Student: _____	Instructor: Andreas Lazari	Assignment: Section 1.6 Homework
Date: _____	Course: Math1111-Summer2018	

1. Use factoring to solve the polynomial equation. Check by substitution or by using a graphing utility and identifying x-intercepts.

$3x^4 - 75x^2 = 0$

$3x^2(x^2-25)=0 \Rightarrow 3x^2=0 \Rightarrow x=\pm\frac{\sqrt{0}}{3}=\frac{0}{3}=0$

$(x^2-25=0 \Rightarrow x^2=25 \Rightarrow x=\pm\sqrt{25}=\pm 5$

$x=5$

$x=-5$

The solution set is $\{-5, 0, 5\}$.
(Use a comma to separate answers as needed. Type repeated roots only once.)

2. Solve the polynomial equation by factoring and then using the zero-product principle.

$x^3 + x^2 = 36x + 36$

$x^3+x^2-36x-36 = x^2(x+1)-36(x+1) \Rightarrow (x+1)(x^2-36)=0$

$\Rightarrow x+1=0 \Rightarrow x=-1$

or $x^2-36=0 \Rightarrow x^2=36 \Rightarrow x=\pm\sqrt{36} \Rightarrow x=\pm 6$

$x=-6$

$x=6$

What is the solution set?

Select the correct choice below and, if necessary, fill in the answer box to complete your choice.

○ A. $\{-6, 6, -1\}$ (Use a comma to separate answers as needed. Simplify your answer.)
○ B. There is no solution.

3. Solve the radical equation.

$\sqrt{2x+7} = x-4$

$(\sqrt{2x+7})^2 = (x-4)^2 \Rightarrow 2x+7 = x^2-8x+16$

$\Rightarrow x^2-8x+16-2x-7=0 \quad x^2-10x+9=0 \Rightarrow (x-9)(x-1)=$

$\Rightarrow x=9,\ x=1$

Select the correct choice below and, if necessary, fill in the answer box to complete your choice.

○ A. The solution set is $\{9\}$.
(Use a comma to separate answers as needed.)
○ B. There is no solution.

Check: $\sqrt{2(9)+7} = 9-4 \Rightarrow \sqrt{25}=5 \Rightarrow 5=$

$\sqrt{2(1)+7} = 1-4 \Rightarrow \sqrt{9}=-3$

$3 \neq -3$

No, $x=1$ is not a solution

4. Solve the radical equation.

$\sqrt{2x+5} + \sqrt{x-6} = 3$

$\sqrt{2x+5} = 3-\sqrt{x-6} \Rightarrow (\sqrt{2x+5})^2 = (3-\sqrt{x-6})^2 \Rightarrow 2x+5 = 3^2-6\sqrt{x-6}+(\sqrt{x-6})^2$

$\Rightarrow 2x+5 = 9-6\sqrt{x-6}+x-6 \Rightarrow 2x+5 = 3+x-6\sqrt{x-6} \Rightarrow 2x-x+5-3=-6\sqrt{x}$

$\Rightarrow x+2 = -6\sqrt{x-6} \Rightarrow (x+2)^2 = (-6\sqrt{x-6})^2 \Rightarrow x^2+4x+4 = 36(x-6)$

$\Rightarrow x^2+4x+4 = 36x-216 \Rightarrow x^2-32x+220=0$

$\Rightarrow (x-22)(x-10)=0 \Rightarrow x=22$ and $x=10$

Select the correct choice below and, if necessary, fill in the answer box to complete your choice.

○ A. The solution set is $\{\ \}$.
(Simplify your answer. Use a comma to separate answers as needed.)
● B. The solution set is the empty set.

Check: $\sqrt{2(22)+5} + \sqrt{22-6} = 3$

$7+4 \neq 3$

Check: $\sqrt{2(10)+5} + \sqrt{10-6} = 3$

$5+2 \neq 3$

No solution

5. Solve and check the given equation with rational exponents.

$x^{5/2} = 243$

Select the correct choice below and, if necessary, fill in the answer box within your choice.

○ A. The solution set is $\{9\}$. (Use a comma to separate answers as needed.)
○ B. There is no solution.

$x^{\frac{5}{2}} = 243 \Rightarrow x = (243)^{\frac{2}{5}}$

$\Rightarrow x = \left((243)^{\frac{1}{5}}\right)^2$

$x = (3)^2 = 9$

6. Solve the equation. Check all solutions.

$2x^{3/2} - 14 = 0$ $\Rightarrow 2x^{3/2} = 14 \Rightarrow x^{3/2} = 7 \Rightarrow x = (7)^{2/3}$

Select the correct choice below and, if necessary, fill in the answer box to complete your choice.

○ **A.** The solution set is $\{ 7^{2/3} \}$.
(Type an exact answer in simplified form. Use a comma to separate answers as needed.)

○ **B.** There is no solution.

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7. Solve the equation with rational exponents.

$(x-5)^{2/3} = 25$ $\Rightarrow x - 5 = \pm 25^{3/2} \Rightarrow x - 5 = \pm (25^{1/2})^3 \Rightarrow x - 5 = \pm (5)^3$

$x - 5 = \pm 125 \Rightarrow x = 125 + 5 = 130$ or $x = -125 + 5 = -120$

Select the correct choice below and, if necessary, fill in the answer box to complete your choice.

