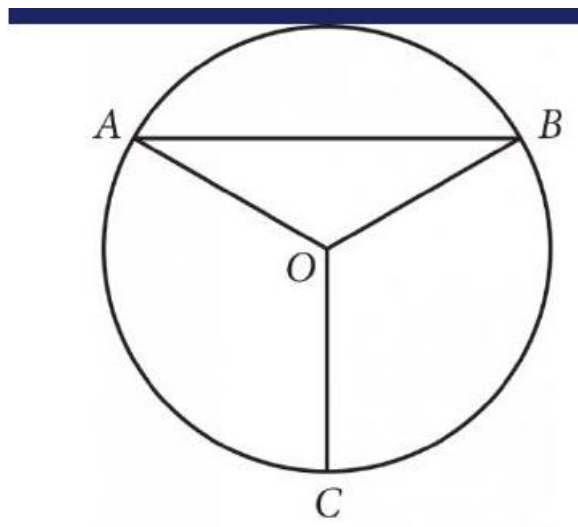


Figure 2: reference attached

Point O is the center of the circle above, and the measure of $\angle OAB$ is 30° . If the length of \overline{OC} is 18, what is the length of arc \overline{AB} ?

- (A) 9π
- (B) 12π
- (C) 15π
- (D) 18π

Answer:



5. Circle Radius from Diameter (10 points)

A circle in the xy -plane has a diameter with endpoints $(2, 4)$ and $(2, 14)$. An equation of this circle is $(x - 2)^2 + (y - 9)^2 = r^2$, where r is a positive constant. What is the value of r ?

Answer:



6. Angle Calculation in Triangle (10 points)

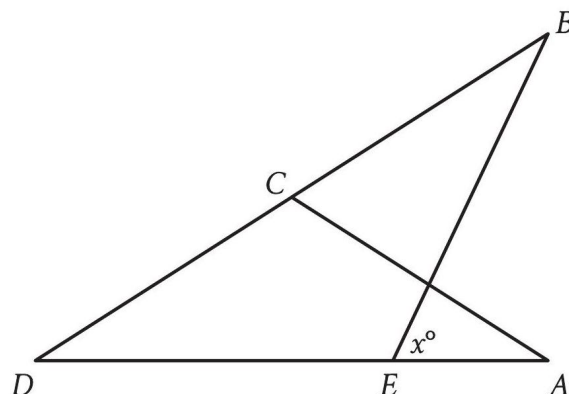


Figure 3: reference attached

In the figure, $AC = CD$. The measure of angle EBC is 45° , and the measure of angle ACD is 104° . What is the value of x ?

Answer:



7. Complex Angle Calculation (10 points)

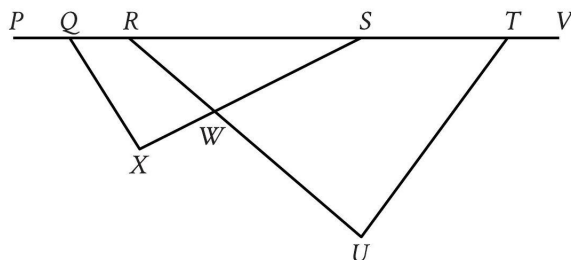


Figure 4: reference attached

In the figure shown, points Q , R , S , and T lie on line segment PV , and line segment RU intersects line segment SX at point W . The measure of $\angle SQX$ is 48° , the measure of $\angle SXQ$ is 86° , the measure of $\angle SWU$ is 85° , and the measure of $\angle VTU$ is 162° . What is the measure, in degrees, of $\angle TUR$?

Answer:



8. **Intersecting Lines Angle** (10 points)

Intersecting lines r , s , and t are shown below.

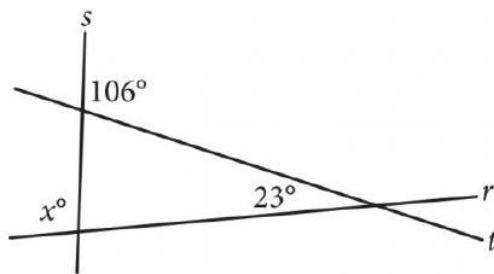


Figure 5: reference attached

What is the value of x ?

