1) Find the three forms of the equation of the line passing through the points (0,3) and (5,0): slope-intercept, point-slope, and standard.

**Solution: Point Slope**

\[ y - y_1 = m(x - x_1) \]

\[ m = \frac{\Delta y}{\Delta x} = \frac{3 - 0}{5 - 0} = \frac{3}{5} \]

\[ y - 3 = -\frac{3}{5}(x - 0) \text{ OR } y - 0 = -\frac{3}{5}(x - 5) \]

**Slope-Intercept**

\[ y = mx + b \]

\[ m = \frac{3}{5} \]

\[ y = -\frac{3}{5}x + 3 \text{ (By using the answer to the pointslope part)} \]

**Standard**

\[ Ax + By = C \]

\[ y = -\frac{3}{5}x + 3 \text{ (By using the answer to the slope-intercept part)} \]

\[ 5y = -3x + 15 \text{ (Multiply through by 5)} \]

\[ 3x + 5y = 15 \]

\[ \square \]

2) Find an equation of the line passing through the points (-9,8) and (7,-6). Find the x and y-intercepts of the line.

**Solution:**

\[ \frac{\Delta y}{\Delta x} = \frac{8 - (-6)}{-9 - 7} = \frac{14}{-16} = -\frac{7}{8} \]

\[ y - y_1 = m(x - x_1) \]

\[ y - 8 = -\frac{7}{8}(x - (-9)) \]

\[ y - 8 = -\frac{7}{8}x - \frac{63}{8} \]

\[ y = -\frac{7}{8}x + \frac{1}{8} \]

\[ \square \]
3) Graph the line described by the following equation: \(5y - 2x = -20\). Determine the \(y\)-coordinate that goes with \(x = 10\).

**Solution:** It is easiest to find the intercepts of the graph. Rewriting the equation into slope-intercept form, we have \(y = \frac{2}{5}x - 4\), so by letting \(x = 0\), we get the \(y\)-intercept is \(-4\), so one coordinate is \((0, -4)\). Then to find the \(x\)-intercept, let \(y = 0\) and solve for \(x\). Doing this, you will get \(x = 10\), so we have the coordinate \((10, 0)\) (This is also the answer to the second part of the question!). The graph of the line looks like:

\[
\begin{align*}
6 - 7x &= x - 14 \\
6 &= 8x - 14 \\
20 &= 8x \\
\frac{20}{8} &= x \\
x &= \frac{5}{2}
\end{align*}
\]

4) Find the slope-intercept equation of the line with slope \(m = -\frac{3}{8}\) passing through the point \((5,6)\).

**Solution:** Use point-slope formula:

\[
y - y_1 = m(x - x_1)
\]

\[
m = -\frac{3}{8}
\]

\[
y - 6 = -\frac{3}{8}(x - 5)
\]

\[
y - 6 = -\frac{3}{8}x + \frac{15}{8}
\]

\[
y = -\frac{3}{8}x + \frac{63}{8}
\]
5) Two lines $y = m_1 x + b_1$ and $y = m_2 x + b_2$ are said to be parallel if $m_1 = m_2$, and perpendicular if $m_1 = -\frac{1}{m_2}$. Test whether the pair of lines $y = 4x - 5$ and $4y = 8 - x$ are parallel, perpendicular, or neither. 

*Solution:* From our equations that are given, we have that 

$$m_1 = 4, \ b_1 = -5$$

$$m_2 = -\frac{1}{4}, \ b_2 = 2$$

We have that:

$$-\frac{1}{m_2} = -\left(-\frac{1}{\frac{1}{4}}\right) = 4 = m_1$$

So we see that the two lines are perpendicular. \[\square\]