

Preliminaries

Introduction

Here are a set of practice problems for the Preliminaries chapter of my Algebra notes. If you are viewing the pdf version of this document (as opposed to viewing it on the web) this document contains only the problems themselves and no solutions are included in this document. Solutions can be found in a number of places on the site.

4. If you'd like a pdf document containing the solutions go to the note page for the section you'd like solutions for and select the download solutions link from there. Or,
5. Go to the download page for the site <http://tutorial.math.lamar.edu/download.aspx> and select the section you'd like solutions for and a link will be provided there.
6. If you'd like to view the solutions on the web or solutions to an individual problem you can go to the problem set web page, select the problem you want the solution for. At this point I do not provide pdf versions of individual solutions, but for a particular problem you can select "Printable View" from the "Solution Pane Options" to get a printable version.

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Here is a list of topics in this chapter that have practice problems written for them.

[Integer Exponents](#)

[Rational Exponents](#)

[Real Exponents](#)

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Integer Exponents

For problems 1 – 4 evaluate the given expression and write the answer as a single number with no exponents.

1. $-6^2 + 4 \cdot 3^2$

$$-36 + 4 \cdot 9 = -36 + 36 = 0$$

$$2. \frac{(-2)^4}{(3^2 + 2^2)^2} = \frac{16}{(9+4)^2} = \frac{16}{169}$$

$$3. \frac{4^0 \cdot 2^{-2}}{3^{-1} \cdot 4^{-2}} = \frac{3 \cdot 16}{4} = 12$$

$$4. 2^{-1} + 4^{-1} = \frac{1}{2} + \frac{1}{4} = \frac{2}{4} + \frac{1}{4} = \frac{3}{4}$$

For problems 5 – 9 simplify the given expression and write the answer with only positive exponents.

$$5. (2w^4v^{-5})^{-2} = \frac{1}{(2w^4v^{-5})^2} = \frac{1}{4w^8v^{-10}} = \frac{v^{10}}{4w^8}$$

$$6. \frac{2x^4y^{-1}}{x^{-6}y^3} = \frac{2x^4x^6}{y^3y^1} = \frac{2x^{10}}{y^4}$$

$$7. \frac{m^{-2}n^{-10}}{m^{-7}n^{-3}} = \frac{m^5}{n^7}$$

$$8. \frac{(2p^2)^{-3}q^4}{(6q)^{-1}p^{-7}} = \frac{6p^7q^4q^1}{8p^6} = \frac{3pq^5}{4}$$

$$9. \left(\frac{z^2y^{-1}x^{-3}}{x^{-8}z^6y^4} \right)^{-4} = \left(\frac{x^5}{z^4y^5} \right)^{-4} = \frac{y^{20}z^{16}}{x^{20}}$$

Rational Exponents

For problems 1 – 6 evaluate the given expression and write the answer as a single number with no exponents.

$$1. 36^{\frac{1}{2}} = 6$$

$$2. (-125)^{\frac{1}{3}} = -5$$

$$3. -16^{\frac{3}{2}} = -4^3 = -64$$

$$4. 27^{-\frac{5}{3}} = \frac{1}{27^{5/3}} = \frac{1}{3^5} = \frac{1}{243}$$

$$5. \left(\frac{9}{4}\right)^{\frac{1}{2}} = \frac{3}{2}$$

$$6. \left(\frac{8}{343}\right)^{-\frac{2}{3}} \left(\frac{343}{8}\right)^{\frac{2}{3}} = \left(\frac{7}{2}\right)^2 = \frac{49}{4}$$

For problems 7 – 10 simplify the given expression and write the answer with only positive exponents.