Answer:



9. **Parallel Lines Angle** (10 points)

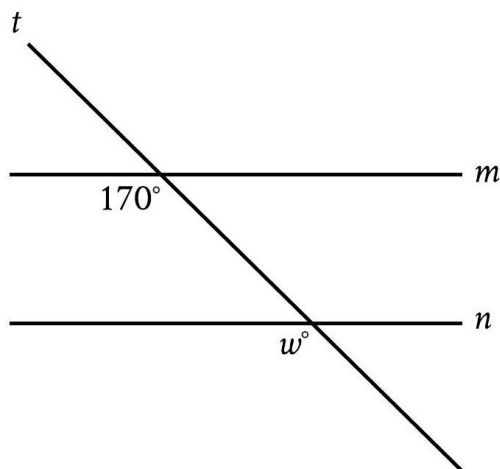


Figure 6: reference attached

In the figure, line m is parallel to line n . What is the value of w ?

- (A) 17
- (B) 30
- (C) 70
- (D) 170

Answer:



10. Isosceles Triangle Angle (10 points)

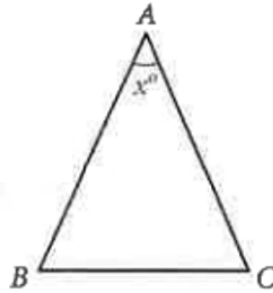


Figure 7: reference attached

In the given triangle, $AB = AC$ and $\angle ABC$ has a measure of 67° . What is the value of x ?

- (A) 36
- (B) 46
- (C) 58
- (D) 70

Answer:



11. Intersecting Segments Angle (10 points)

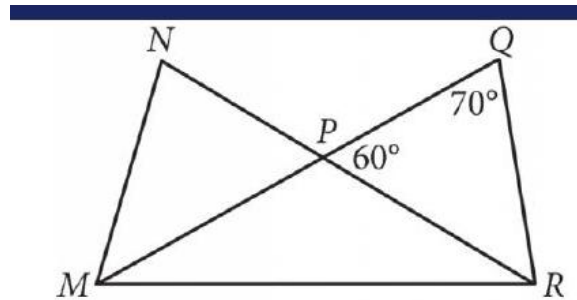


Figure 8: reference attached

In the figure above, \overline{MQ} and \overline{NR} intersect at point P , $NP = QP$, and $MP = PR$. What is the measure, in degrees, of $\angle QMR$? (Disregard the degree symbol when gridding your answer.)

Answer:



12. Similar Triangles Angle (10 points)

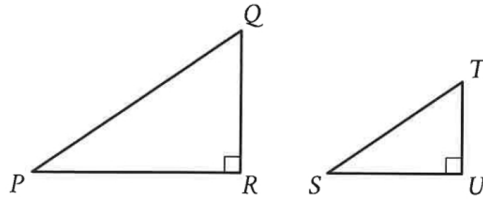


Figure 9: reference attached

Right triangles PQR and STU are similar, where P corresponds to S . If the measure of angle Q is 18° , what is the measure of angle S ?

- (A) 18°
- (B) 72°
- (C) 82°
- (D) 162°

Answer:



13. Parallel Lines with Transversal (10 points)

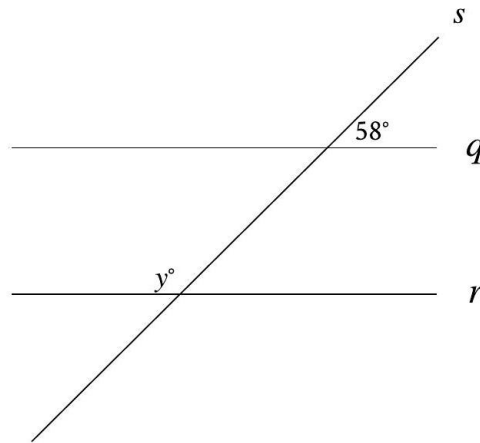


Figure 10: reference attached

In the figure, line q is parallel to line r , and both lines are intersected by line s . If $y = 2x + 8$, what is the value of x ?

Answer:



14. **Parallel Lines Angle Relationship** (10 points)

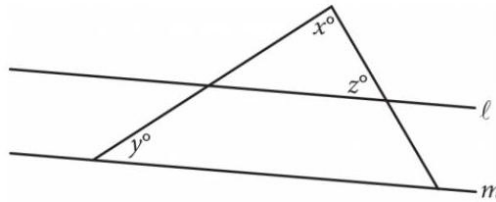


Figure 11: reference attached

In the figure above, lines ℓ and m are parallel, $y = 20$, and $z = 60$. What is the value of x ?

