2.
$$a^3 + 4a^2 + 3a$$
 has a factor $(a - (-3))$ compute all other factors:
$$(a-2) (a+1)^2$$

$$(a-4) (a-1) (a+1)$$

$$a (a+1) (a+3)$$

$$(a-4) (a-3) (a+1)$$

Solution

Apply Long Division.
a (a + 1) (a + 3)