○ **A.** The solution set is $\{-120, 130\}$.
(Simplify your answer. Use a comma to separate answers as needed.)

○ **B.** The solution set is the empty set.

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8. Find all real and complex roots.

$x^4 - 6x^2 + 5 = 0$ Let $y = x^2$

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

$\Rightarrow (y-5)(y-1) = 0 \Rightarrow y = 5$ or $y = 1$

if $y = 5 \Rightarrow x^2 = 5 \Rightarrow x = \pm\sqrt{5}$, $x = -\sqrt{5}$, $x = \sqrt{5}$

if $y = 1 \Rightarrow x^2 = 1 \Rightarrow x = \pm 1$, $x = 1$, $x = -1$

The solution set is $\{\sqrt{5}, -\sqrt{5}, 1, -1\}$.
(Use a comma to separate answers as needed. Type an exact answer, using radicals as needed. Type complex answers in the form $a + bi$.)

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9. Solve the following equation by making an appropriate substitution.

$x^{-2} + 8x^{-1} - 20 = 0$ Let $y = x^{-1}$

$(x^{-1})^2 + 8(x^{-1}) - 20 = 0 \Rightarrow y^2 + 8y - 20 = 0$

$(y-2)(y+10) = 0 \Rightarrow y = 2$ and $y = -10$

if $y = 2 \Rightarrow x^{-1} = 2 \Rightarrow x = \frac{1}{2}$

if $y = -10 \Rightarrow x^{-1} = -10 \Rightarrow x = -\frac{1}{10}$

Select the correct choice below and, if necessary, fill in the answer box to complete your choice.

○ **A.** The solution set is $\{\frac{1}{2}, -\frac{1}{10}\}$. (Use a comma to separate answers as needed.)

○ **B.** The solution set is the empty set.

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10. Find the solution(s) of the equation.

$|2x - 1| = 9$ $\Rightarrow 2x - 1 = \pm 9$

$\Rightarrow 2x - 1 = 9 \Rightarrow 2x = 10 \Rightarrow x = 5$

$\Rightarrow 2x - 1 = -9 \Rightarrow 2x = -8 \Rightarrow x = -4$

Select the correct choice below and, if necessary, fill in the answer box to complete your choice.

○ **A.** The solution set is $\{-4, 5\}$.
(Use a comma to separate answers as needed.)

○ **B.** There is no solution.

11. Find the solution set for the equation.

$3|2x-7|=3$ $\Rightarrow |2x-7|=1$ $\Rightarrow 2x-7=\pm 1 \Rightarrow 2x-7=1 \Rightarrow 2x=8 \Rightarrow x=4$ or $2x-7=-1 \Rightarrow 2x=6 \Rightarrow x=3$

Select the correct choice below and, if necessary, fill in the answer box to complete your choice.

- ○ **A.** The solution set is $\{3, 4\}$.
  (Simplify your answer. Use a comma to separate answers as needed.)
- ○ **B.** There is no solution.

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12. Solve the given absolute value equation, or indicate if it has no solution.

$|x+9|+8=1$ $|x+9|=1-8 \Rightarrow |x+9|=-7$. No, solution. Absolute value can not be negative.

Select the correct choice below and, if necessary, fill in the answer box to complete your choice.

- ○ **A.** The solution set is $\{\ \}$
  (Use a comma to separate answers as needed.)
- ● **B.** There is no solution.

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13. A basketball player's hang time is the time spent in the air when shooting a basket. The formula $t=\frac{\sqrt{d}}{2}$ models hang time, t, in seconds, in terms of the vertical distance of a player's jump, d, in feet. When a particular player dunked a basketball, his hang time for the shot was approximately 1.12 seconds. What was the vertical distance, d, of his jump, rounded to the nearest tenth?

The jump was 5 feet. (Round to the nearest tenth as needed.)

Solve the formula $t=\frac{\sqrt{d}}{2}$ for d

$\Rightarrow 2t=\sqrt{d} \Rightarrow (2t)^2=(\sqrt{d})^2$

$4t^2=d$

for $t=1.12$ seconds

$d=4(1.12)^2=5.0176 \simeq 5$ ft

1. 0,5, − 5

2. A. { 6, − 6, − 1 } (Use a comma to separate answers as needed. Simplify your answer.)

3. A. The solution set is { 9 }.(Use a comma to separate answers as needed.)

4. B. The solution set is the empty set.

5. A. The solution set is { 9 }. (Use a comma to separate answers as needed.)

6. A. The solution set is $\{ 7^{2/3} \}$.
(Type an exact answer in simplified form. Use a comma to separate answers as needed.)

7. A. The solution set is { − 120,130 }.(Simplify your answer. Use a comma to separate answers as needed.)

8. $\sqrt{5}, -\sqrt{5}, 1, -1$

9. A. The solution set is $\left\{ \frac{1}{2}, -\frac{1}{10} \right\}$. (Use a comma to separate answers as needed.)

10. A. The solution set is { − 4,5 }.(Use a comma to separate answers as needed.)

11. A. The solution set is { 4,3 }.(Simplify your answer. Use a comma to separate answers as needed.)

12. B. There is no solution.

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