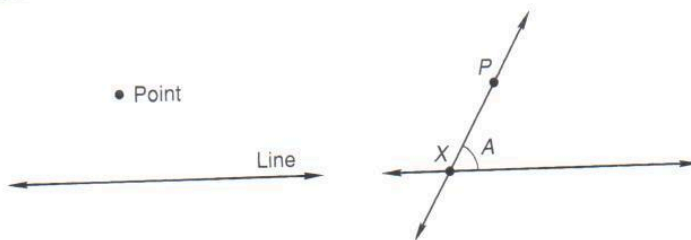
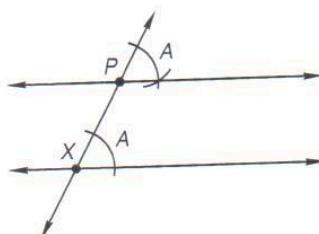


**constructing
parallels**

We can construct a line that is parallel to a given line and that passes through a point not on the line. On the left below, we show the line and the point. The first step is to pick a point X on the line and draw the new line \overleftrightarrow{PX} . We do this on the right and call the angle formed angle A .



Next we copy angle A at point P .



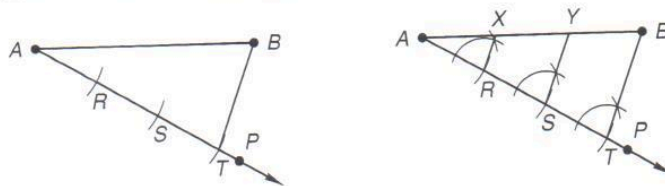
We remember from Lesson 1 that if two lines are cut by a transversal so that a pair of corresponding angles is congruent, then the lines are parallel. Therefore, the constructed line that passes through P is parallel to the given line.

**equal
segments**

We can use construction to divide a line segment into any number of segments of equal lengths. To illustrate, we will divide a line segment into three segments of equal lengths. On the left, we show segment AB . On the right, we draw ray AP at a convenient angle to AB .



Next, on \overrightarrow{AP} we use a compass to mark off three equal segments \overline{AR} , \overline{RS} , and \overline{ST} . Lastly, we connect T and B and construct line segments parallel to this segment from R and S .



Since parallel lines separate transversals into proportional segments, $AX = XY = YB$. The same procedure could be used to divide \overline{AB} into any desired number of segments of equal lengths by laying off on \overrightarrow{AP} the necessary number of equal segments and drawing the required parallel line segments.

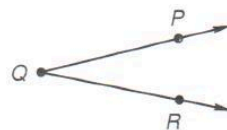
**problem set
4**

1. Three times the complement of angle A is 40° more than the supplement of angle A . Find the measure of angle A .
2. The ratio of sycophants to mere flatterers was 10 to 7. If there were 1106 who were mere flatterers, how many sycophants were there?

3. A poll was conducted with 594 respondents favoring the new bill. If this was 72% of all respondents, how many respondents were there?
4. Shannon had a total of twenty dimes and quarters. If the value of the coins was \$3.35, how many of each coin did she have?
5. The total number of orange football helmets and blue football helmets is 44. If twice the number of blue football helmets exceeds the number of orange football helmets by 4, how many are there of each color?
6. The lengths of the sides of a triangle are 10 m, 9 m, and 3 m, respectively. Is the triangle a right triangle, an acute triangle, or an obtuse triangle?
7. Construct a segment congruent to \overline{AB} .



8. Construct an angle which is congruent to $\angle PQR$.



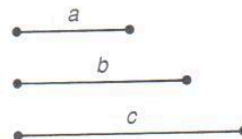
9. Construct the perpendicular bisector of segment MN .



10. Construct a perpendicular to \overline{RS} at P .



11. Construct a triangle whose sides have lengths a , b , and c .



Solve:

$$12. \begin{cases} 2x - 3y = 5 \\ 3x + y = 35 \end{cases}$$

$$13. \frac{3}{2}x + \frac{1}{5} = \frac{3}{10}$$

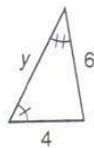
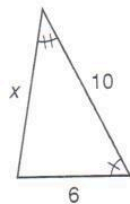
$$14. -3(-x^0 - 4) + 2(-x)^0 = 7(x - 3^2 + 4^2)$$

$$15. \text{Add: } \frac{3}{x^2} + \frac{1}{x} - \frac{2}{x+1}$$

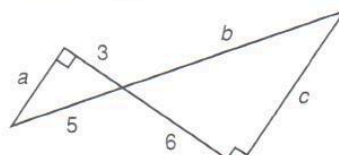
$$16. \text{Expand: } \frac{9s^2t^{-3}}{s^{-2}t} \left(\frac{3^{-1}s^{-1}t}{s^2} - \frac{s^3t^4}{t^{-1}} \right)$$

$$17. \text{Evaluate: } \frac{3^0 4^{-1}}{2^{-4}} x^{-1} y + 2^{-1} x y^0 - 3x + y^2 \text{ if } x = 1 \text{ and } y = 2$$

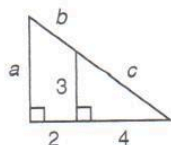
18. Find x and y .



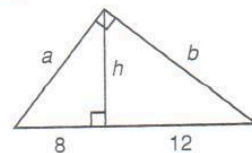
19. Find a , b , and c .



20. Find a , b , and c .

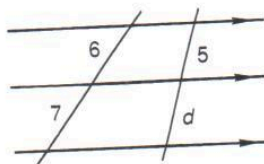


21. Find a , b , and h .

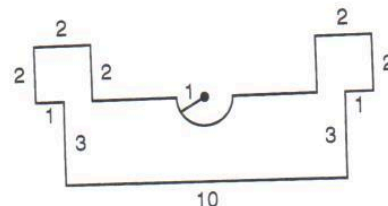


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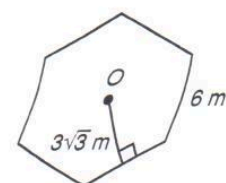
22. Find
- d
- .



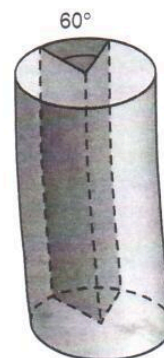
23. Find the perimeter of the figure. All angles that look like right angles are right angles. Dimensions are in meters.



24. In the regular hexagon shown,
- O
- is the center. Draw line segments connecting each vertex to
- O
- to break the figure into six congruent triangles. Find the area of the figure.



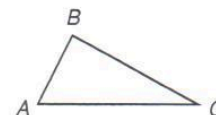
25. The radius of the right circular cylinder is 3 meters and the height is 12 meters. The measure of the central angle of the shaded sector is
- 60°
- . Find the volume of the slice of the cylinder that has the
- 60°
- sector as its top surface.



26. The base of a right circular cone has a radius of 10 cm. The height of the cone is 10 cm. Find the volume and surface area of the cone.
27. A sphere has a radius of 10 m. Find the volume and surface area of the sphere.
28. The base of a regular pyramid is a square whose perimeter is 20 cm. The height of the pyramid is 5 cm. Find the volume of the pyramid.

CONCEPT REVIEW
PROBLEMS

29. Given:
- $\triangle ABC$
- where
- $m\angle A < m\angle C$
-
- Compare: A.
- AB
- B.
- BC

**Note:** Figure not drawn to scale

30. Let
- x
- and
- y
- be real numbers. If
- $y > 1$
- , compare: A.
- $\frac{x+1}{y+1}$
- B.
- $\frac{x}{y} + 1$