Solve the inequalities for x.

1. $6 - 7x > 4$

   Solution:

   Rearranging, we have

   $$-7x > -2 \implies x < \frac{2}{7}.$$

   In interval notation, this is $\boxed{\left(-\infty, \frac{2}{7}\right)}$.

2. $5x + 2 > -3x - 4$

   Solution:

   Rearranging, we have

   $$8x > -6 \implies x > -\frac{3}{4}$$

   In interval notation, this is $\boxed{\left(-\frac{3}{4}, \infty\right)}$.

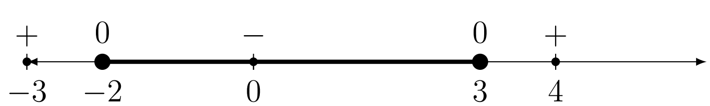
3. $x^2 - x - 6 \leq 0$

   Solution:

   Factoring,

   $$x^2 - x - 6 \leq 0 \quad \implies \quad (x-3)(x+2) \leq 0$$

   Creating a sign chart, we look for intervals around $x = -2$ and $x = 3$ where the product is positive:

   The correct interval is then $\boxed{[-2, 3]}$.

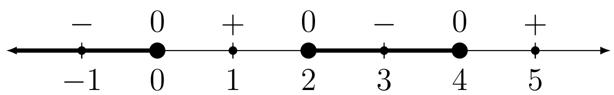
4. $x^3 \leq 6x^2 - 8x$

Solution:

Rearranging,

$$\begin{aligned} x^3 \leq 6x^2 - 8x &\implies x^3 - 6x^2 + 8x \leq 0 \\ &\implies x(x-2)(x-4) \leq 0 \end{aligned}$$

Creating a sign chart, we have



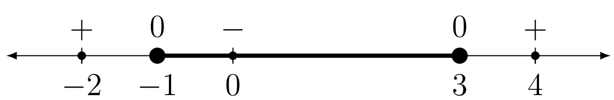
The correct interval is then $\boxed{(-\infty, 0] \cup [2, 4]}$.

5. $\dfrac{(x-2)(x-1)}{5-x} \leq 1$

Solution:

If $5 - x > 0$ (i.e. $x < 5$), we have

$$\begin{aligned} x^2 - 3x + 2 \leq (5 - x) &\implies x^2 - 2x - 3 \leq 0 \\ &\implies (x-3)(x+1) \leq 0 \end{aligned}$$

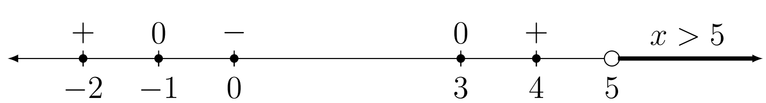


This gives us the interval $[-1, 3]$.

If $5 - x < 0$ (i.e. $x > 5$), we have

$$\begin{aligned} x^2 - 3x + 2 \geq 5 - x &\implies x^2 - 2x - 3 \geq 0 \\ &\implies (x-3)(x+1) \geq 0 \end{aligned}$$

The interval $(-\infty, -1) \cup (3, \infty)$ satisfies $(x-3)(x+1) \geq 0$. Incorporating our assumption that $x > 5$, we have $(5, \infty)$.



Putting these together, we have $\boxed{[-1, 3] \cup (5, \infty)}$.