1 If  and  is the shortest side of , what is the shortest side of ?

|  |  |
| --- | --- |
| 1) |  |
| 2) |  |
| 3) |  |
| 4) |  |

 2 In circle *O* shown in the diagram below, chords  and  are parallel.



If  and , what is ?

|  |  |
| --- | --- |
| 1) | 38 |
| 2) | 44 |
| 3) | 88 |
| 4) | 96 |

 3 As shown in the diagram below,  is a median of .



Which statement is *always* true?

|  |  |
| --- | --- |
| 1) |  |
| 2) |  |
| 3) |  |
| 4) |  |

 4 In the diagram below, under which transformation is  the image of ?



|  |  |
| --- | --- |
| 1) |  |
| 2) |  |
| 3) |  |
| 4) |  |

 5 Line segment *AB* is a diameter of circle *O* whose center has coordinates . What are the coordinates of point *B* if the coordinates of point *A* are ?

|  |  |
| --- | --- |
| 1) |  |
| 2) |  |
| 3) |  |
| 4) |  |

 6 Plane *A* and plane *B* are two distinct planes that are both perpendicular to line . Which statement about planes *A* and *B* is true?

|  |  |
| --- | --- |
| 1) | Planes *A* and *B* have a common edge, which forms a line. |
| 2) | Planes *A* and *B* are perpendicular to each other*.* |
| 3) | Planes *A* and *B* intersect each other at exactly one point*.* |
| 4) | Planes *A* and *B* are parallel to each other*.* |

 7 Triangle *ABC* is similar to triangle *DEF*. The lengths of the sides of  are 5, 8, and 11. What is the length of the shortest side of  if its perimeter is 60?

|  |  |
| --- | --- |
| 1) | 10 |
| 2) | 12.5 |
| 3) | 20 |
| 4) | 27.5 |

 8 In the diagram below of right triangle *ABC*, altitude  is drawn to hypotenuse .



If  and , what is the length of altitude ?

|  |  |
| --- | --- |
| 1) | 6 |
| 2) |  |
| 3) | 3 |
| 4) |  |

 9 The diagram below shows the construction of an equilateral triangle.



Which statement justifies this construction?

|  |  |
| --- | --- |
| 1) |  |
| 2) |  |
| 3) |  |
| 4) |  |

 10 What is the slope of the line perpendicular to the line represented by the equation ?

|  |  |
| --- | --- |
| 1) |  |
| 2) | 2 |
| 3) |  |
| 4) |  |

 11 Triangle *ABC* is shown in the diagram below.



If  joins the midpoints of  and , which statement is *not* true?

|  |  |
| --- | --- |
| 1) |  |
| 2) |  |
| 3) |  |
| 4) |  |

 12 The equations  and  are graphed on a set of axes. What is the solution of this system?

|  |  |
| --- | --- |
| 1) |  |
| 2) |  |
| 3) |  |
| 4) |  |

 13 Square *ABCD* has vertices , , , and . What is the length of a side of the square?

|  |  |
| --- | --- |
| 1) |  |
| 2) |  |
| 3) |  |
| 4) |  |

 14 The diagram below shows , with , , and .



If , what is ?

|  |  |
| --- | --- |
| 1) | 26 |
| 2) | 38 |
| 3) | 52 |
| 4) | 64 |

 15 As shown in the diagram below,  and  intersect at point *A* and  is perpendicular to both  and  at *A*.

**

Which statement is *not* true?

|  |  |
| --- | --- |
| 1) |  is perpendicular to plane *BAD*. |
| 2) |  is perpendicular to plane *FAB*. |
| 3) |  is perpendicular to plane *CAD*. |
| 4) |  is perpendicular to plane *BAT*. |

