

Math 115 Quiz #2 No calculators - show all work. 2/10/09

① Solve by factoring:  $3x^2 + 11x - 4 = 0$

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$$(3x - 1)(x + 4) = 0$$

$$x = \frac{1}{3}, -4$$

② Solve:  $2x + \sqrt{2x+1} = 5$       CHECK:  $2(\frac{3}{2}) + \sqrt{2(\frac{3}{2})+1} = 5$

Isolate  $\sqrt{\phantom{x}}$ :  $\sqrt{2x+1} = 5 - 2x$

$$3 + \sqrt{3+1} = 5$$

Square:  $(\phantom{x})^2 = (\phantom{x})^2$

$$2 \cdot 4 + \sqrt{2 \cdot 4 + 1} = 5$$

$$2x+1 = (5-2x)^2$$

$$8 + \sqrt{9} = 5$$

$$2x+1 = 25 - 20x + 4x^2$$

$$8 + 3 = 5 \text{ No.}$$

$$-2x-1 \quad -2x-1$$

So  $x=4$  fails

$$4x^2 - 22x + 24 = 0$$

$$\boxed{x = \frac{3}{2}}$$

$$2x^2 - 11x + 12 = 0$$

$$(2x - 3)(x - 4) = 0$$

$$x = \frac{3}{2}, 4$$

③  $3x^{2/3} + x^{1/3} - 4 = 0$

$$y = x^{1/3}$$

$$3y^2 + y - 4 = 0$$

$$(3y + 4)(y - 1) = 0$$

$$y = -\frac{4}{3}, 1$$

$$x^{1/3} = -\frac{4}{3}, 1 \Rightarrow x = \left(-\frac{4}{3}\right)^3, 1^3$$

$$= -\frac{64}{27}, 1$$

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① Solve by factoring:

$$2x^2 + 9x - 5 = 0$$

$$(2x - 1)(x + 5) = 0$$

$$x = \frac{1}{2}, -5$$

② Solve:  $2x + \sqrt{2x-1} = 7$

$$\sqrt{2x-1} = 7 - 2x$$

$$(\sqrt{2x-1})^2 = (7-2x)^2$$

$$2x-1 = 49 - 28x + 4x^2$$

$$-2x + 1 \quad \quad \quad +1 \quad -2x$$

$$0 = 4x^2 - 30x + 50$$

$$2x^2 - 15x + 25 = 0$$

$$(2x - 5)(x - 5) = 0$$

$$x = \frac{5}{2}, 5, \text{ check}$$

$$x = \frac{5}{2} = 2\left(\frac{5}{2}\right) + \sqrt{2\left(\frac{5}{2}\right) - 1} = 7$$

$$5 + \sqrt{5-1} = 7$$

$$5 + 2 = 7 \text{ works}$$

$$x = 5 = 2(5) + \sqrt{2(5) - 1} = 7$$

$$10 + \sqrt{9} = 7$$

$$10 + 3 = 7 \text{ NO}$$

So  $x = 5$  fails.

$$\boxed{x = \frac{5}{2}}$$

③ Solve:  $2x^{\frac{2}{3}} + 3x^{\frac{1}{3}} - 5 = 0$

$$y = x^{\frac{1}{3}}$$

$$2y^2 + 3y - 5 = 0$$

$$(2y + 5)(y - 1)$$

$$y = -\frac{5}{2}, 1$$

$$x^{\frac{1}{3}} = -\frac{5}{2}, 1$$

cube:  $x = \left(-\frac{5}{2}\right)^3, 1^3$   
 $= -\frac{125}{8}, 1$