Questions on 3.10 HW?

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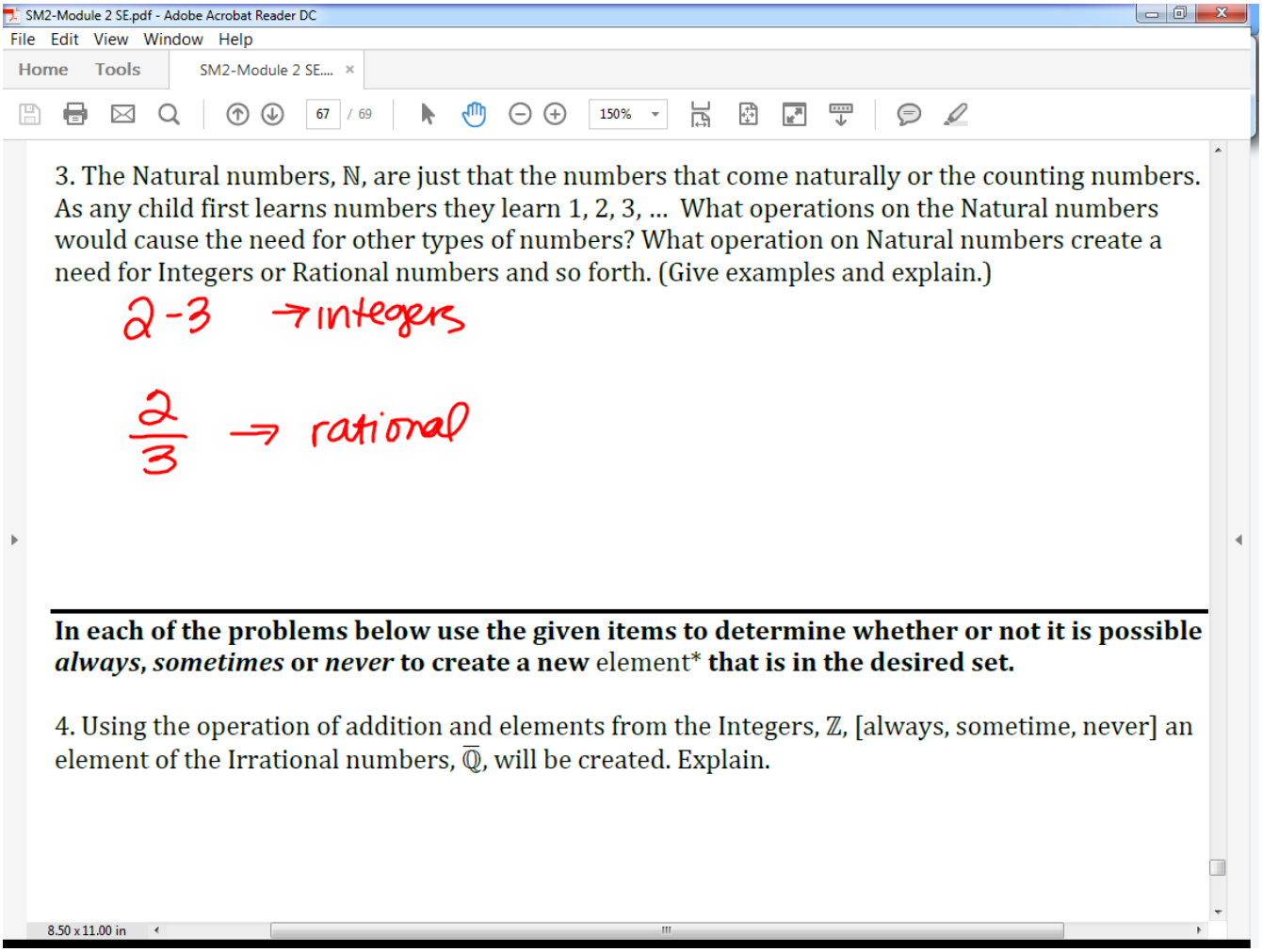
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67 / 69
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3. The Natural numbers, ℕ, are just that the numbers that come naturally or the counting numbers. As any child first learns numbers they learn 1, 2, 3, ... What operations on the Natural numbers would cause the need for other types of numbers? What operation on Natural numbers create a need for Integers or Rational numbers and so forth. (Give examples and explain.)
2 - 3 → integers
2/3 → rational
In each of the problems below use the given items to determine whether or not it is possible always, sometimes or never to create a new element* that is in the desired set.
4. Using the operation of addition and elements from the Integers, ℤ, [always, sometime, never] an element of the Irrational numbers, ℚ, will be created. Explain.
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Make a prediction as to the nature of the solutions for each quadratic (Real, Complex, Integer, etc.) then solve each of the quadratic equations below using an appropriate and efficient method. Give the solutions and compare to your prediction.

$a=-5, b=3, c=2$

9. $-5x^2 + 3x + 2 = 0$

$(-x \quad 2)(5x \quad 1)$

Prediction: Complex

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

$x=\frac{-3\pm\sqrt{3^2-4\cdot-5\cdot2}}{2\cdot-10}$

$x=\frac{-3\pm\sqrt{9+40}}{-20}$

$x=\frac{-3\pm\sqrt{49}}{-20}$

$x=\frac{-3\pm7}{-20}$

$x=\frac{-3+7}{-20}$ & $\frac{-3-7}{-20}$

$x=-\frac{4}{20}$ & $\frac{1}{2}$

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

10. $x^2 + 3x + 2 = 0$

Prediction:

Solutions:

11. $x^2 + 3x - 12 = 0$

Prediction:

Solutions:

12. $4x^2 - 19x - 5 = 0$

Prediction:

Solutions:

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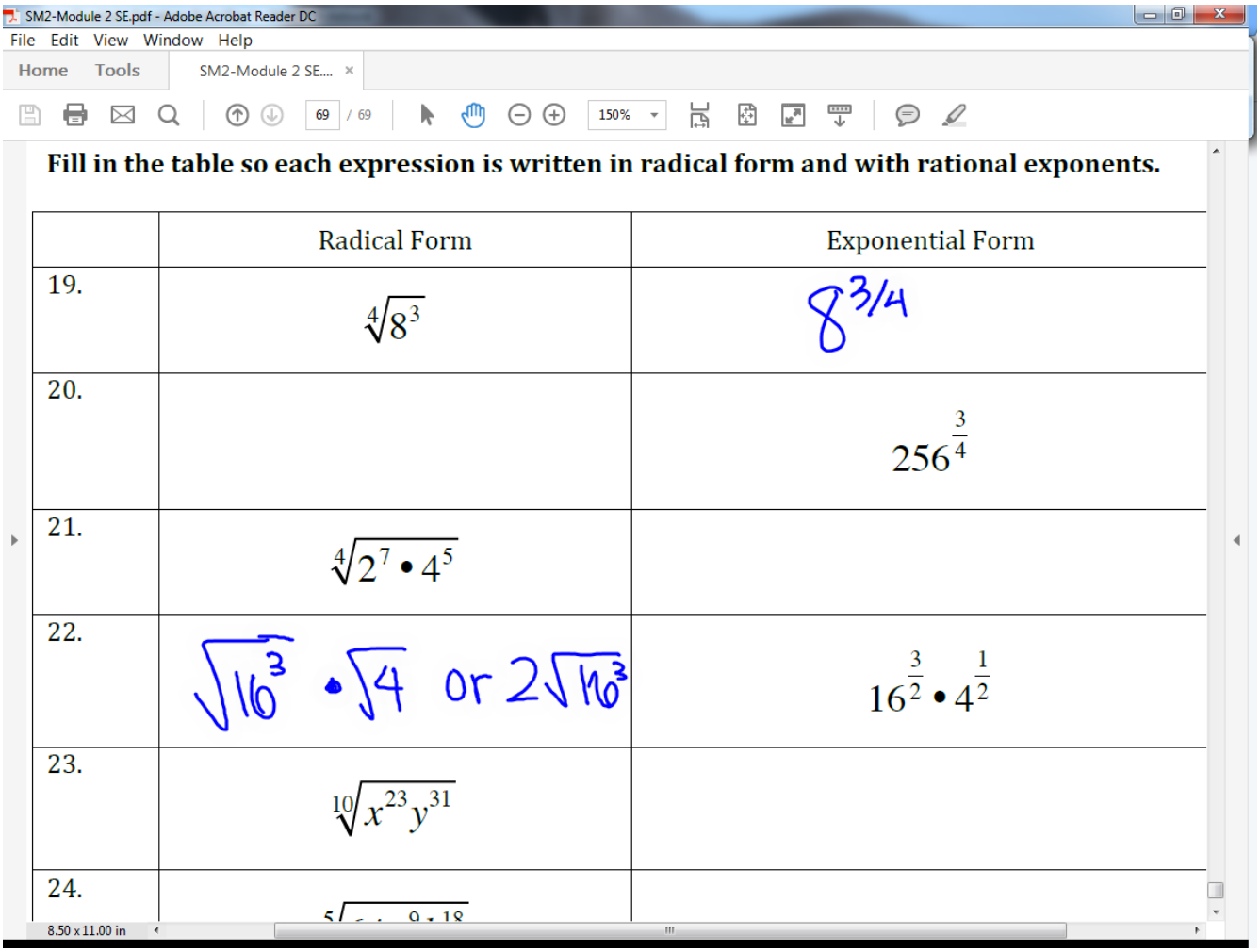
$x=-\frac{1}{5}$ $x+\frac{1}{5}=0$ $5x+1$