 16 Which set of numbers could *not* represent the lengths of the sides of a right triangle?

|  |  |
| --- | --- |
| 1) |  |
| 2) |  |
| 3) |  |
| 4) |  |

 17 How many points are 5 units from a line and also equidistant from two points on the line?

|  |  |
| --- | --- |
| 1) | 1 |
| 2) | 2 |
| 3) | 3 |
| 4) | 0 |

 18 The equation of a circle is . What are the coordinates of the center of this circle and the length of its radius?

|  |  |
| --- | --- |
| 1) |  and 16 |
| 2) |  and 16 |
| 3) |  and  |
| 4) |  and  |

 19 The equation of a line is . What is an equation of the line that is perpendicular to the given line and that passes through the point ?

|  |  |
| --- | --- |
| 1) |  |
| 2) |  |
| 3) |  |
| 4) |  |

 20 Consider the relationship between the two statements below.



These statements are

|  |  |
| --- | --- |
| 1) | inverses |
| 2) | converses |
| 3) | contrapositives |
| 4) | biconditionals |

 21 In the diagram of trapezoid *ABCD* below, , , , and .



What is ?

|  |  |
| --- | --- |
| 1) | 25 |
| 2) | 35 |
| 3) | 60 |
| 4) | 90 |

 22 In circle *R* shown below, diameter  is perpendicular to chord  at point *L*.

**

Which statement is *not* always true?

|  |  |
| --- | --- |
| 1) |  |
| 2) |  |
| 3) |  |
| 4) |  |

 23 Which equation represents circle *A* shown in the diagram below?



|  |  |
| --- | --- |
| 1) |  |
| 2) |  |
| 3) |  |
| 4) |  |

 24 Which equation represents a line that is parallel to the line whose equation is ?

|  |  |
| --- | --- |
| 1) |  |
| 2) |  |
| 3) |  |
| 4) |  |

 25 In the diagram below of circle *O*,  and  are secants.



If  and , what is the degree measure of ?

|  |  |
| --- | --- |
| 1) | 25 |
| 2) | 35 |
| 3) | 45 |
| 4) | 50 |

 26 The measure of an interior angle of a regular polygon is 120°. How many sides does the polygon have?

|  |  |
| --- | --- |
| 1) | 5 |
| 2) | 6 |
| 3) | 3 |
| 4) | 4 |

 27 As shown in the diagram of rectangle *ABCD* below, diagonals  and  intersect at *E*.



If  and , then the length of  is

|  |  |
| --- | --- |
| 1) | 6 |
| 2) | 10 |
| 3) | 12 |
| 4) | 24 |

 28 If the vertices of  are , , and , then  is classified as

|  |  |
| --- | --- |
| 1) | right |
| 2) | scalene |
| 3) | isosceles |
| 4) | equilateral |

 29 After the transformation , the image of  is . If  and , find the value of *x*.

 30 In the diagram below, circles *A* and *B* are tangent at point *C* and  is drawn. Sketch all common tangent lines.

**

 31 On the set of axes below, graph the locus of points 4 units from  and the locus of points 3 units from the origin. Label with an **X** *any* points that satisfy *both* conditions.



 32 Write an equation of a circle whose center is  and whose diameter is 10*.*

 33 Using a compass and straightedge, construct a line perpendicular to line  through point *P*. [Leave all construction marks.]



 34 Write an equation of the line that is the perpendicular bisector of the line segment having endpoints  and . [The use of the grid below is optional]



 35 A right circular cylinder with a height of 5 cm has a base with a diameter of 6 cm. Find the lateral area of the cylinder to the *nearest hundredth of a square centimeter*. Find the volume of the cylinder to the *nearest hundredth of a cubic centimeter*.

 36 Triangle *ABC* has vertices ,  and . State and label the coordinates of the vertices of , the image of , following the composite transformation . [The use of the set of axes below is optional.]



 37 In , , , and . Determine the longest side of .

 38 The diagram below shows rectangle *ABCD* with points *E* and *F* on side . Segments  and  intersect at *G*, and . Prove: 

