

## PREREQUISITES PRACTICE PROBLEMS 2

### Problem 1

Compute

- |     |  |  |
|-----|--|--|
| (1) | $\left(\frac{1}{4}\right)^{-\frac{5}{2}} \cdot \frac{2^3}{3} \cdot (3^4)^{-\frac{3}{4}}$           | $[2^8 \cdot 3^{-4}]$                       |
| (2) | $\left(\frac{e^2\sqrt{e}}{e^{\frac{1}{2}}}\right)^{-1}$  | $[e^{-2}]$                                 |
| (3) | $\sin\left(\frac{7\pi}{8}\right)$  | $\left[\frac{\sqrt{2-\sqrt{2}}}{2}\right]$ |
| (4) | $\sec\left(\frac{3\pi}{2}\right)$  | [Not defined]                              |
| (5) | $\operatorname{arctg}(1) - \operatorname{arctg}(0) + \arcsin\left(\frac{1}{2}\right) + \arccos(0)$ | $\left[\frac{11}{12}\pi\right]$            |
| (6) | $\ln(3e^3) - \ln(15e) + \ln(25) - \log_3 3^5$  | $[-3 + \ln(5)]$                            |
| (7) | $e^{-3\ln(x^2)}$   | $\left[\frac{1}{x^6}\right]$               |

### Problem 2

Solve the following equations

- |      |                                      |  |
|------|--------------------------------------|--|
| (8)  | $\sin(\theta) = -\frac{\sqrt{3}}{2}$ | $[\theta = -\frac{\pi}{3} + 2k\pi, \theta = \frac{4}{3}\pi + 2k\pi, k \in \mathbb{Z}]$                         |
| (9)  | $2 \cos(5\theta) - 1 = 0$            | $[\theta = \frac{\pi}{15} + \frac{2}{5}k\pi, \theta = -\frac{\pi}{15}\pi + \frac{2}{5}k\pi, k \in \mathbb{Z}]$ |
| (10) | $\operatorname{tg}(x) = 3$           | $[x = \operatorname{arctg}(3) + k\pi, k \in \mathbb{Z}]$   |
| (11) | $8^x - 16 = 0$                       | $[x = \frac{4}{3}]$  |
| (12) | $9^x = 3^{x+1} - 1$                  | $[x = \log_3\left(\frac{3 \pm \sqrt{5}}{2}\right)]$  |
| (13) | $4^{2x+1} = 7$                       | $[x = \frac{\log_4 7 - 1}{2}]$   |
| (14) | $\ln(3x - 1) = -1$                   | $[x = \frac{e^{-1} + 1}{3}]$   |
| (15) | $\ln(x^2 - 4) = 1$                   | $[x = \pm\sqrt{4 + e}]$  |
| (16) | $2 \ln(x) - \ln(2x - 1) = 0$         | $[x = 1]$  |

### Problem 3

Graph the following functions

- (17)  $3x - 2y + 1 = 0$
- (18)  $y = -x^2 + 2x$
- (19)  $y = 1 - 2 \cos(x)$
- (20)  $y = e^x - 1$
- (21)  $y = -\ln(x - 1)$