

Pre-Calculus Summer Assignment

70 points (based on completion)

Name _____

- $\angle X$ is an obtuse angle for which measure(s)?
 - $0^\circ < m\angle X < 90^\circ$
 - $0^\circ < m\angle X < 180^\circ$
 - $90^\circ < m\angle X < 180^\circ$
 - $m\angle X = 180^\circ$

- In Figure 1, name the intersection of planes $DCGH$, $AEHD$.
 - AD
 - point D
 - HD
 - plane ABCD

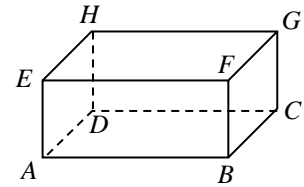


Figure 1

- In Figure 2, which of the following are *not* coplanar points?
 - S, O, T, and V
 - T, R, X, and Y
 - V, Y, S, and O
 - V, R, Y, and X

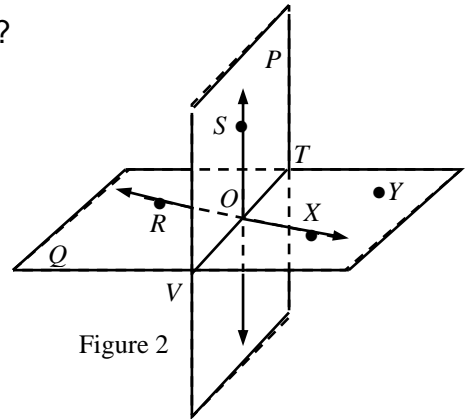


Figure 2

- In Figure 3, if \overline{QS} bisects $\angle MQR$ and $m\angle SQR = 63^\circ$, what is the value of $m\angle MQR$?
 - 63°
 - 125°
 - 126°
 - 180°

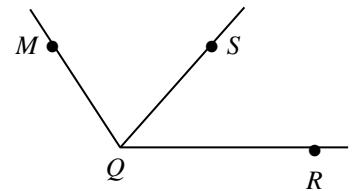


Figure 3

- In Figure 4, if all the lines are *coplanar*, which pair of angles are a linear pair?
 - $\angle 3$ and $\angle 4$
 - $\angle 4$ and $\angle 5$
 - $\angle 1$ and $\angle 4$
 - $\angle 2$ and $\angle 3$

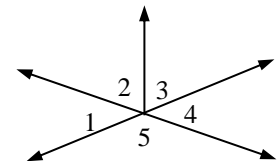


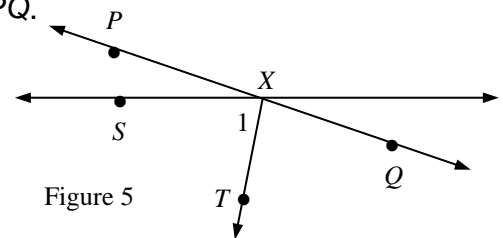
Figure 4

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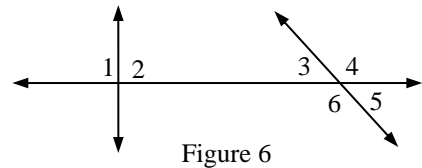
6. Find the length of \overline{AC} . B is between A and C ;
 $AB = 5$, and $BC = 12$.
- A. 14
 - B. 11
 - C. 16
 - D. 17

7. In Figure 5, $PQ = 3x - 8$, $XQ = x - 6$, and $PX = 12$. Find PQ .
- A. $PQ = 16$
 - B. $PQ = 13$
 - C. $PQ = 15$
 - D. $PQ = 6$



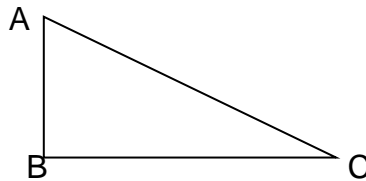
8. If the measures of two supplementary angles are $2x - 3$ and $3x - 2$, then the measure of the *smaller* angle is:
- A. 71
 - B. 67
 - C. 82
 - D. 76

9. In Figure 6, which pair of angles can be classified as vertical angles?
- A. $\angle 3$ and $\angle 6$
 - B. $\angle 2$ and $\angle 1$
 - C. $\angle 5$ and $\angle 3$
 - D. $\angle 3$ and $\angle 1$



10. In a right triangle ABC , if the length of $AB = 5$ cm., length of $BC = 12$ cm., and $\angle ABC = 90^\circ$, what is the length of AC ?