- (A) 120
- (B) 100
- (C) 90
- (D) 80

Answer:



15. **Parallel Lines Proportionality** (10 points)

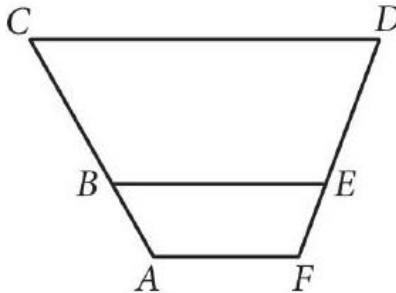


Figure 12: reference attached

In the figure above, \overline{AF} , \overline{BE} , and \overline{CD} are parallel. Points B and E lie on \overline{AC} and \overline{FD} , respectively. If $AB = 9$, $BC = 18.5$, and $FE = 8.5$, what is the length of \overline{ED} , to the nearest tenth?

- (A) 16.8
- (B) 17.5
- (C) 18.4
- (D) 19.6

Answer:



16. **Similar Triangles Sine Value** (10 points)

Triangle FGH is similar to triangle JKL , where angle F corresponds to angle J and angles G and K are right angles. If $\sin(F) = \frac{308}{317}$, what is the value of $\sin(J)$?

- (A) $\frac{75}{317}$
- (B) $\frac{308}{317}$
- (C) $\frac{317}{308}$
- (D) $\frac{317}{75}$

Answer:



17. **Right Triangle Trigonometric Relationship** (10 points)

In right triangle RST , the sum of the measures of angle R and angle S is 90 degrees. The value of $\sin(R)$ is $\frac{\sqrt{15}}{4}$. What is the value of $\cos(S)$?

- (A) $\frac{\sqrt{15}}{15}$
- (B) $\frac{\sqrt{15}}{4}$
- (C) $\frac{4\sqrt{15}}{15}$
- (D) $\sqrt{15}$

Answer:



18. **Tangent Value Calculation** (10 points)

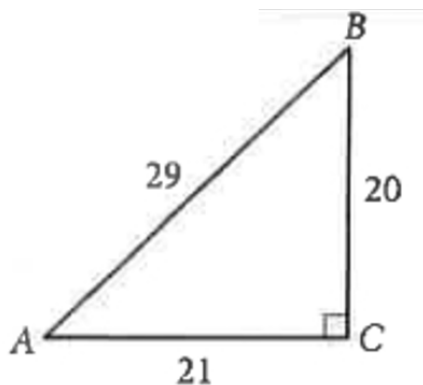


Figure 13: reference attached

In the figure above, what is the value of $\tan(A)$?

- (A) $\frac{20}{29}$
- (B) $\frac{21}{29}$
- (C) $\frac{20}{21}$
- (D) $\frac{21}{20}$

Answer:



19. **Right Triangle Side Length** (10 points)

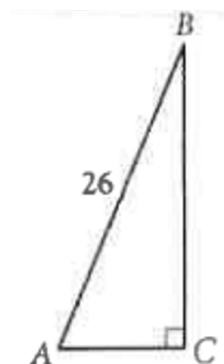


Figure 14: reference attached

Triangle ABC above is a right triangle, and $\sin(B) = \frac{5}{13}$. What is the length of side \overline{BC} ?

Answer:



20. **Pythagorean Theorem Application** (10 points)

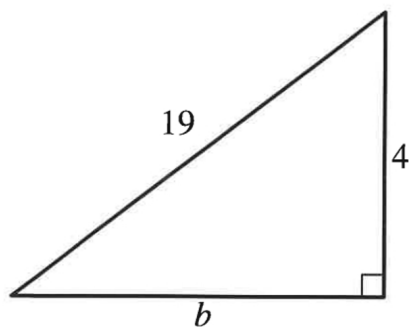


Figure 15: reference attached

Which equation shows the relationship between the side lengths of the given triangle?

- (A) $4b = 19$
- (B) $4 + b = 19$
- (C) $4^2 + b^2 = 19^2$
- (D) $4^2 - b^2 = 19^2$

Answer:

