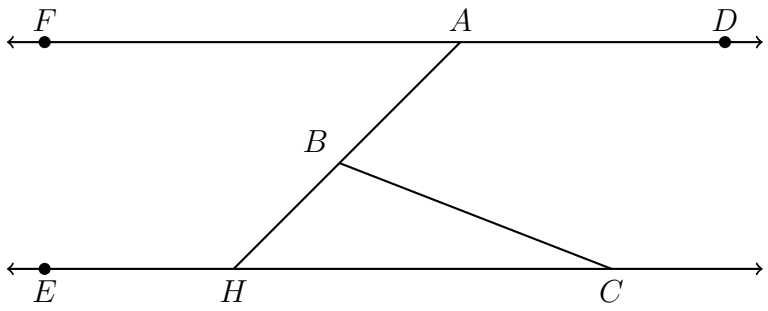
Angle calculation situations

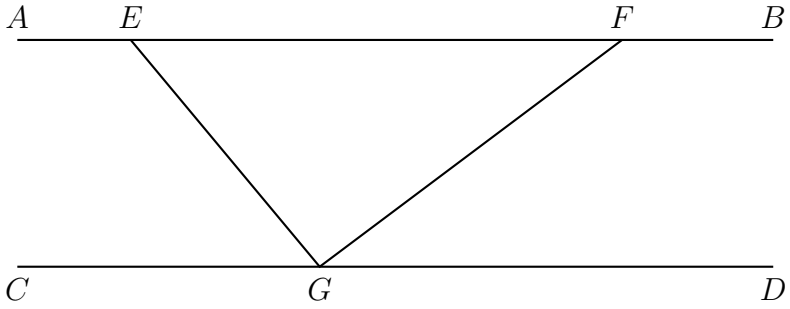
1. In the diagram below, $\overline{FAD} \parallel \overline{EHC}$, and $\overline{ABH}$ and $\overline{BC}$ are drawn.



If $m\angle FAB = 48°$ and $m\angle ECB = 18°$, what is $m\angle ABC$?

(a) 18°
(b) 48°
(c) 66°
(d) 114°

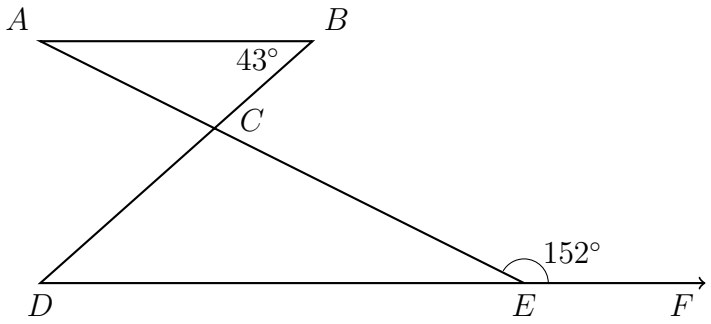
2. In the diagram below, $\overline{AEFB} \parallel \overline{CGD}$, and $\overline{GE}$ and $\overline{GF}$ are drawn.



If $m\angle EFG = 32°$ and $m\angle AEG = 137°$, what is $m\angle EGF$?

(a) 11°
(b) 43°
(c) 75°
(d) 105°

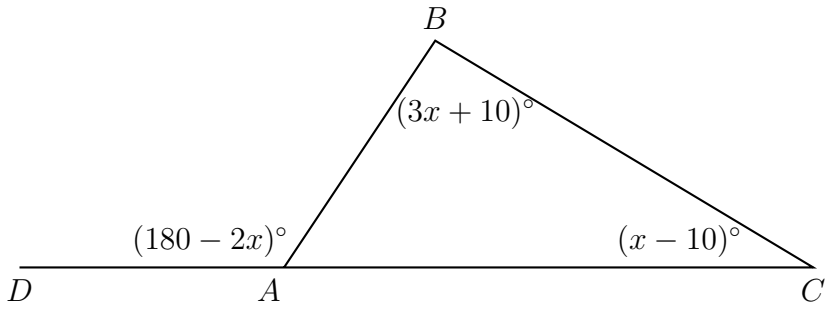
3. In the diagram below, $\overline{AB} \parallel \overline{DEF}$, $\overline{AB}$ and $\overline{BD}$ intersect at C, $m\angle B = 43°$, and $m\angle CEF = 152°$.



Which statement is true?

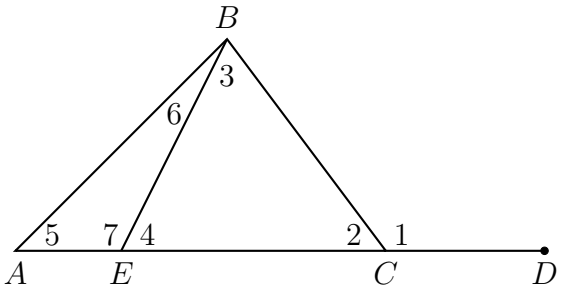
(a) $m\angle D = 28°$
(b) $m\angle A = 43°$
(c) $m\angle ACD = 71°$
(d) $m\angle BCE = 109°$

4. In $\triangle ABC$ shown below, side $\overline{AC}$ is extended to point D with $m\angle DAB = (180 - 2x)°$, $m\angle C = (x - 10)°$, and $m\angle B = (3x + 10)°$.



What is $m\angle BAC$?

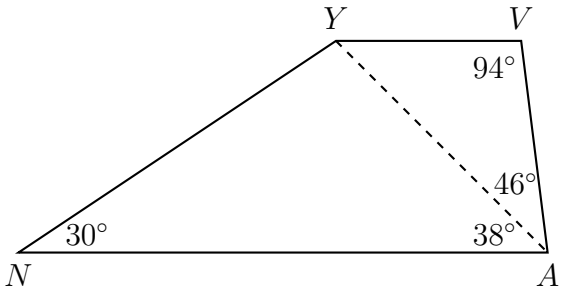
5. In the diagram below of triangle ABC, $\overline{AC}$ is extended through point C to point D, and $\overline{BE}$ is drawn to $\overline{AC}$.



Which equation is always true?

(a) $\angle 1 = m\angle 3 + m\angle 2$
(b) $\angle 5 = m\angle 3 - m\angle 2$
(c) $\angle 6 = m\angle 3 - m\angle 2$
(d) $\angle 7 = m\angle 3 + m\angle 2$

6. In diagram of quadrilateral $NAVY$, $m\angle YNA = 30°$, $m\angle YAN = 38°$, $m\angle AVY = 94°$, and $m\angle VAY = 46°$.

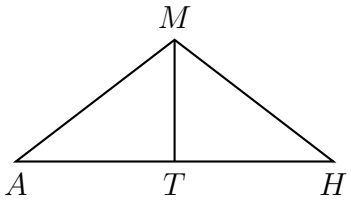


Which segment has the shortest length?

(a) $\overline{AY}$
(b) $\overline{NY}$
(c) $\overline{VA}$
(d) $\overline{VY}$

Congruence and similarity situations

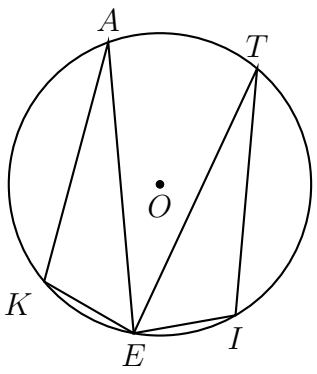
7. Triangle $A'B'C'$ is the image of triangle ABC after a translation of 2 units to the right and 3 units up. Is triangle ABC congruent to triangle $A'B'C'$? Explain why.
8. In triangle MAH below, $\overline{MT}$ is the perpendicular bisector of $\overline{AH}$.



Which statement is *not* always true?

(a) $\triangle MAH$ is isosceles.
(b) $\triangle MAT$ is isosceles.
(c) $\overline{MT}$ bisects $\angle AMH$.
(d) $\angle A$ and $\angle TMH$ are complementary.

9. In the diagram below of circle O, points K, A, T, I, and E are on the circle, $\triangle KAE$ and $\triangle ITE$ are drawn, $\overset{\frown}{KE} \cong \overset{\frown}{EI}$, and $\angle EKA \cong \angle EIT$.



Which statement about $\triangle KAE$ and $\triangle ITE$ is always true?

(a) They are neither congruent nor similar.

(b) They are similar but not congruent.

(c) They are right triangles.

(d) They are congruent.

Linear equations

10. Determine and state an equation of the line perpendicular to the line $5x - 4y = 10$ and passing through the point $(5, 12)$.

11. What is an equation of the image of the line $y = \frac{3}{2}x - 4$ after a dilation of a scale factor of $\frac{3}{4}$ centered at the origin?

12. Which equation represents a line that is perpendicular to the line represented by $y = \frac{2}{3}x + 1$?

    (a) $3x + 2y = 12$

    (b) $3x - 2y = 12$

    (c) $y = \frac{3}{2}x + 2$

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

13. What is an equation of the line that passes through the point $(6, 8)$ and is perpendicular to a line with equation $y = \frac{3}{2}x + 5$?

    (a) $y - 8 = \frac{3}{2}(x - 6)$

    (b) $y - 8 = -\frac{3}{2}(x - 6)$

    (c) $y + 8 = \frac{3}{2}(x + 6)$

    (d) $y + 8 = -\frac{3}{2}(x + 6)$

14. Line MN is dilated by a scale factor of 2 centered at the point $(0, 6)$. If $\overline{MN}$ is represented by $y = -3x + 6$, which equation can represent $\overline{M'N'}$, the image of $\overline{MN}$?

    (a) $y = -3x + 12$

    (b) $y = -3x + 6$

    (c) $y = -6x + 12$

    (d) $y = -6x + 6$

15. The line represented by $2y = x + 8$ is dilated by a scale factor of k centered at the origin, such that the image of the line has an equation of $y - \frac{1}{2}x = 2$. What is the scale factor?

Partition line segments by a given ratio

16. The endpoints of directed line segment PQ have coordinates of $P(-7, -5)$ and $Q(5, 3)$. What are the coordinates of point A, on $\overline{PQ}$, that divide $\overline{PQ}$ into a ratio of 1:3?
17. Point M divides $\overline{AB}$ so that $AM : MB = 1 : 2$. If A has coordinates $(-1, -3)$ and B has coordinates $(8, 9)$, what are the coordinates of M?
18. The coordinates of the endpoints of directed line segment ABC are $A(-8, 7)$ and $C(7, -13)$. If $AB : BC = 3 : 2$, what are the coordinates of B?
19. Directed line segment DE has endpoints $D(-4, -2)$ and $E(1, 8)$. Point F divides such that $DF : FE$ is $2 : 3$. What are the coordinates of F?

Volume, density

20. A cone has a volume of 108π and a base diameter of 12. What is the height of the cone?

21. A child's tent can be modeled as a pyramid with a square base whose sides measure 60 inches and whose height measures 84 inches. What is the volume of the tent, to the *nearest cubic foot*?

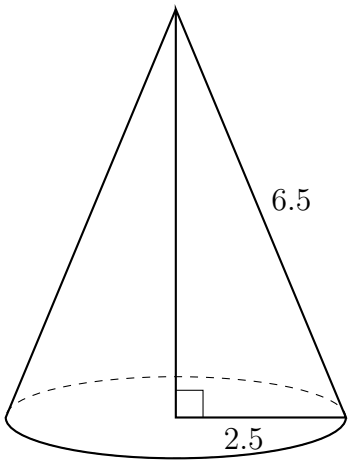
22. Lou has a solid clay brick in the shape of a rectangular prism with a length of 8 inches, a width of 3.5 inches, and a height of 2.25 inches. If the clay weighs 1.055 oz/in^3, how much does Lou's brick weigh, to the nearest ounce?

23. A rectangular tabletop will be made of maple wood that weighs 43 pounds per cubic foot. The tabletop will have a length of eight feet, a width of three feet, and a thickness of one inch. Determine and state the weight of the tabletop, in pounds.

24. The base of a pyramid is a rectangle with a width of 4.6 cm and a length of 9 cm. What is the height, in centimeters, of the pyramid if its volume is 82.8 cm^3?

25. Randy's basketball is in the shape of a sphere with a maximum circumference of 29.5 inches. Determine and state the volume of the basketball, to the *nearest cubic inch*.

26. As shown in the diagram below, the radius of a cone is 2.5 cm and its slant height is 6.5 cm.



How many cubic centimeters are in the volume of the cone? Express your answer in terms of π.

3-D rotation

27. Which three-dimensional figure will result when a rectangle 6 inches long and 5 inches wide is continuously rotated about the longer side?

    (a) a rectangular prism with a length of 6 inches, width of 6 inches, and height of 5 inches

    (b) a rectangular prism with a length of 6 inches, width of 5 inches, and height of 5 inches

    (c) a cylinder with a radius of 5 inches and a height of 6 inches

    (d) a cylinder with a radius of 6 inches and a height of 5 inches

28. An isosceles right triangle whose legs measure 6 is continuously rotated about one of its legs to form a three-dimensional object. The three-dimensional object is a

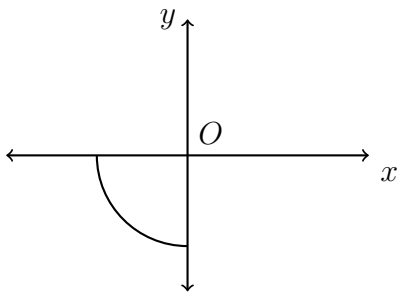
    (a) cylinder with a diameter of 6

    (b) cylinder with a diameter of 12

    (c) cone with a diameter of 6

    (d) cone with a diameter of 12

29. Circle O is centered at the origin. In the diagram below, a quarter of circle O is graphed.



    Which three-dimensional figure is generated when the quarter circle is continuously rotated about the y-axis?

    (a) cone

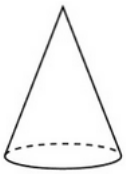
    (b) sphere

    (c) cylinder

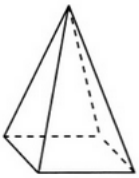
    (d) hemisphere

30. A student has a rectangular postcard that he folds in half lengthwise. Next, he rotates it continuously about the folded edge. Which three dimensional object below is generated by this rotation?

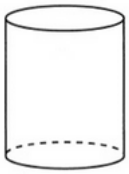
(a) cone



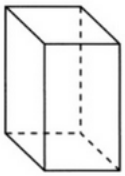
(b) pyramid



(c) cylinder



(d) rectangular prism



31. If a rectangle is continuously rotated around one of its sides, what is the three-dimensional figure formed?

(a) cone
(b) sphere
(c) cylinder
(d) rectangular prism

32. If an equilateral triangle is continuously rotated around one of its medians, which 3-dimensional object is generated?

(a) cone
(b) sphere
(c) pyramid
(d) prism

Scale effects

33. After a dilation with center $(0, 0)$, the image of $\overline{DB}$ is $\overline{D'B'}$. If $DB = 4.5$ and $D'B' = 18$, then what is the scale factor of this dilation?

34. Given square $RSTV$, where $RS = 9$ cm. If square $RSTV$ is dilated by a scale factor of 3 about a given center, what is the perimeter, in centimeters, of the image of $RSTV$ after the dilation?

35. Jaden is comparing two cones. The radius of the base of cone A is twice as large as the radius of the base of cone B. The height of cone B is twice the height of cone A. The volume of cone A is

    (a) twice the volume of cone B

    (b) four times the volume of cone B

    (c) equal to the volume of cone B

    (d) equal to half the volume of cone B

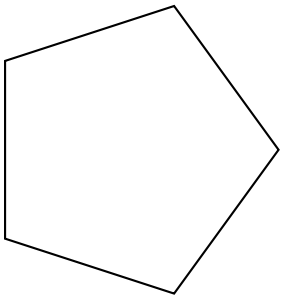
Transformations (onto)

36. A regular hexagon is rotated about its center. Which degree measure will carry the regular hexagon onto itself?

    (a) 45° (c) 120°

    (b) 90° (d) 135°

37. What is the smallest non-zero angle of rotation about its center that would map the pentagon onto itself?



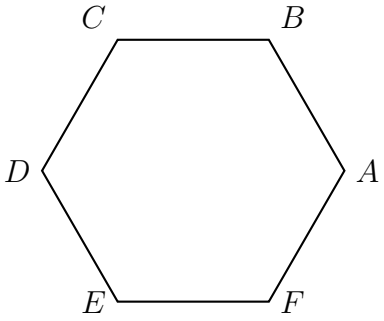
38. Circle YES or NO to indicate whether the given transformation maps the hexagon onto itself.

    (a) Yes No A reflection over $\overleftrightarrow{AD}$.

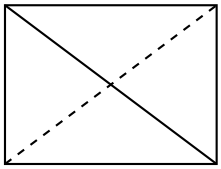
    (b) Yes No A rotation of 60° clockwise around the hexagon's center.

    (c) Yes No A reflection over a line through the midpoints of $\overline{BC}$, $\overline{EF}$.

    (d) Yes No A rotation of 120° counterclockwise around point D.



39. The figure shows a rectangle (not a square).



    Which transformations carries the rectangle onto itself? Mark each True or False.

(a) A reflection over the solid diagonal True False

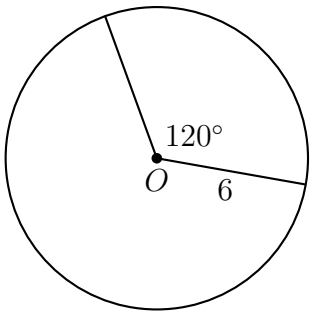
(b) A reflection over the dashed diagonal True False

(c) A clockwise rotation of 90° about the intersection of the diagonals True False

(d) A clockwise rotation of 180° about the intersection of the diagonals True False

Sector area and arc length

40. The diagram below shows circle O with radii $\overline{OA}$ and $\overline{OB}$. The measure of angle AOB is 120°, and the length of a radius is 6 inches.



Which expression represents the length of arc AB, in inches?

(a) $\frac{120}{360}(6\pi)$

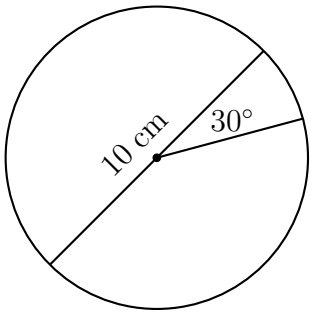
(b) $120(6)$

(c) $\frac{1}{3}(36\pi)$

(d) $\frac{1}{3}(12\pi)$

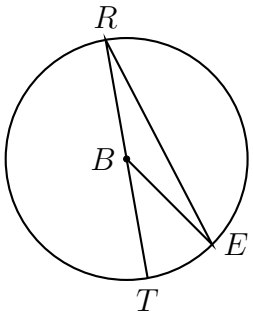
41. The area of a sector of a circle with a radius measuring 15 cm is 75π cm^2. What is the measure of the central angle that forms the sector?

42. A circle with a diameter of 10 cm and a central angle of 30° is drawn below.



What is the area, to the *nearest tenth of a square centimeter*, of the sector formed by the 30° angle?

43. In circle B below, diameter $\overline{RT}$, radius $\overline{BE}$, and chord $\overline{RE}$ are drawn.



It $m\angle TRE = 15°$ and $BE = 9$, then the area of sector EBR is what in terms of π?

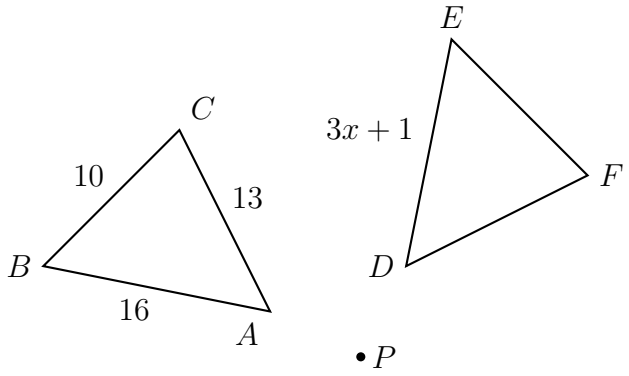
Similar triangles (dilation)

44. Triangle JGR is similar to triangle MST. Which statement is *not* always true?

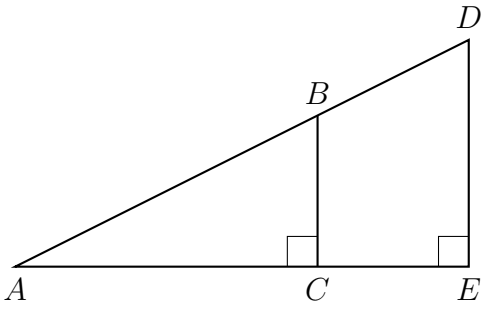
(a) $\angle J \cong \angle M$
(b) $\angle G \cong \angle T$
(c) $\angle R \cong \angle T$
(d) $\angle G \cong \angle S$

45. In the diagram below, $\triangle ABC$ with sides of 10, 13, and 16, is mapped onto $\triangle DEF$ after a clockwise rotation of 90° about point P.

If $DE = 3x + 1$, what is the value of x?



46. In the diagram below of right triangle AED, $\overline{BC} \parallel \overline{DE}$.

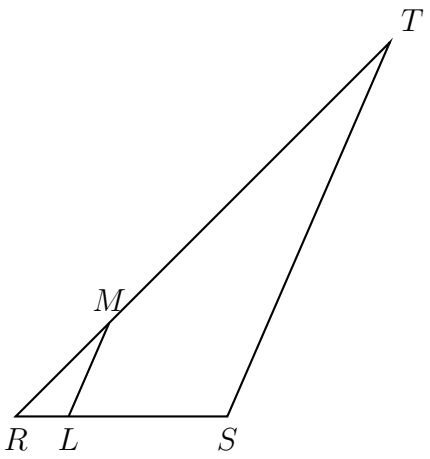


Which statement is always true?

(a) $\frac{AC}{BC} = \frac{DE}{AE}$
(b) $\frac{AB}{AD} = \frac{BC}{DE}$
(c) $\frac{AC}{CE} = \frac{BC}{DE}$
(d) $\frac{DE}{BC} = \frac{DB}{AB}$

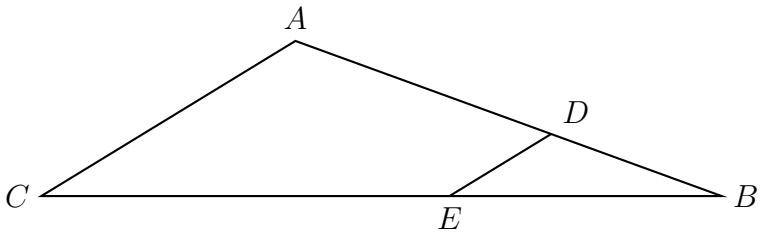
47. put top-down dilation here

48. In the diagram below of $\triangle RST$, L is a point on $\overline{RS}$, and M is a point on $\overline{RT}$, such that $\overline{LM} \parallel \overline{ST}$.



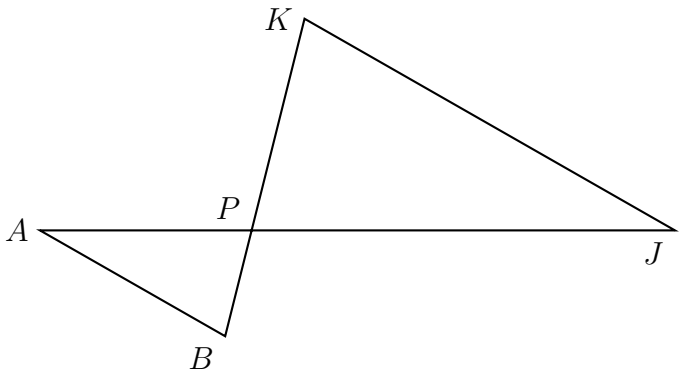
If $RL = 2$, $LS = 6$, $LM = 4$, and $ST = x + 2$, what is the length of $\overline{ST}$?

49. In the diagram of $\triangle ABC$ below, points D and E are on sides $\overline{AB}$ and $\overline{CB}$ respectively, such that $\overline{DE} \parallel \overline{AC}$.

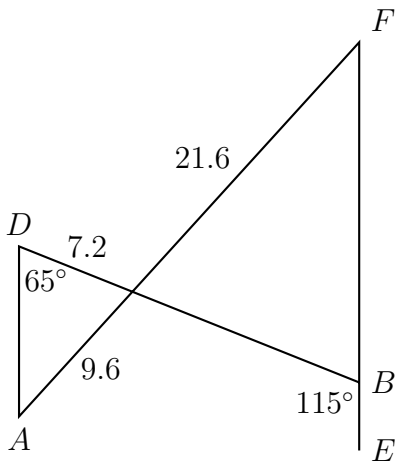


IF EB is 3 more than DB, $AB = 14$, and $CB = 21$, what is the length of $\overline{AD}$?

50. Given $\triangle ABP \sim \triangle JKP$ as shown below. $AB = 9.6$, $AP = 12.0$, $BP = 6.3$, and $JP = 27.0$. Find JK.

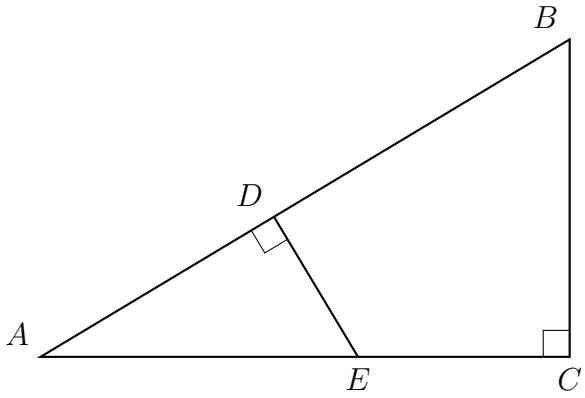


51. In the diagram below, $\overline{AF}$ and $\overline{DB}$ intersect at C, and $\overline{AD}$ and $\overline{FBE}$ are drawn such that $m\angle D = 65°$, $m\angle CBE = 115°$, $DC = 7.2$, $AC = 9.6$, and $FC = 21.6$.



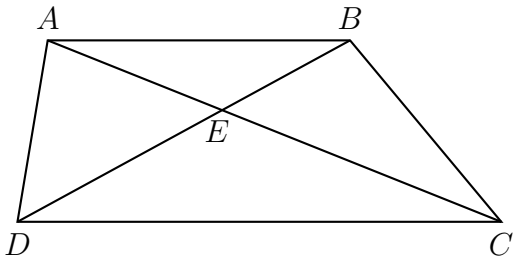
What is the length of $\overline{CB}$?

52. In $\triangle ABC$ shown below, $\angle ACB$ is a right angle, E is a point on $\overline{AC}$, and $\overline{ED}$ is drawn perpendicular to hypotenuse $\overline{AB}$.



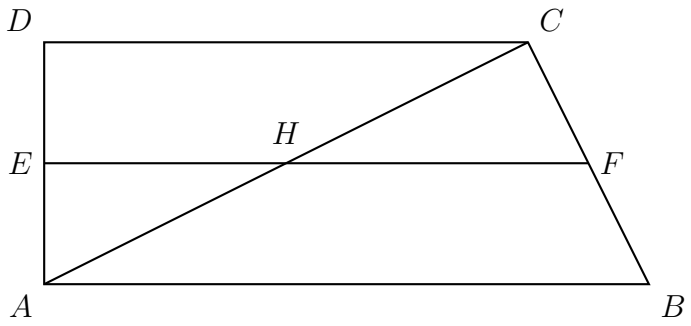
If $AB = 9$, $BC = 6$, and $DE = 4$, what is the length of $\overline{AE}$?

53. In trapezoid $ABCD$ below, $\overline{AB} \parallel \overline{CD}$.



If $AE = 5.2$, $AC = 11.7$, and $CD = 10.5$, what is the length of $\overline{AB}$, to *the nearest tenth*?

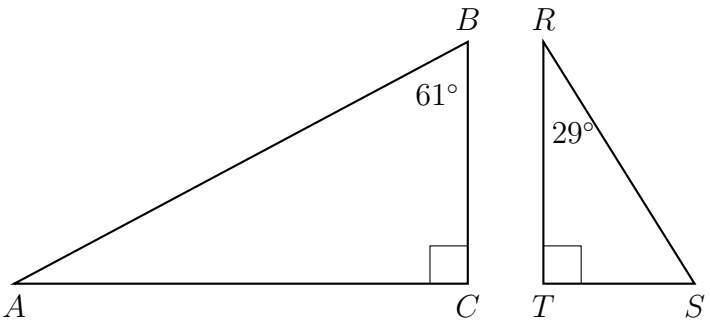
54. In quadrilateral $ABCD$ below, $\overline{AB} \parallel \overline{CD}$, and E, H, and F are the midpoints of $\overline{AD}$, $\overline{AC}$, and $\overline{BC}$, respectively.



If $AB = 24$, $CD = 18$, and $AH = 10$, then what is FH?

Similarity (altitude of a right triangle)

55. Given right triangle ABC with a right angle at C, $m\angle B = 61°$. Given right triangle RST with a right angle at T, $m\angle R = 29°$.



Which proportion in relation to $\triangle ABC$ and $\triangle RST$ is *not* correct?

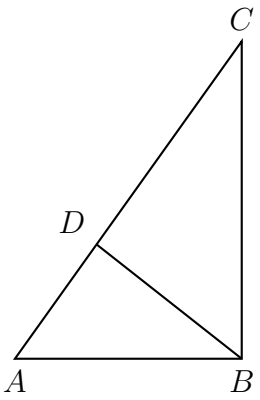
(a) $\frac{AB}{RS} = \frac{RT}{AC}$

(b) $\frac{BC}{ST} = \frac{AB}{RS}$

(c) $\frac{BC}{ST} = \frac{AC}{RT}$

(d) $\frac{AB}{AC} = \frac{RS}{RT}$

56. In the accompanying diagram of right triangle ABC, altitude $\overline{BD}$ is drawn to hypotenuse $\overline{AC}$.



Which statement must be true?

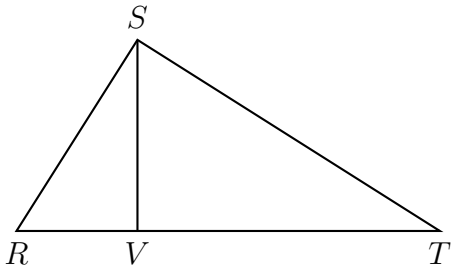
(a) $\frac{AD}{AB} = \frac{BC}{AC}$

(b) $\frac{AD}{AB} = \frac{AB}{AC}$

(c) $\frac{BD}{BC} = \frac{AB}{AD}$

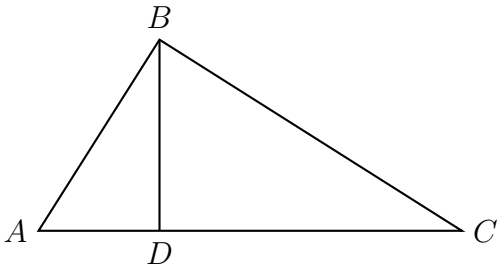
(d) $\frac{AB}{BC} = \frac{BD}{AC}$

57. In right triangle RST below, altitude $\overline{SV}$ is drawn to hypotenuse $\overline{RT}$.



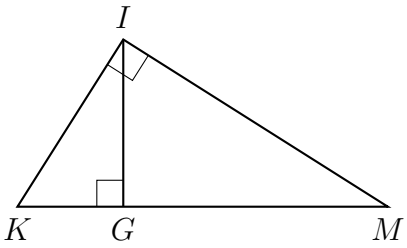
If $RV = 4.1$ and $TV = 10.2$, what is the length of $\overline{ST}$, to the *nearest tenth*?

58. In the diagram below of right triangle ABC, altitude $\overline{BD}$ is drawn to hypotenuse $\overline{AC}$.



If $BD = 4$, $AD = x - 6$, and $CD = x$, what is the length of $\overline{CD}$?

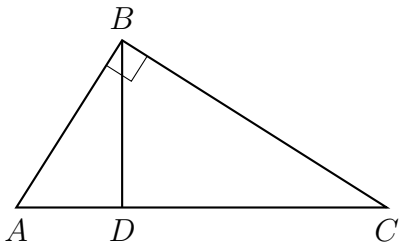
59. In the diagram below of right triangle KMI, altitude $\overline{IG}$ is drawn to hypotenuse $\overline{KM}$.



IF $KG = 9$ and $IG = 12$, what is the length of $\overline{IM}$?

60. Line segment CD is the altitude drawn to hypotenuse in right triangle ECF. If $EC = 10$ and $EF = 24$, then, to the *nearest tenth*, ED is what length?

61. In diagram below of right triangle ABC, altitude $\overline{BD}$ is drawn.



Which ratio is always equivalent to $\cos A$?

(a) $\frac{AB}{BC}$

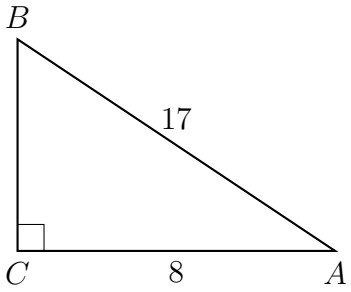
(b) $\frac{BD}{BC}$

(c) $\frac{BD}{AB}$

(d) $\frac{BC}{AC}$

Trigonometry

62. In the diagram below of right triangle ABC, $AC = 8$, and $AB = 17$.



Which equation would determine the value of angle A?

(a) $\sin A = \frac{8}{17}$ (c) $\cos A = \frac{15}{17}$

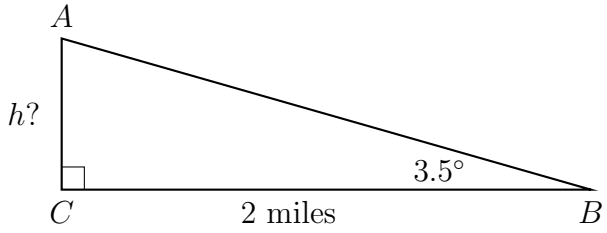
(b) $\tan A = \frac{8}{15}$ (d) $\tan A = \frac{15}{8}$

63. From a point on the ground one-half mile from the base of a historic monument, the angle of elevation to its top is 11.87°. To the nearest foot, what is the height of the monument? (1 mile = 5280 feet)

64. At a distance of two miles, the angle of elevation to the top of a radio tower is 3.5°.

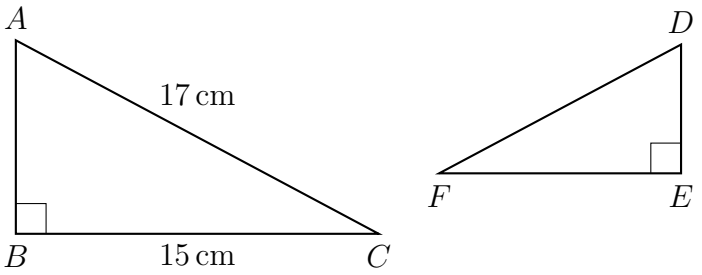
What is the height of the tower, to the *nearest foot*? (1 mile = 5280 feet)

not to scale



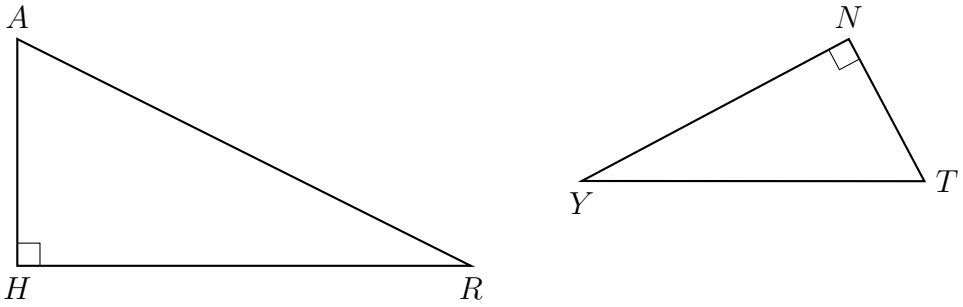
65. In right triangle ABC, hypotenuse $\overline{AB}$ has a length of 26 cm, and side $\overline{BC}$ has a length of 17.6 cm. What is the measure of angle B, to the *nearest degree*?

66. Kayla was cutting right triangles from wood to use for an art project. Two of the right triangles she cut are shown below.



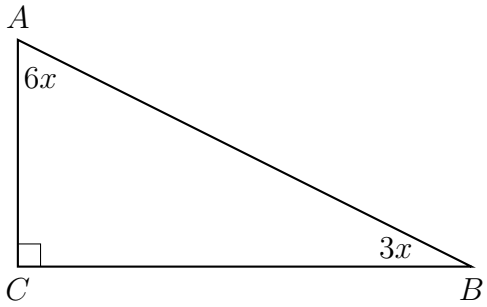
If $\triangle ABC \sim \triangle DEF$, with right angles B and E, $BC = 15$ cm, and $AC = 17$ cm, what is the measure of $\angle F$, to the *nearest degree*?

67. In the diagram below of $\triangle HAR$ and $\triangle NTY$, angles H and N are right angles, and $\triangle HAR \sim \triangle NTY$



If $AR = 13$ and $HR = 12$, what is the measure of $\angle Y$, to the *nearest degree*?

68. In the diagram below of right $\triangle ABC$, $\sin A = \cos B$, $m\angle A = 6x$, and $m\angle B = 3x$. Find x.



69. For the acute angles in a right triangle, $\sin(4x)^\circ = \cos(3x + 13)^\circ$.
What is the number of degrees in the measure of the smaller angle?

70. In a right triangle, the acute angles have the relationship $\sin(2x + 4) = \cos(46)$.

What is the value of x?

71. In right triangle ABC, $m\angle C = 90^\circ$ and $AC \neq BC$. Which trigonometric ratio is equivalent to $\sin B$?

(a) $\cos A$
(b) $\cos B$
(c) $\tan A$
(d) $\tan B$

Circle equations

72. What is the equation of a circle with center $(5, 7)$ and radius $r = 3$?
73. What are the coordinates of the center and the length of the radius of the circle whose equation is $(x - 3)^2 + y^2 = 16$?
74. What is the equation of a circle with center $(-3, 7)$ and radius $r = 4$?
75. The equation of a cirle is $x^2 + y^2 - 2x - 14y = -14$. What are the center and radius of the circle?
76. The equation of a cirle is $x^2+8x+y^2-12y = 144$. What are the coordinates of the center and the length of the radius of the circle?

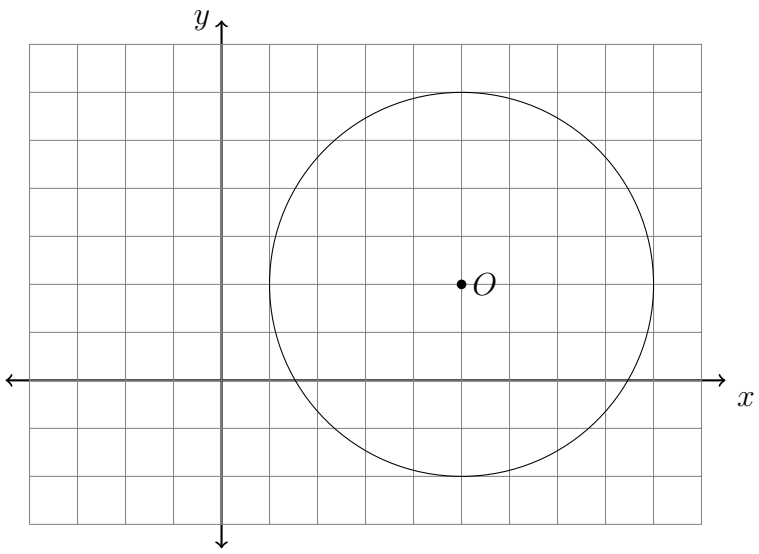
    (a) center $(4, -6)$ and radius 12

    (b) center $(-4, 6)$ and radius 12

    (c) center $(4, -6)$ and radius 14

    (d) center $(-4, 6)$ and radius 14

77. What is an equation of circle O shown in the graph below?



(a) $x^2 + 10x + y^2 + 4y = -13$

(b) $x^2 - 10x + y^2 - 4y = -13$

(c) $x^2 + 10x + y^2 + 4y = -25$

(d) $x^2 - 10x + y^2 - 4y = -25$

78. What are the coordinates of the center and the length of the radius of the circle whose equation is $x^2 + y^2 = 8x - 6y + 39$?

    (a) center $(-4, 3)$ and radius 64

    (b) center $(4, -3)$ and radius 64

    (c) center $(-4, 3)$ and radius 8

    (d) center $(4, -3)$ and radius 8

79. What is an equation of a circle whose center is (1,4) and diameter is 10?

    (a) $x^2 - 2x + y^2 - 8y = 8$

    (b) $x^2 + 2x + y^2 + 8y = 8$

    (c) $x^2 - 2x + y^2 - 8y = 83$

    (d) $x^2 + 2x + y^2 + 8y = 83$

80. The equation of a cirle is $x^2 + y^2 + 4x - 8y = -16$. The statement that best describes circle O is the

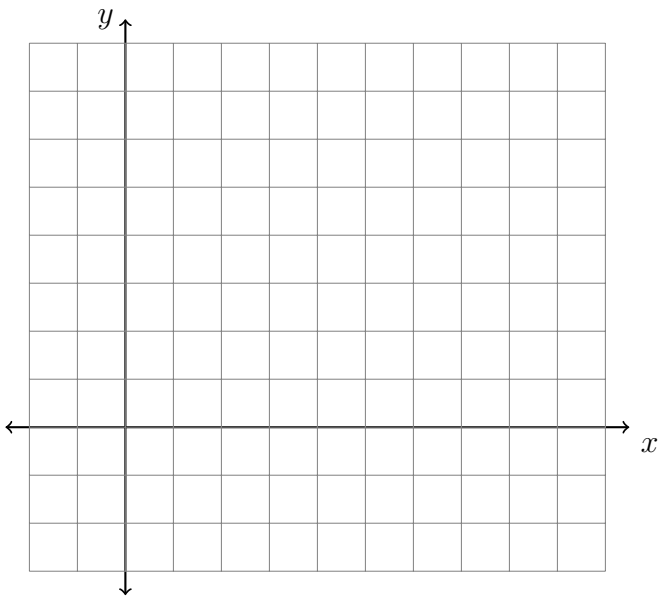
    (a) center is $(2, -4)$ and is tangent to the x-axis

    (b) center is $(2, -4)$ and is tangent to the y-axis

    (c) center is $(-2, 4)$ and is tangent to the x-axis

    (d) center is $(-2, 4)$ and is tangent to the y-axis

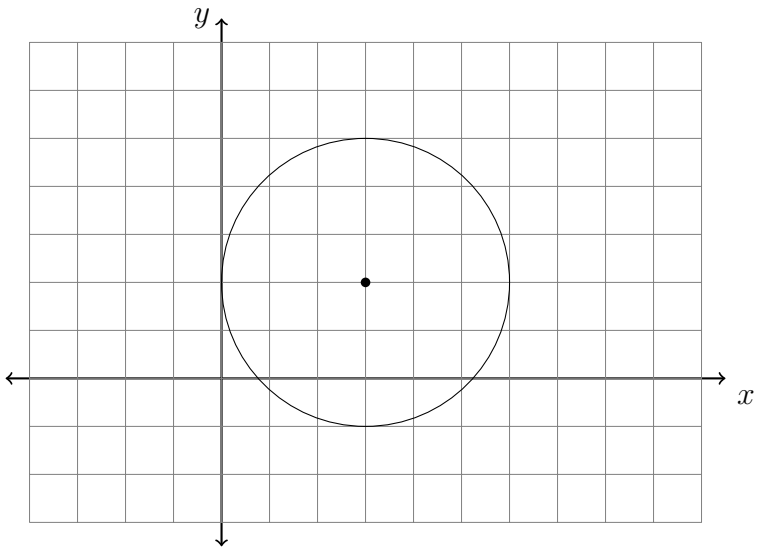
81. What is the equation of a circle whose diameter is $\overline{AB}$ with $A(2, -1)$ and $B(8, 7)$?



