

Determine the equation of each polynomial with the following characteristics. Leave the answer in factored form. $P(x) = a(x-r)(x-r)(x-r)(x-r)(x-r)$

1. A cubic equation; with roots at $x = 3$, $x = -6$ and $x = 2$ with a y-intercept of 108.
2. A function that passes through the point $(2, 28)$ and has x-intercepts at $(6, 0)$, $(-5, 0)$ $(0,0)$ and $(1, 0)$.
3. A function with roots at $x = 3$ (multiplicity of 2) and $x = -1$ (multiplicity of 3) and has a y-intercept of $(0, 45)$
4. A 4th degree function with roots at $x = 5$, $x = 1$, and $x = -3$ (multiplicity of 2) passing through the point $(-2, 14)$

5. A quadratic function with root $x=1$ (multiplicity of 2) passing through the point $(2, -1)$

6. A polynomial passing through the point $(3, -2.5)$ with x-intercepts at $(-2, 0)$, $(4, 0)$ and $(-2, 0)$

7. A cubic function with a root $x=3$ (multiplicity of 3) passing through $(0, 54)$

8. A function with a y-intercept at $(0, 5)$ and a x-intercept at $(-2, 0)$