$x=\frac{1}{2}$ $x-\frac{1}{2}=0$ $2x-1$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69 / 69
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Fill in the table so each expression is written in radical form and with rational exponents.
Radical Form
Exponential Form
19.
$\sqrt[4]{8^3}$
$8^{3/4}$
20.
$256^{\frac{3}{4}}$
21.
$\sqrt[4]{2^7 \cdot 4^5}$
22.
$\sqrt{16^3} \cdot \sqrt{4}$ or $2\sqrt{16^3}$
$16^{\frac{3}{2}} \cdot 4^{\frac{1}{2}}$
23.
$\sqrt[10]{x^{23}y^{31}}$
24.
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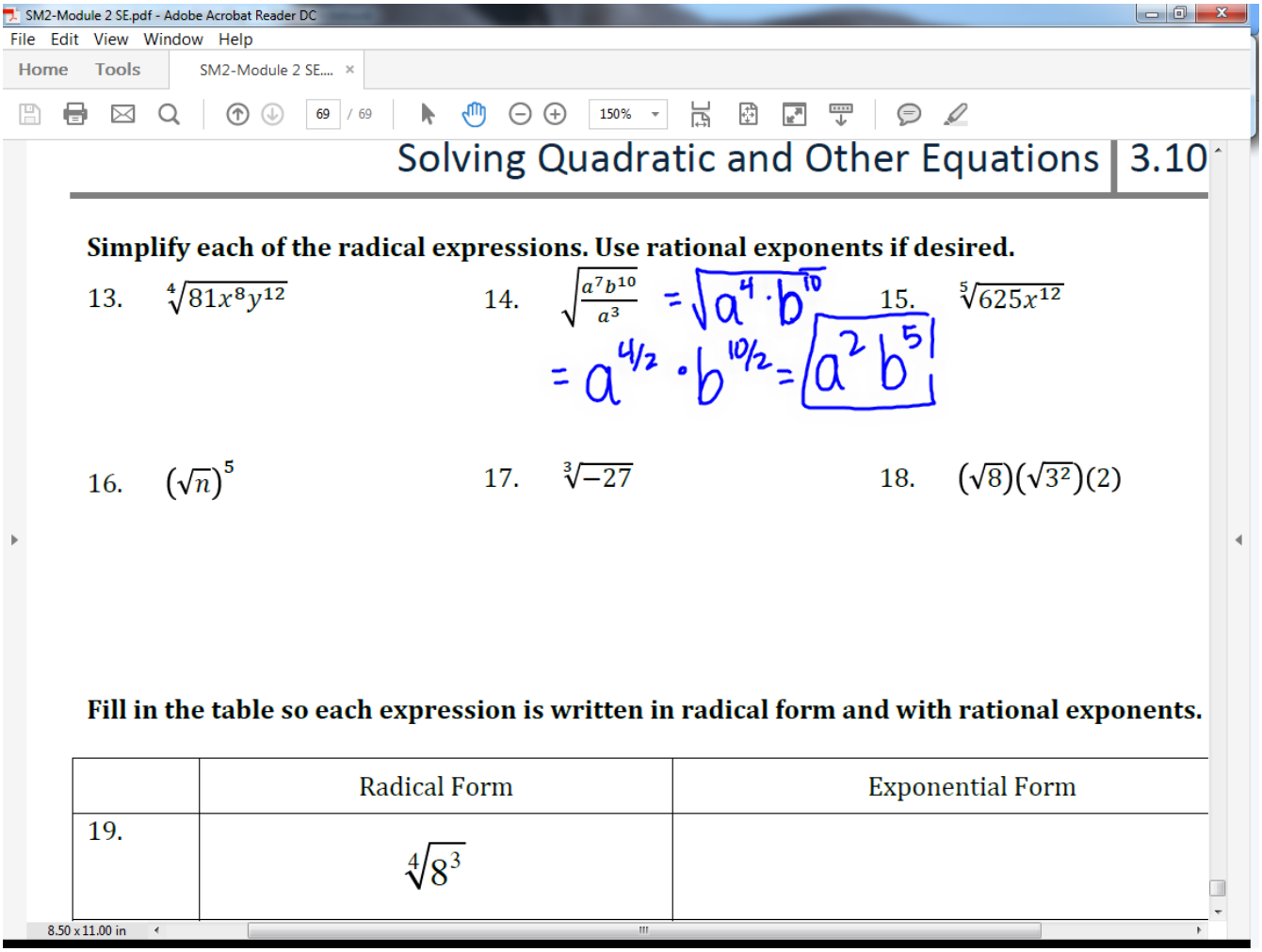
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69 / 69 150%

Solving Quadratic and Other Equations | 3.10

Simplify each of the radical expressions. Use rational exponents if desired.