82. What are the coordinates of the center and the length of the radius of the circle whose equation is $(x + 8)^2 + (y - 3)^2 = 4$?

83. What is the equation of a circle with center $(1, -9)$ and radius $r = 8$?

84. What is an equation of circle O shown in the graph below?



85. The equation of a cirle is $x^2 + y^2 - 6x + 2y = 6$. What are the coordinates of the center and the length of the radius of the circle?

    (a) center $(-3, 1)$ and radius 4

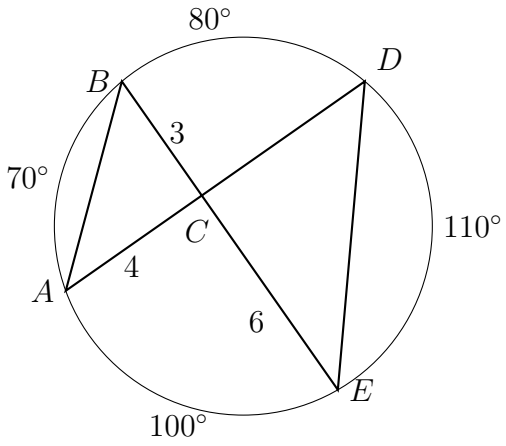
    (b) center $(3, -1)$ and radius 4

    (c) center $(-3, 1)$ and radius 16

    (d) center $(3, -1)$ and radius 16

Chord and sector situations (Similarity)

86. As shown, circle O has chords $\overline{AD}$ and $\overline{BE}$ intersecting at C, and $m\widehat{AB} = 70°$, $m\widehat{BD} = 80°$, $m\widehat{AE} = 100°$, and $m\widehat{DE} = 110°$. $BC = 3$, $AC = 4$, and $CE = 6$.



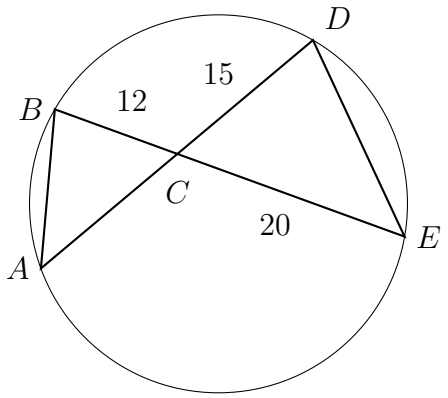
(a) Write down the measure of angles $\angle B$ and $\angle D$.

(b) Write down the measure of angles $\angle A$ and $\angle E$.

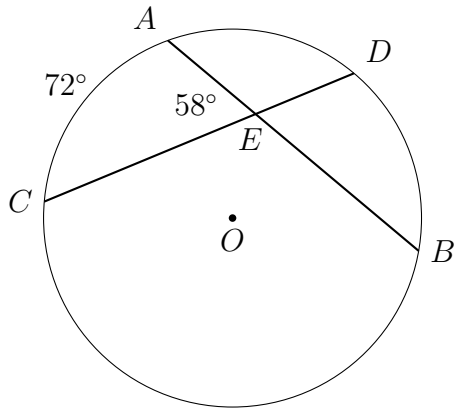
(c) Find the measures of the two angles at C.

(d) Find the scale factor and CD.

87. Circle O has chords $\overline{AD}$ and $\overline{BE}$ intersecting at C, as shown. Find AC.



88. In the diagram below of circle O, chords $\overline{AB}$ and $\overline{CD}$ intersect at E.



If $\text{m}\widehat{AC} = 72°$ and $\text{m}\angle AEC = 58°$, how many degrees are in $\text{m}\widehat{DB}$?

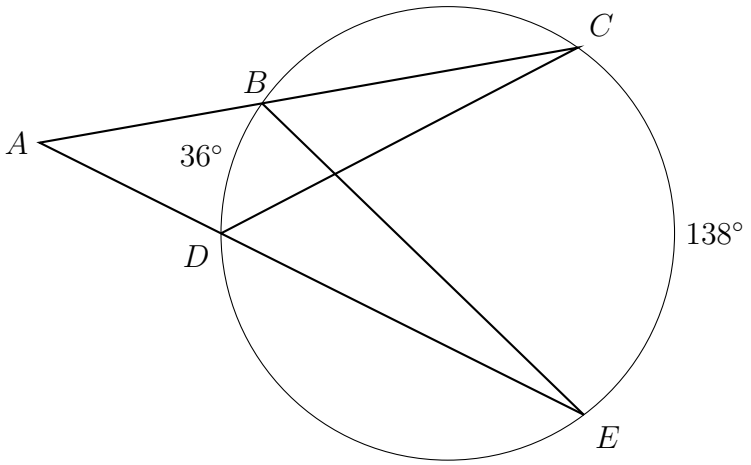
89. The secants $\overline{ABC}$ and $\overline{ADE}$ intersect the circle O, as shown in the diagram. Given $m\widehat{BD} = 36°$ and $m\widehat{CE} = 138°$.

    (a) Find the $m\angle CDE$, $m\angle CBE$.

    (b) Find the $m\angle C$, $m\angle E$.

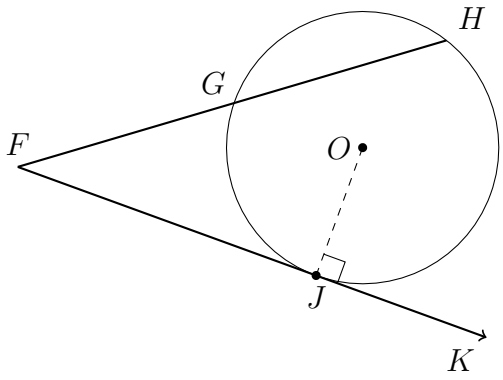
    (c) Find the $m\angle A$.

    (d) Two similar triangles are shown. Write a similarity statement, listing the triangles' vertices in corresponding order.



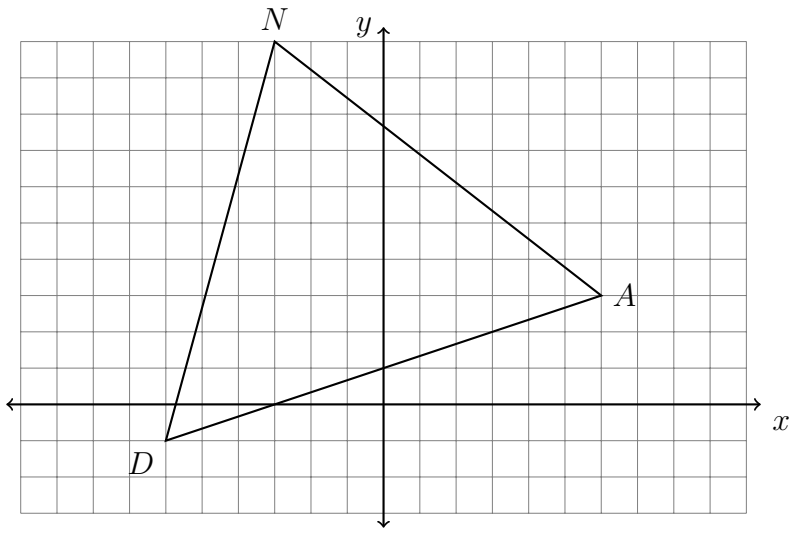
90. **External lines:** Circle with center at point O, at right.

