p.103 #19

Determine a polynomial function $P(x)$ that satisfies each set of conditions

(a) $P(-4)=P(-\frac{3}{4})=P(\frac{1}{2})=0$ and $P(-2)=50$

To three real zero there correspond three factors

$P(x)=a(x+4)(4x+3)(2x-1)$

Need to determine a:

$P(-2)=a(-2+4)(4(-2)+3)(2(-2)-1)$

$P(-2)=a(2)(-5)(-5)$

$50=50a$, $a=1$

$\therefore P(x)=(x+4)(4x+3)(2x-1)$

(b) $P(3)=P(-1)=P(\frac{2}{3})=P(-\frac{3}{2})=0$ and $P(1)=-18$

$P(x)=a(x-3)(x+1)(3x-2)(2x+3)$

$P(1)=a(1-3)(1+1)(3(1)-2)(2(1)+3)$

$P(1)=a(-2)(2)(1)(5)$

$-18=-20a$

$a=\frac{-18}{-20}=\frac{9}{10}$

$\therefore P(x)=\frac{9}{10}(x-3)(x+1)(3x-2)(2x+3)$