MAT 142, Quiz #2, Spring 2017 Name KEY

Instructions: Show all work. Give exact answers unless specifically asked to round.

1. Solve.

a. $x - \sqrt{2x+5} = 5$

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

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

$2x+5 = x^2 - 10x + 25$

$x^2 - 12x + 20 = 0$

$(x-10)(x-2) = 0$ $x = 10, 2$

$10 - \sqrt{20+5} = 10 - 5 = 5$ ✓

$2 - \sqrt{4+5} = 2 - 3 = -1$ ✗

b. $2x^{3/2} + 7x^{3/4} - 15 = 0$

$u = x^{3/4}$ $2u^2 + 7u - 15 = 0$

$(2u-3)(u+5) = 0$ $u = -5$ $u = \frac{3}{2}$

$-5 = x^{3/4} \Rightarrow x = (-5)^{4/3} = 5\sqrt[3]{5}$ *

$\frac{3}{2} = x^{3/4}$ $x = (3/2)^{4/3} = \sqrt[3]{\frac{81}{16}} = \boxed{\frac{3}{2}\sqrt[3]{\frac{3}{2}}}$

* 4th roots can't be negative

c. $|x+1| + 5 = 3$

$-5 \quad -5$

$|x+1| = -2$ no solution

2. Factor completely.

a. $8x^3 - 1$

$(2x-1)(4x^2 + 2x + 1)$

b. $x^3 + 2x^2 - 4x - 8$

$x^2(x+2) - 4(x+2)$

$(x^2-4)(x+2)$

$(x-2)(x+2)(x+2) = (x-2)(x+2)^2$

c. $(2x-1)^{1/2} - \frac{1}{5}(2x-1)^{5/2}$

$\frac{1}{5}(2x-1)^{1/2}\left[5-(2x-1)^2\right]$

$\frac{1}{5}(2x-1)^{1/2}\left[5-4x^2+4x-1\right]$

$-\frac{1}{5}(2x-1)^{1/2}\left[4x^2-4x-4\right]$

$-\frac{4}{5}(2x-1)^{1/2}\left[x^2-x-1\right]$

3. Find the sum of $\sum_{k=5}^{9} k(k+4)$.

$5(9)+6(10)+7(11)+8(12)+9(13)$

$45+60+77+96+117=395$