- Secant $\overline{FGH}$
- Radius $\overline{OJ}$
- Tangent $\overline{FJK}$
- Point of tangency J
- Note: $\overline{OJ} \perp \overline{FJK}$



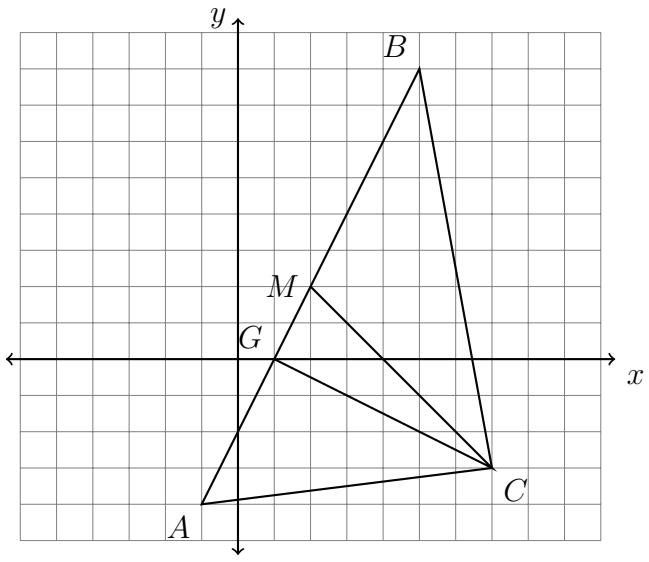
Analytic geometry

91. Triangle DAN is graphed on the set of axes below. The vertices of DAN have coordinates $D(-6,-1)$, $A(6,3)$, and $N(-3,10)$.



What is the area of $\triangle DAN$?

92. In the diagram below, $\triangle ABC$, altitude $\overline{CG}$, and median $\overline{CM}$ are drawn.



Which expression represents the area of $\triangle ABC$?

(a) $\dfrac{(BC)(AC)}{2}$

(b) $\dfrac{(GC)(BC)}{2}$

(c) $\dfrac{(CM)(AB)}{2}$

(d) $\dfrac{(GC)(AB)}{2}$

93. In this problem use the following theorem (copy it at the bottom of the page after your calculations):

A quadrilateral is a parallelogram if and only if it's opposite sides are parallel.

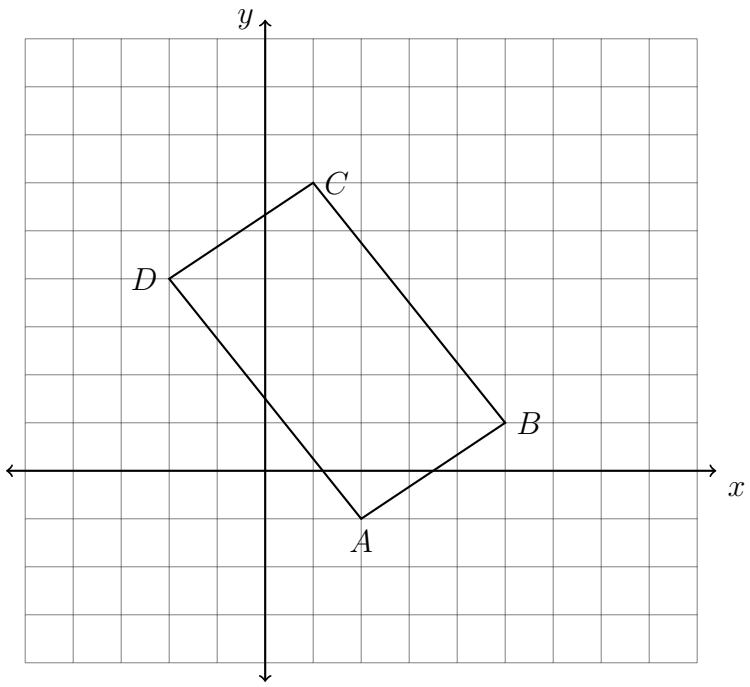
Shown below is quadrilateral $ABCD$, $A(2,-1)$, $B(5,1)$, $C(1,6)$, and $D(-2,4)$.

Prove it is a parallelogram by

(a) finding the slope of each of the four sides,

(b) stating which sides are parallel,

(c) copying the theorem as your conclusion.



94. Rhombus $STAR$ has vertices $S(-1,2)4$, $T(2,3)$, $A(3,0)$, and $R(0,-1)$. What is the perimeter of rhombus $STAR$?

95. Prove that quadrilateral $ABCD$ is a rectangle by calculating the slope of each side and showing that consecutive sides are perpendicular.

96. Aug 2018 #35
The vertices of quadrilateral MATH have coordinates M(4,2), A(1,-3), T(9,3), and H(6,8). Prove that quadrilateral MATH is a parallelogram. (scaffold)

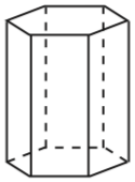
(a) Find four slopes, starting with: $m_{MA} = \dfrac{-3-2}{1-4} =$

(b) Make two statements about parallel sides:
$m_{MA} = m_{TH}$ *iff* _____ $\parallel$ _____

(c) Conclusion: $MATH$ is a parallelogram because both pairs of opposite sides are _____

Cross sections of solids

97. A right hexagonal prism is shown below. A two-dimensional cross section that is perpendicular to the base is taken from the prism.



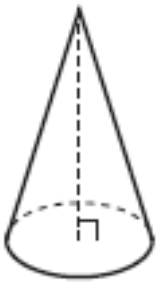
Which figure describes the two-dimensional cross section?

(a) rectangle
(b) triangle
(c) pentagon
(d) hexagon

98. A right cylinder is cut perpendicular to its base. The shape of the cross section is a

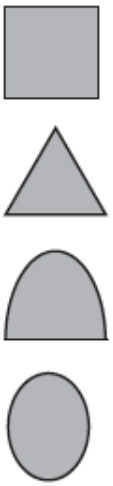
(a) circle
(b) cylinder
(c) rectangle
(d) triangular prism

99. William is drawing pictures of cross sections of the right circular cone below.



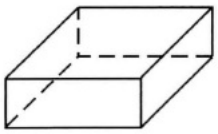
Which drawing can *not* be a cross section of a cone?

(a) square
(b) triangle
(c) parabola
(d) ellipse

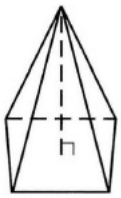


100. Which figure can have the same cross section as a sphere?

(a) rectangular prism

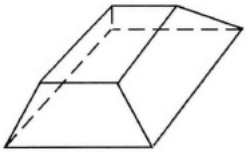


(b) pyramid



(c) cone

(d) truncated pyramid



101. The cross section of a regular pyramid contains the altitude of the pyramid. The shape of this cross section is a

(a) circle
(b) square
(c) triangle
(d) rectangle

102. A two-dimensional cross section is taken of a three-dimensional object. If this cross section is a triangle, what can not be the three-dimensional object?

(a) cylinder
(b) pyramid
(c) cone
(d) rectangular prism

103. A plane intersects a hexagonal prism. The plane is perpendicular to the base of the prism. Which two-dimensional figure is the cross section of the plane intersecting the prism?

(a) rectangle
(b) triangle
(c) trapezoid
(d) hexagon