- A. 16 cm.
- B. 13 cm.
- C. 17 cm.
- D. 14 cm.



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11. In Figure 7, two lines intersect. Solve for y .

- A. 40
- B. 38
- C. 43
- D. 35

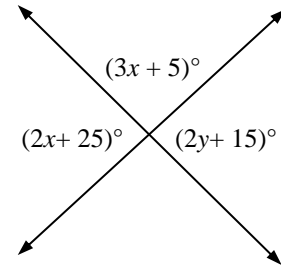


Figure 7

12. Which step of the following proof is justified by using the Subtraction Property of Equality?

- (1) $4(x - 2) = x + 1$
- (2) $4x - 8 = x + 1$
- (3) $4x = x + 9$
- (4) $3x = 9$
- (5) $x = 3$

- A. Step 2
- B. Step 3
- C. Step 4
- D. Step 5

13. Complete the following to make a true statement: "In a plane, if two lines are _____ to a third line, then the two lines are _____ to each other."

- A. parallel, parallel
- B. perpendicular, perpendicular
- C. parallel, perpendicular
- D. None of the above

14. In Figure 8, $\angle 1$ and $\angle 2$ are called:

- A. Vertical angles
- B. Corresponding angles
- C. Supplementary angles
- D. Complementary angles

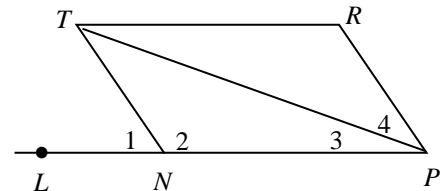


Figure 8

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15. Which one of the following is false?
- A. Complementary angles add up to 90° .
 - B. A rectangle is always a parallelogram.
 - C. Supplementary angles add up to 360° .
 - D. All angles in a square are 90°

16. In Figure 9, what value of x makes $a \parallel b$?
- A. $x = 30$
 - B. $x = 20$
 - C. $x = 10$
 - D. $x = 50$

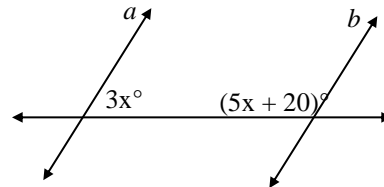


Figure 9

17. In Figure 10, classify $\triangle ABC$ by its angles.
- A. an obtuse triangle.
 - B. an acute triangle.
 - C. a right triangle.
 - D. a scalene triangle.

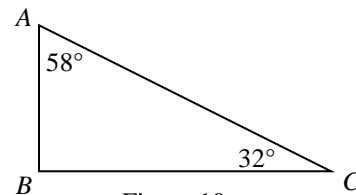


Figure 10

18. In a triangle, which type of triangle has no sides equal?
- A. Scalene
 - B. Obtuse
 - C. Equilateral
 - D. Isosceles

19. In Figure 11, $AB = AC = CD$, and $\angle ADE = 150^\circ$. Find $m\angle BAC$.
- A. 40°
 - B. 50°
 - C. 60°
 - D. 70°

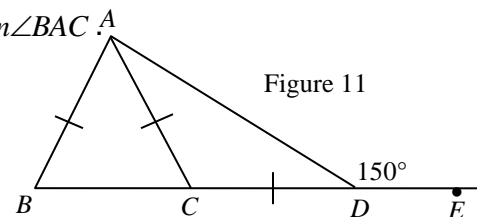


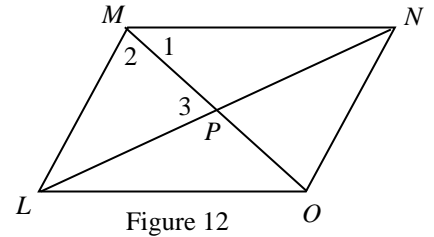
Figure 11

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20. Of the 3 sides in a triangle, which option does **NOT** form a triangle?
- A. 2, 6, 7
 - B. 3, 4, 6
 - C. 3, 9, 12
 - D. 6, 12, 15

21. In Figure 12, $LMNO$ is a parallelogram with $m\angle 1 = 45$, $m\angle 2 = 60$, and $m\angle 3 = 80^\circ$. Find $m\angle MNP$.
- A. 65
 - B. 40
 - C. 35
 - D. 100



22. In isosceles $\triangle BAG$, $BA = 2x + 1$, $GA = 3x - 5$, and $BG = x + 5$. If $\angle G \cong \angle B$, what is the perimeter of $\triangle BAG$?
- A. 36
 - B. 42
 - C. 32
 - D. 37

