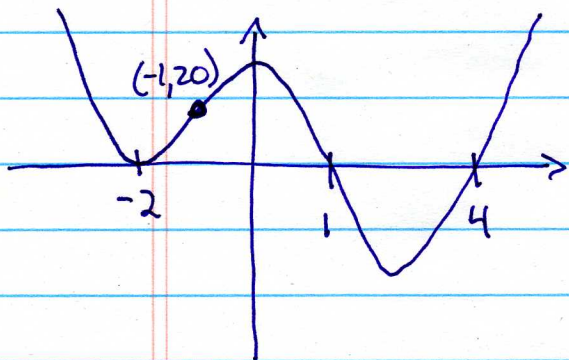


# Webwork 1.2 #7



All zeros of polynomial are shown, exponents of polynomial are least shown, and it passes through  $(-1, 20)$ .

Find the polynomial.

$$\begin{aligned} \text{zero at } x = -2 &\Rightarrow (x+2)^2 \leftarrow \begin{array}{l} \text{smallest multiplicity that} \\ \text{doesn't change sign.} \end{array} \\ x = 1 &\Rightarrow (x-1)^1 \leftarrow \begin{array}{l} \text{smallest multiplicity} \\ \text{that changes sign.} \end{array} \\ x = 4 &\Rightarrow (x-4)^1 \end{aligned}$$

$$\Rightarrow (x+2)^2(x-1)^1(x-4)^1$$

This is not the polynomial, since if we multiply it out the leading term would be  $x^4$ , but the polynomial must be  $ax^4$  as leading term, and we will use the fact it passes through  $(-1, 20)$  to determine  $a$ .

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

$$P(-1) = a(-1+2)^2(-1-1)(-1-4) = 20 \quad \text{solve for } a$$

$$a = 2.$$

The polynomial is  $P(x) = 2(x+2)^2(x-1)(x-4)$