can leave with rational exponents

$$7. \left(a^3 b^{-\frac{1}{4}}\right)^{\frac{2}{3}} \left(\frac{a^3}{b^{\frac{1}{4}}}\right)^{\frac{2}{3}} = \frac{a^2}{b^{\frac{1}{2}}} = \boxed{\frac{a^2}{b^{\frac{1}{2}}}} \text{ or } \frac{a^2}{\sqrt{b}} \cdot \frac{\sqrt[6]{b^5}}{\sqrt[6]{b^5}} = \frac{a^2 \sqrt[6]{b^5}}{b}$$

$$8. x^{\frac{1}{4}} x^{-\frac{1}{5}} x^{\frac{5}{20}} x^{-\frac{4}{20}} = \boxed{x^{\frac{1}{20}}} = \sqrt[20]{x}$$

$$9. \left(\frac{q^3 p^{-\frac{1}{2}}}{q^{-\frac{1}{3}} p}\right)^{\frac{3}{7}} \left(\frac{q^3 q^{\frac{1}{3}}}{p \cdot p^{\frac{1}{2}}}\right)^{\frac{3}{7}} = \left(\frac{q^{\frac{10}{3}}}{p^{\frac{3}{2}}}\right)^{\frac{3}{7}} = \boxed{\frac{q^{\frac{10}{7}}}{p^{\frac{9}{14}}}}$$

$$10. \left(\frac{m^{\frac{1}{2}} n^{-\frac{1}{3}}}{n^{\frac{2}{3}} m^{-\frac{7}{4}}}\right)^{-\frac{1}{6}} = \left(\frac{m^{\frac{1}{2}} m^{\frac{7}{4}}}{n^{\frac{2}{3}} n^{\frac{1}{3}}}\right)^{-\frac{1}{6}} = \left(\frac{m^{\frac{9}{4}}}{n}\right)^{-\frac{1}{6}} = \left(\frac{n}{m^{\frac{9}{4}}}\right)^{\frac{1}{6}} = \boxed{\frac{n^{\frac{1}{6}}}{m^{\frac{3}{8}}}}$$

Real Exponents

For problems 1 – 3 simplify the given expression and write the answer with only positive exponents.

leave with decimal exponents

$$1. (x^{0.1} y^{-0.3})^{-2.4} = x^{-0.24} y^{0.72} = \frac{y^{0.72}}{x^{0.24}}$$

$$2. (x^{-0.15})^3 (y^4)^{-1.8} = x^{-0.45} y^{-7.2} = \frac{1}{x^{0.45} y^{7.2}}$$

Challenge

$$3. \left(\frac{p^{3.2} q^{-0.7}}{q^{-6.4} p^{-1.9}}\right)^{-1.5} = \left(\frac{p^{3.2} q^{6.4} p^{1.9}}{q^{0.7}}\right)^{-1.5} = (p^{5.1} q^{5.7})^{-1.5} = p^{-7.65} q^{-8.55} = \frac{1}{p^{7.65} q^{8.55}}$$

Radicals

For problems 1 – 3 write the expression in exponential form.

1. $\sqrt[3]{y}$ $y^{1/3}$

2. $\sqrt[3]{x^2}$ $x^{2/3}$

3. $\sqrt[6]{ab}$ $(ab)^{1/6}$

4. $\sqrt{w^2v^3}$ $(w^2v^3)^{1/2}$

For problems 5 – 7 evaluate the radical.

5. $\sqrt[4]{81}$ 3

6. $\sqrt[3]{-512}$ -8

7. $\sqrt[3]{1000}$ 10

For problems 8 – 12 simplify each of the following. Assume that x , y and z are all positive.

8. $\sqrt[3]{x^8}$ $x^2\sqrt[3]{x^2}$

9. $\sqrt{8y^3}$ $2y\sqrt{2y}$

10. $\sqrt[4]{x^7y^{20}z^{11}}$ $xy^5z^2\sqrt[4]{x^3z^3}$

11. $\sqrt[3]{54x^6y^7z^2}$ $3x^2y^2\sqrt[3]{2yz^2}$

12. $\sqrt[4]{4x^3y}\sqrt[4]{8x^2y^3z^5} = \sqrt[4]{32x^5y^4z^5} = 2xyz\sqrt[4]{2xz}$

For problems 13 – 15 multiply each of the following. Assume that x is positive.