23. In Figure 13, find the values of a and b .
- A. $a = 5$, $b = 5\sqrt{2}$.
 - B. $a = 5\sqrt{3}$, $b = 10$
 - C. $a = 10$, $b = 10\sqrt{3}$
 - D. $a = 5\sqrt{3}$, $b = 6\sqrt{3}$

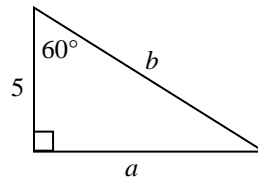


Figure 13

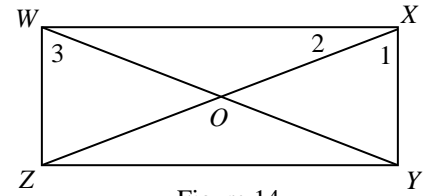
24. In a rectangle, what is **NOT** true?
- A. Opposite sides are equal.
 - B. The diagonals intersect at 90° .
 - C. The diagonals are equal.
 - D. All angles are 90° .

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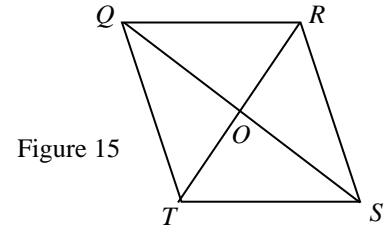
25. In Figure 14, $WXYZ$ is a rectangle. If $\angle 1 = 50^\circ$, what is the value of $\angle XOY$?

- A. 50°
- B. 100°
- C. 80°
- D. 60°



26. In Figure 15, $QRST$ is a rhombus. Which of the following is *not* always true?

- A. $ST \cong QT$
- B. $\angle TOS$ is a right angle
- C. $QS \cong TR$
- D. $\angle RSQ \cong \angle QST$



27. Which of the following statements *cannot* be written as a true biconditional statement?

- A. If the sum of two angles is 90° , then the angles are complementary.
- B. If M is the midpoint of segment PQ , then $PM + MQ = PQ$.
- C. If $4x + 5 = 29$, then $x = 6$.
- D. If the sum of two angles is 180° , then the angles are supplementary.

28. In triangle ABC , if $AB = 3$, $BC = 8$, and $AC = 7$, then the smallest angle of the triangle is:

- A. $\angle C$
- B. $\angle A$
- C. $\angle B$
- D. cannot be determined

29. If $h = 4$, $j = 6$, and $k = 2$, which one of the following ratios is equal to $1/2$?

- A. $\frac{h}{h+k}$
- B. $\frac{h+j}{k}$
- C. $\frac{h}{j+k}$
- D. $\frac{j}{h+k}$

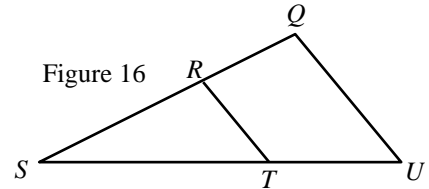
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30. If the lengths of two sides of a triangle are 4 and 7, then the length of the third side *must* be between ? and ?.
- A. 3, 8
 - B. 4, 10
 - C. 3, 11
 - D. 4, 11

31. In Figure 16, if RT is parallel to QU , $SR = 8$, $RQ = 12$, and $RT = 10$, find QU .

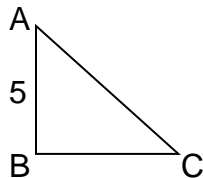
- A. 15
- B. 26
- C. 20
- D. 25



32. Which of the following pairs of objects are always similar?

- A. Two circles
- B. A rhombus and a rectangle
- C. Two regular polygons
- D. Two right triangles

33. For $\triangle ABC$ which is a right-angle triangle, $\angle ABC = 90^\circ$, $\angle BAC = 45^\circ$, and $\angle ACB = 45^\circ$. What is the value of AC if $AB = 5$.



