3. Find all zeros of the following polynomials. Remember that for any polynomial $P(x)$, c is a zero (or $(c, 0)$ is an x-intercept) if $(x - c)$ is a factor of $P(x)$.

1. $P(x) = x(x^2 - 5x + 4)$

$= x(x-4)(x-1)$

Therefore, $x = 0, 1,$ and 4 are the zeros.

2. $Q(x) = x^3 - x^2 - 7x + 7$ Hint: graph it on your calculator to get started

Use calculator.

We will see how to do this algebraically in the coming weeks.

3. $R(x) = (6x - 5)(x + 2)(4x + 9)$

$6x - 5 = 0 \Rightarrow x = 5/6$

$x + 2 = 0 \Rightarrow x = -2$

$4x + 9 = 0 \Rightarrow x = -\frac{9}{4}$

} all zeros.

4. $S(x) = x^4 - 3x^3 + 2x^2$

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

$= x^2(x-2)(x-1)$

$\Rightarrow$ $x = 0, 1,$ and 2 are zeros.

4. The graphs of every polynomial share a number of properties. For example, they are all continuous, smooth (i.e. no cusps or sharp edges), and they all diverge as $x \to \pm\infty$. Find 3 examples of polynomials with different orders that do not have any x-intercepts.

examples $y = x^2 + 1$

$y = -x^4 - 5$

$y = x^6 + 1000$.

5. What class of orders of polynomials must always have at least one zero? Explain precisely why this must be true.

ODD-Powered polynomials always have at least one zero. One end diverges to $+\infty$ while the other diverges to $-\infty$, so since all polynomials are continuous, it must cross the x-axis at some point!