Quiz 3

1) Find all real zeros of the given polynomial.

$$P(x) = x^3 + 4x^2 + 3x - 2$$

The possible rational zeros are ± 1 and ± 2. It is easy to see that -2 is a root, and so, divide by $x + 2$ to get

-2	1	4	3	-2
		-2	-4	2
	1	2	-1	0

$$P(x) = (x + 2)(x^2 + 2x - 1).$$

Now use the quadratic formula to get the other two roots.

$$x = \frac{-2 \pm \sqrt{4 + 4}}{2} = -1 \pm \sqrt{2}.$$

2) Factor the given polynomial, find all zeros, and sketch the graph.

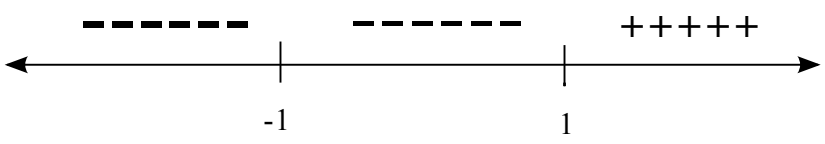
$$P(x) = x^3 + x^2 - x - 1$$

The polynomial factors as

$$P(x) = (x - 1)(x + 1)^2.$$

So the roots are -1 and 1.

Test point x	$P(x)$	Sign
2	$(2 - 1)(2 + 1)^2 = 9$	$+$
0	$(0 - 1)(0 + 1)^2 = -1$	$-$
-2	$(-2 - 1)(-2 + 1)^2 = -3$	$-$



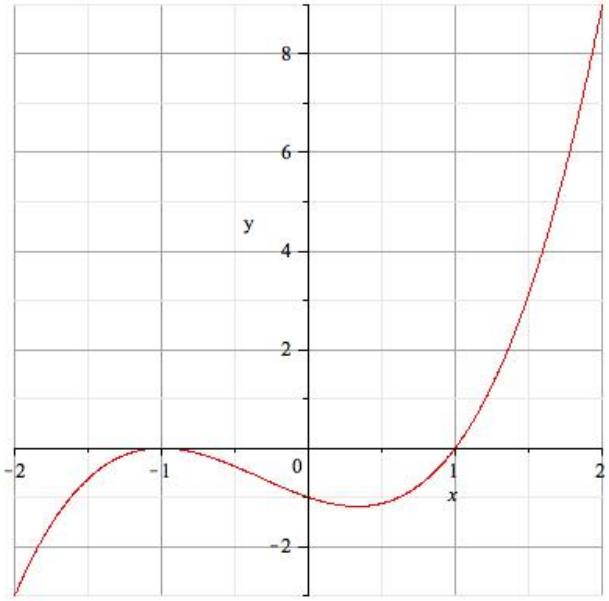


Figure 1: $P(x) = (x-1)(x+1)^2$.

The y-intercept is -1.