- A. 5
- B. $10\sqrt{2}$
- C. $5\sqrt{2}$
- D. 10

34. In a right-angle triangle ABC , if $\angle ABC = 90^\circ$, $BC = 6$, and $AC = 8$, then $AB =$?.

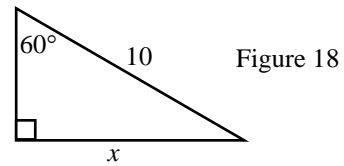
- A. 14
- B. $\sqrt{28}$
- C. 10
- D. 2

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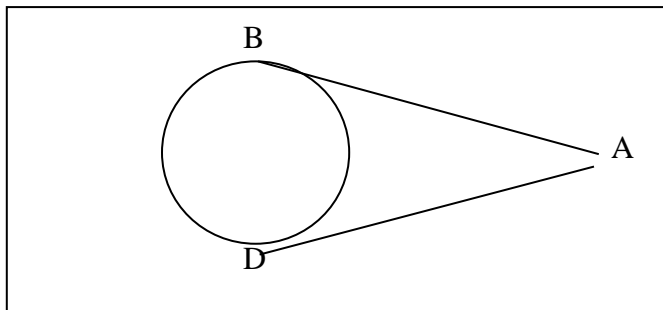
35. A triangle with sides of lengths 5, 12, and 13 is a(n) ___? triangle.
- A. acute
 - B. right
 - C. obtuse
 - D. Answer cannot be determined.

36. In Figure 18, find length x to the nearest integer.
- A. 9
 - B. 10
 - C. 8
 - D. 11



37. In an equilateral triangle with sides of length 10, the length of the altitude is:
- A. 10
 - B. 5
 - C. $\sqrt{75}$
 - D. 7

38. In the circle below, points B and D are the points of tangency. If $AB = 5x - 7$ and $AD = 2x + 8$, find the value of x .



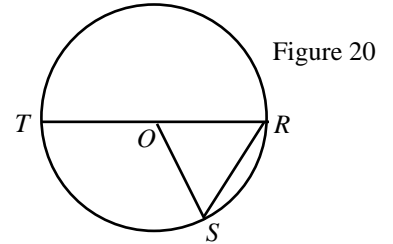
- A. 4
- B. 6
- C. 5
- D. 7

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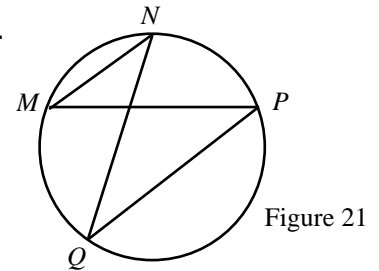
39. If the diameter of a circle with center C is 16 cm and $CA = 9$ cm, where is point A located relative to the circle?
- point A is on the circle
 - point A is outside the circle
 - point A is inside the circle
 - cannot be determined

40. In Figure 20, O is the center of the circle and $m\angle ROS = 80^\circ$. Find the value of arc TS .
- 160°
 - 200°
 - 180°
 - 100°

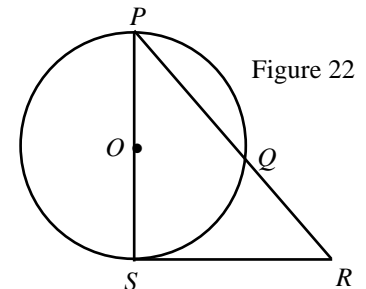


41. A chord of a circle has length 8 cm and is located 3 cm from the center of the circle. What is the radius of the circle?
- 5 cm
 - 8 cm
 - 6 cm
 - $5\sqrt{2}$

42. In Figure 21, arc $MN = 60^\circ$, arc $MQ = 100^\circ$ and arc $PQ = 120^\circ$. Find $m\angle NQP$.
- 40°
 - 35°
 - 90°
 - 80°



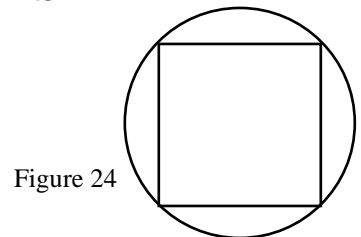
43. In Figure 22, O is the center of the circle, \overline{PR} is a secant and \overline{RS} is a tangent. If arc $SQ = 120^\circ$, what is $m\angle SRQ$?
- 50
 - 40
 - 60
 - 30



