

## İSTANBUL OKAN ÜNİVERSİTESİ MÜHENDİSLİK FAKÜLTESİ MÜHENDİSLİK TEMEL BİLİMLERİ BÖLÜMÜ

2019 - 20

MATH117 Mathematics for Architecture – Homework 2 Solutions N. Course

- 6. (a)  $\mathbb{R}$ . Since  $x^3 x^2 + x 1$  is a polynomial, it is defined on all of  $\mathbb{R}$ .
  - (b)  $(-\infty, 2]$ . The function  $\sqrt{4-2x}$  is only defined if (4-2x) is positive, i.e. if  $x \le 2$ .
  - (c)  $(-\infty, -3) \cup (-3, 3) \cup (3, \infty)$ . The function  $\frac{7}{x^2-9}$  is defined iff its denominator is non-zero that is if  $x \neq \pm 3$ .
- (7.) (a)  $-45^\circ = -\frac{\pi}{4}$ 
  - (b)  $315^{\circ} = \frac{7\pi}{4}$
  - (c)  $10^{\circ} = \frac{\pi}{18}$
  - (d)  $\frac{\pi}{9} = 20^{\circ}$
  - (e)  $\frac{5\pi}{4} = 225^{\circ}$
  - (f)  $-\frac{3\pi}{2} = -270^{\circ}$
  - 8. (a)  $(x,y) = (r\cos\theta, r\sin\theta) = (2\sqrt{3}\cos\frac{2\pi}{3}, 2\sqrt{3}\sin\frac{2\pi}{3}) = (-\sqrt{3}, 3).$ 
    - (b) The are many possible answers: We can calculate that  $r = \sqrt{x^2 + y^2} = \sqrt{2}$  and  $\theta = \tan^{-1} \frac{y}{x} = \tan^{-1}(-1) = -\frac{\pi}{4}$ . So one possible answer is  $(\sqrt{2}, -\frac{\pi}{4})$ .
    - (c) (1080, 0)



9.

(a) The focus of the parabola  $x^2 = -8y$  is (0, -2).

(b) First we write the equation  $7x^2 + 16y^2 = 112$  as  $\frac{x^2}{4^2} + \frac{y^2}{7} = 1$ . We can see that we have  $\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1$  with a = 4 and  $b = \sqrt{7}$ . Therefore  $c = \sqrt{a^2 - b^2} = \sqrt{16 - 7} = 3$ . The foci are at  $(\pm 3, 0)$ .