Section 1.1

Pythagorean Theorem: For a right triangle with hypotenuse of length $c$ and sides of length $a$ and $b$, you have $a^2 + b^2 = c^2$.

Distance Formula: The distance $d$ between the points $(x_1, y_1)$ and $(x_2, y_2)$ in the plane is $d = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$.

Midpoint Formula: The midpoint of a line segment joining the points $(x_1, y_1)$ and $(x_2, y_2)$ is given by the Midpoint Formula:

$$\text{Midpoint} = \left(\frac{x_1 + x_2}{2}, \frac{y_1 + y_2}{2}\right).$$

Common Formulas for Area $A$, Perimeter $P$, Circumference $C$, and Volume $V$

<table>
<thead>
<tr>
<th>Rectangle</th>
<th>Circle</th>
<th>Triangle</th>
<th>Rectangular Solid</th>
<th>Circular Cylinder</th>
<th>Sphere</th>
</tr>
</thead>
<tbody>
<tr>
<td>$A = lw$</td>
<td>$A = \pi r^2$</td>
<td>$A = \frac{1}{2}bh$</td>
<td>$V = lwh$</td>
<td>$V = \pi r^2 h$</td>
<td>$V = \frac{4}{3} \pi r^3$</td>
</tr>
<tr>
<td>$P = 2l + 2w$</td>
<td>$C = 2\pi r$</td>
<td>$P = a + b + c$</td>
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</tbody>
</table>

Problems

Problem 1. Plot the points in the Cartesian plane. $A(3, 1)$, $B\left(\frac{3}{4}, -3\right)$, $C(-3, 4)$, $D\left(-\frac{4}{3}, -\frac{3}{2}\right)$. 
Problem 2. Determine the quadrant(s) in which \((x, y)\) is located so that the condition(s) is (are) satisfied.

a) \(x > 4\)

b) \(x > 2\) and \(y = 3\)

c) \(xy < 0\)

Problem 3. Show that the points form the vertices of the indicated polygon.

a) Right Triangle: \((1, 5), (1, -2), (5, -2)\)

b) Isosceles Triangle: \((1, -3), (3, 2), (-2, 4)\)
**Problem 4.** Find the midpoint of the line segment joining the points $(1, 12), \ (6, 0)$.

**Problem 5.** Find the coordinates of the endpoint of a line segment if the coordinates of the other endpoint and midpoint are, respectively, $(1, -2), \ (4, -1)$.
Problem 6. The polygon with original coordinates of vertices \((-3, 6), (-5, 3), (-3, 0), (-1, 3)\) is shifted down by 3 units and shifted to the left by 6 units. Find the coordinates of the vertices of the polygon in its new position.

Problem 7. The diameter of a cylindrical propane gas tank is 4 feet. The total volume of the tank is 603.2 cubic feet. Find the length of the tank.

Homework for this section: Read section 1.1. Watch any videos (marked with \(\square\) in the e-book). Also, do the tutorials (marked with \(\pi\) in the e-book). Do the following problems in preparation for the quiz: #5, 7, 9, 15, 19, 23, 27, 33, 39, 43