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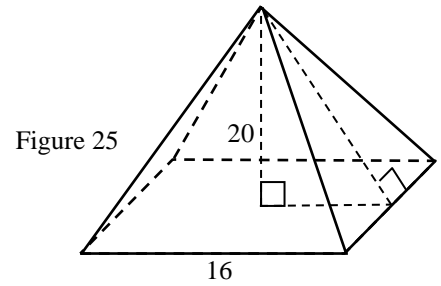
44. Find the area of a circle with diameter 18 cm.
- A. 81π units²
 - B. 18π units²
 - C. 326π units²
 - D. 163π units²
45. In a circle with center C and radius 12 cm., if $\angle ACB = 90^\circ$, what is the length of arc AB ?
- A. 9π
 - B. 6π
 - C. 10π
 - D. 5π
46. The area of a regular polygon with perimeter 12 cm. and apothem 8 cm. is:
- A. 96 cm.^2
 - B. 32 cm.^2
 - C. 64 cm.^2
 - D. 48 cm.^2
47. The length of a rectangle is 14 units and the rectangle has area 70 square units. What is the perimeter of the rectangle?
- A. $p = 17$ units
 - B. $p = 38$ units
 - C. $p = 32$ units
 - D. $p = 44$ units
48. In Figure 24, a square is inscribed in a circle with radius 8 units. What is the area of the square?
- A. $A = 100$ units²
 - B. $A = 128\sqrt{2}$ units²
 - C. $A = 128$ units²
 - D. $A = 120\sqrt{2}$ units²



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49. Find the slant height of the regular square pyramid in Figure 25.
- A. $4\sqrt{29}$
 - B. $6\sqrt{2}$
 - C. $3\sqrt{29}$
 - D. 18



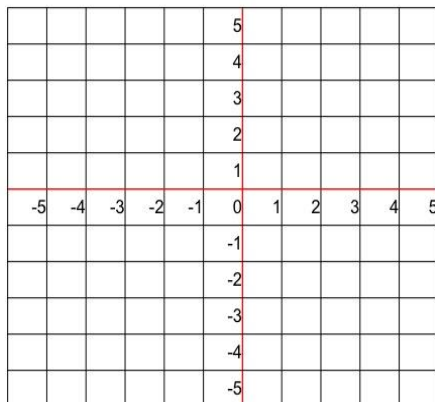
50. Find the volume of a regular square pyramid with base edge 12 and slant height 10.
- A. $V = 1152$ cubic units
 - B. $V = 384$ cubic units
 - C. $V = 576$ cubic units
 - D. $V = 232$ cubic units

51. 30 is 40% of what number?

52. Solve for x: $|4x - 1| = 11$

53. Sketch the graph of a function $f(x) = 2x^2 - 5x + 3$ with domain $\{x: 1 \leq x \leq 4\}$, and range: $\{y: -3 \leq y \leq 5\}$

Graphing Data



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54. Write an equation in slope-intercept form that contains the point $(-2, 5)$ and has a slope of -3 .

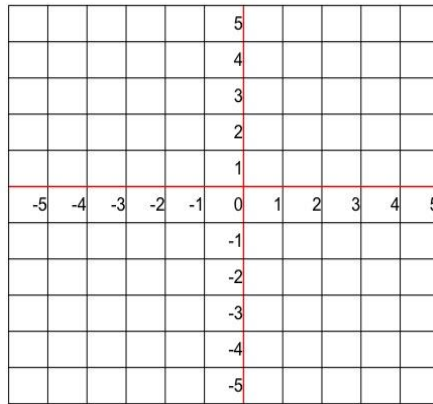
55. Write an equation of the line that contains the point $(-4, 6)$ and is perpendicular to the line $5x - 6y = 15$.

56. Solve:

$$\begin{aligned} 5x - 4y + 3z &= 15 \\ 6x + 2y + 9z &= 13 \\ 7x + 6y - 6z &= 6 \end{aligned}$$

57. Plot the graph of the inequality: $5x + 3y \geq -15$
 $2x + 6y < -9$

Graphing Data



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58. Find the vertex, x- and y- intercept, and symmetric point of $y = 2x^2 + 7x + 3$.

59. Factor completely: $x^3 - 125$

60. Factor: $5x^3 + 6x^2 - 45x - 54$

61. Multiply: $(x^2 + 3x - 4)(x + 2)$

62. Long division: $(x^3 - 9x^2 + 23x - 15) \div (x + 5)$

63. Use the factor theorem to factorize: $x^3 - x^2 - 5x + 2$

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64. Simplify: $\sqrt{12} + 2\sqrt{48} + 5\sqrt{147} - 4\sqrt{12}$

65. Solve: $\sqrt{x-1} + 3 = x$, showing the Domain and extraneous solutions, if any.

67. Find the 45th term of the Arithmetic series 2, 5, 8.....

68. Find the two geometric means between 5 and 135.

69. Expand the binomial series: $(x + y)^5$

70. Find the 8th term of $(a - b)^{17}$