13. $\sqrt[4]{81x^8y^{12}}$

14. $\sqrt{\frac{a^7b^{10}}{a^3}} = \sqrt{a^4 \cdot b^{10}} = a^{4/2} \cdot b^{10/2} = a^2b^5$

15. $\sqrt[5]{625x^{12}}$

16. $(\sqrt{n})^5$

17. $\sqrt[3]{-27}$

18. $(\sqrt{8})(\sqrt{3^2})(2)$

Fill in the table so each expression is written in radical form and with rational exponents.

	Radical Form	Exponential Form
19.	$\sqrt[4]{8^3}$	

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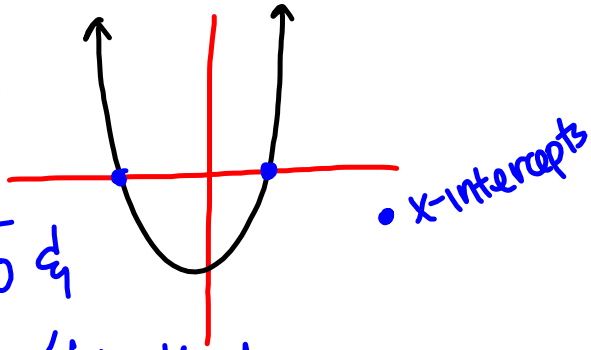
Solving Quadratic Equations - what does it mean?

→ Find the x-intercepts, where the quadratic crosses the x-axis.

* Also called solutions, roots, or zeroes.



→ Either graph or set equation equal to zero & use one of the following 4 methods:

1- Quadratic Formula $x = \frac{-b \pm \sqrt{b^2-4ac}}{2a}$

$6n^2 - 116 = -5n$

$a = 6$
$b = 5$
$c = -116$

$+5n \quad +5n$

$6n^2 + 5n - 116 = 0$

$x = \frac{-5 \pm \sqrt{5^2-4 \cdot 6 \cdot -116}}{2 \cdot 6} = \frac{-5 \pm \sqrt{25+2784}}{12} =$

$= \frac{-5 \pm \sqrt{2809}}{12} = \frac{-5 \pm 53}{12} \rightarrow \frac{-5+53}{12}$ & $\frac{-5-53}{12}$

$\frac{48}{12}$ & $\frac{-58}{12}$

4 & $-\frac{29}{12}$

$7p^2 = -1$

$b^2 + 10b = 7$

$11p^2 - 2 = -p$

2 - Taking Square Roots (when b=0 or we have no bx term)

$6b^2 + 6 = 156$

$-6 \quad -6$

$\frac{6b^2}{6} = \frac{150}{6}$

$\sqrt{b^2} = \sqrt{25}$

$b = \pm 5$

OR

$b = -5, 5$

$2 - 7n^2 = -78$

$9k^2 + 4 = 8$

$9x^2 + 2 = -123$

3- Factoring (factors of c that add to b)

$v^2 = 2v + 8$

$-2v \quad -2v \quad -8$

$v^2 - 2v - 8 = 0$

$(v - 4)(v + 2) = 0$

$v = 4, -2$

$n^2 - 16 = 0$

$n^2 = 8n - 15$

$x^2 + 3x = 0$

4- Completing the Square

$$x^2 - 12x + 25 = -10$$

$+10 \quad +10$

$x^2 - 12x + 35 = 0$

$+1 \quad +1$

$x^2 - 12x + 36 = 1$

$(x-6)(x-6) = 1$

$\sqrt{(x-6)^2} = \sqrt{1}$

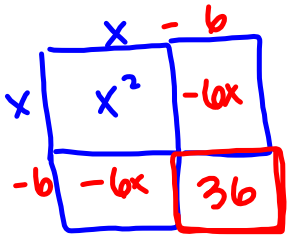
$x - 6 = \pm 1$

$+6 \quad +6$

$x = 6 \pm 1$

$x = 6+1$ & $6-1$

$x = 7$ & 5



$$x^2 + 4x - 91 = -9$$

$$a^2 + 2a - 75 = 5$$

Homework

Solving Quadratic Equations WKS

Nov 9-2:33 PM