King Fahd University of Petroleum and Minerals
Math Prep-Year Program
Math 001-Term 042

Name: KEY **SEC**_____ **ID#:**_____

1. By completing the square, $9x^2 - 12x - 5 = 0$ is written as $(x-a)^2 = b$.
   Find the value of: $3ab$

$x^2 - \frac{12}{9}x - \frac{5}{9} = 0$

$x^2 - \frac{4}{3}x = \frac{5}{9}$

$\left(x - \frac{2}{3}\right)^2 = \frac{5}{9} + \left(\frac{2}{3}\right)^2$

$\left(x - \frac{2}{3}\right)^2 = 1$

$a = \frac{2}{3}, \quad b = 1$

$\therefore \quad 3ab$

$= 3 \cdot \frac{2}{3} \cdot 1$

$= 2$

2. Solve the following equations:

   a) $(2x+11)^{1/2} - (2x-5)^{1/2} - 2 = 0$

$\left(\sqrt{2x+11}\right)^2 = \left(2 + \sqrt{2x-5}\right)^2$

$2x + 11 = 4 + 4\sqrt{2x-5} + 2x - 5$

$12 = 4\sqrt{2x-5}$

$(3)^2 = \left(\sqrt{2x-5}\right)^2$

$9 = 2x - 5$

$2x = 14$

$x = 7$

check:

$\sqrt{25} - \sqrt{9} - 2 = 0$

$5 - 3 - 2 = 0$

$2 - 2 = 0$

$0 = 0$

$\therefore \quad S.S = \{7\}$

b) $\sqrt{x} - 5\sqrt[4]{x} = -6$

let $y = x^{1/4} \Rightarrow y^2 = x^{1/2}$

$\Rightarrow y^2 - 5y + 6 = 0$

$(y-3)(y-2) = 0$

$y = 3$ OR $y = 2$

$x^{1/4} = 3$ OR $x^{1/4} = 2$

$x = 81$ $x = 16$

check: $\Rightarrow$ S.S = $\{81, 16\}$

c) $(x+1)^{2/3} - 3(x+1)^{1/3} + 2 = 0$

let $y = (x+1)^{1/3}$

$\rightarrow y^2 - 3y + 2 = 0$

$(y-2)(y-1) = 0$

$y = 2$ OR $y = 1$

$(x+1)^{1/3} = 2$ $(x+1)^{1/3} = 1$

$x+1 = 8$ $x+1 = 1$

$x = 7$ $x = 0$

S.S = $\{0, 7\}$