

Assignment 8

Question 1. [3 marks] Write the following expressions in the form of a power function, i.e. x^n , where n is an integer or a fraction.

(a) $\sqrt[4]{x}$, (b) $\frac{1}{x^7}$, (c) $\sqrt[3]{x^4}$.

Question 2. [5 marks] Solve the equations below, i.e. find *all* real solutions.

(a) $x^6 = 64$,

(b) $x^{-3} = 27$,

(c) $\sqrt{x} = \frac{1}{3}$,

(d) $\sqrt[3]{x^5} = 32$,

(e) $x^{-\frac{1}{2}} = 8$

Question 3. [2 marks] Decide for each function if it is a linear function, a quadratic function, a power function, a polynomial or a rational function?

(a) $y = x^3 - 5$

(b) $y = 1$

(c) $y = x - \frac{1}{3}$

(d) $y = \frac{x^2 + 3x}{x - 1}$

(e) $y = \sqrt[3]{x}$

Question 4. [3 marks] Find the natural domains for the following functions and find their zeros.

(a) $y = (x - \sqrt{3})(3x - 8)$,

(b) $y = \frac{x^2 - 81}{x - 1} = \frac{(x - 9)(x + 9)}{x - 1}$.

Question 5. [3 marks] Consider a right triangle with two equal sides. The length of the hypotenuse of this triangle is 1 unit. Find the lengths of the sides.

Question 6. [4 marks]

- (a) Sketch the unit circle. Mark on the unit circle the point with the coordinates $\left(\frac{1}{\sqrt{2}}, \frac{1}{\sqrt{2}}\right)$.
- (b) Given that $0 < x < 2\pi$ and $\cos x = \frac{1}{\sqrt{2}}$, $\sin x = \frac{1}{\sqrt{2}}$, find x in radians and in degrees.
- (c) Mark on the unit circle the angles x , $x + \frac{\pi}{2}$, $x + \pi$, $x + \frac{3\pi}{2}$, $x + 2\pi$. Here x is the angle that you have found in part (b).
- (d) Find the value $x + \pi$ for x from part (b) in radians and in degrees. What is $\sin(x + \pi)$, $\cos(x + \pi)$, and $\tan(x + \pi)$?