Problem 1

i. $\sin(\frac{\pi}{4})$
   $\frac{\pi}{4} \times \frac{180}{\pi} = 45°$
   $\sin(45°) = \frac{\sqrt{2}}{2}$

ii. $\sin\frac{\pi}{2}$
   $\sin(90°) = 1$

iii. $\sin\frac{\pi}{3}$
   $\sin(60°) = \frac{\sqrt{3}}{2}$

iv. $\sin(0) = 0$

v. $\cos(0) = 1$

vi. $\cos(\frac{\pi}{3})$
   $\cos(60°) = \frac{1}{2}$

vii. $\cos(\frac{3\pi}{4})$
   $\cos(135°) = \cos(180° - 45°)$
   $\cos(45°) = \frac{1}{2}$

viii. $\cos(-\frac{\pi}{6})$
   $\cos(-60°) = -\cos(30°) = \sin(30°) = \frac{1}{2}$

ix. $\tan(\frac{2\pi}{3})$
   $\tan(120°) = \tan(180° - 60°) = \tan(60°) = -\sqrt{3}$

x. $\tan(\frac{5\pi}{4})$
   $\tan(255°) = \tan(180° + 45°) = \tan(45°) = 1$

Problem 2

a) i. $r = \sqrt{3^2 + 4^2} = 5$
       $\tan\theta = \frac{4}{3}$
       $\theta = \arctan\frac{4}{3} = 53,13$
       $(5; 53, 13°)$

   ii. $r = \sqrt{\sqrt{3}^2 + 1^2} = 2$
       $\tan\theta = \frac{1}{\sqrt{3}}$
       $\theta = \arctan\frac{1}{\sqrt{3}} = 30$
       $(2, 30°)$

   iii. $r = \sqrt{-2^2 + 2^2} = 0$
       $\theta = \arctan\frac{-2}{2} = -45$
       $(0, -45°)$

   iv. $r = \sqrt{0^2 + 1^2} = 1$
       $\theta = \arctan\frac{1}{0} = 90°$
       $(1, 90°)$

   v. $r = \sqrt{5^2 + 12^2} = 13$
       $\theta = \arctan\frac{12}{5} = 67,3801°$
       $(13; 67, 3821°)$

b)   vi. $y = r\sin\theta$
$$y = 1 \times \sin(0°) = 0$$
$$x = r\cos\theta$$
$$x = 1 \times \cos(0°) = 1$$
$$(0, 1)$$

vii. $\theta = 60°$
$$x = 3 \times \sin(60°) = \frac{3\sqrt{3}}{2}$$
$$y = 3 \times \cos(60°) = \frac{3}{2}$$
$$\left(\frac{3\sqrt{3}}{2}; \frac{3}{2}\right)$$

viii. $\theta = 405°$
$$x = 3 \times \sin(405°) = \frac{3\sqrt{2}}{2}$$
$$y = 3 \times \cos(405°) = \frac{3\sqrt{2}}{2}$$
$$\left(\frac{3\sqrt{2}}{2}; \frac{3\sqrt{2}}{2}\right)$$

ix. $\theta = 120°$
$$x = 5 \times \sin(120°) = \frac{5\sqrt{3}}{2}$$
$$y = -5 \times \cos(120°) = -\frac{5}{2}$$
$$\left(\frac{5\sqrt{3}}{2}; -\frac{5}{2}\right)$$

x. $\theta = 330°$
$$x = 2 \times \sin(330°) = -\frac{2}{2} = -1$$
$$y = 2 \times \cos(330°) = \frac{2\sqrt{3}}{2}$$
$$\left(-1; \frac{2\sqrt{3}}{2}\right)$$

Problem 3

a)   i. $\frac{x^5 \times x^2}{x^3}$
$$= x^4$$

ii. $e^2 \times e^{-4}$
$$= \frac{e^{\cancel{2}^1}}{e^{\cancel{4}^2}}$$
$$= \frac{1}{e^2}$$
$$= e^{-2}$$

b)   i. $x^2 + 10x$
$$= x(x + 10)$$

ii. $x^2 + 4x + 3$
$$= (x + 3)(x + 1)$$

iii. $x^2 + 8x + 16$
$$= (x + 4)(x + 4)$$

iv. $x^2 - 64$
$$= (x - 8)(x + 8)$$

v. $x^2 - 3x - 28$
$$= (x - 4)(x + 7)$$

vi. $\frac{e^3x^2+e^2x}{ex+1}$

$= \frac{e^2x(\cancel{ex+1})}{\cancel{ex+1}}$

$= e^2x$

Problem 4

a) i. $\sum_{k=1}^{9} k$

$= 1 + 2 + 3 + 4 + 5 + 6 + 7 + 8 + 9$

$= 45$

    ii. $\sum_{k=1}^{5} k^2$

$= 1^2 + 2^2 + 3^2 + 4^2 + 5^2$

$= 55$

    iii. $\sum_{k=4}^{10} (2k-1)$

$= (2 \times 4 - 1) + (2 \times 5 - 1) + (2 \times 6 - 1) + (2 \times 7 - 1) + (2 \times 8 - 1) + (2 \times 9 - 1) + (2 \times 10 - 1)$

$= 7 + 9 + 11 + 13 + 15 + 17 + 19$

$= 91$

b) i. $\bar{x} = \frac{2+10+14+15+19+25}{6}$

$= 14,1667$

    ii. $\bar{x} = \frac{4+6+3+2+10}{6}$

$= \frac{16}{6}$

$= 2,6667$