13. $\sqrt{x}(4-3\sqrt{x})$ $4\sqrt{x} - 3x$

14. $(2\sqrt{x}+1)(3-4\sqrt{x})$ $6\sqrt{x} - 8x + 3 - 4\sqrt{x} = 2\sqrt{x} - 8x + 3$

15. $(\sqrt[3]{x}+2\sqrt[3]{x^2})(4-\sqrt[3]{x^2})$ $4\sqrt[3]{x} - x + 8\sqrt[3]{x^2} - 2\sqrt[3]{x^4} = 4\sqrt[3]{x} - x + 8\sqrt[3]{x^2} - 2x\sqrt[3]{x}$

For problems 16 – 19 rationalize the denominator. Assume that x and y are both positive.

$$16. \frac{6}{\sqrt{x}} \cdot \frac{6\sqrt{x}}{x}$$

$$17. \frac{9}{\sqrt[3]{2x}} \cdot \frac{\sqrt[3]{(2x)^2}}{\sqrt[3]{(2x)^2}} = \frac{9\sqrt[3]{4x^2}}{2x}$$

$$18. \frac{4}{(\sqrt{x+2\sqrt{y}})(\sqrt{x-2\sqrt{y}})} \cdot \frac{(\sqrt{x-2\sqrt{y}})}{(\sqrt{x-2\sqrt{y}})} = \frac{4\sqrt{x-8\sqrt{y}}}{x-4y}$$

$$19. \frac{10}{(3-5\sqrt{x})} \cdot \frac{(3+5\sqrt{x})}{(3+5\sqrt{x})} = \frac{30+50\sqrt{x}}{9-25x}$$

Polynomials

For problems 1 – 10 perform the indicated operation and identify the degree of the result.

1. Add $4x^3 - 2x^2 + 1$ to $7x^2 + 12x$ $= 4x^3 + 5x^2 + 12x + 1$ degree: 3

2. Subtract $4z^6 + 3z^2 + 2z$ from $-10z^6 + 7z^2 - 8$ $= -14z^6 + 10z^2 - 2z - 8$ degree: 6

3. Subtract $+3x^2 + 7x + 8$ from $x^4 + 7x^3 - 12x - 1$ $= x^4 + 7x^3 + 3x^2 - 7x - 9$ degree: 4

4. $12y(3y^4 - 7y^2 + 1)$ $= 36y^5 - 84y^3 + 12y$ degree: 5

5. $(3x+1)(2-9x^2)$ $= 6x - 27x^3 + 2 - 9x^2 = -27x^3 - 9x^2 + 6x + 2$ degree: 3

6. $(w^2 + 2)(3w^2 + w)$ $= 3w^4 + w^3 + 6w^2 + 2w$ degree: 4

7. $(4x^6 - 3x)(4x^6 + 3x)$ $= 16x^{12} - 9x^2$ degree: 12

8. $3(10 - 4y^3)^2$ $= 3(100 - 80y^3 + 16y^6) = 48y^6 - 240y^3 + 300$ degree: 6

9. $(x^2 + x - 2)(3x^2 - 8x - 7)$ $= 3x^4 - 8x^3 - 7x^2 + 3x^3 - 8x^2 - 7x - 6x^2 + 16x + 14 = 3x^4 - 5x^3 - 21x^2 + 9x + 14$ degree: 4

10. Subtract $3(x^2 + 1)^2$ from $6x^3 - 9x^2 - 13x - 4$ $= -3x^4 + 6x^3 - 15x^2 - 13x - 7$ degree: 4

Factoring Polynomials

For problems 1 – 4 factor out the greatest common factor from each polynomial.

1. $6x^7 + 3x^4 - 9x^3$ $3x^3(2x^4 + x^1 - 3x)$
2. $a^3b^8 - 7a^{10}b^4 + 2a^5b^2$ $a^3b^2(b^6 - 7a^7b^2 + 2a^2)$
3. $2x(x^2+1)^3 - 16(x^2+1)^5$ $2(x^2+1)^3(x - 8(x^2+1)^2)$
4. $x^2(2-6x) + 4x(4-12x)$ $2x^2(1-3x) + 16x(1-3x) = 2x(1-3x)(x+8)$

For problems 5 & 6 factor each of the following by grouping.

5. $7x + 7x^3 + x^4 + x^6$ $7x(1+x^2) + x^4(1+x^2) = (7x+x^4)(1+x^2)$
6. $18x + 33 - 6x^4 - 11x^3$ $3(6x+11) - x^3(6x+11) = (3-x^3)(6x+11)$

For problems 7 – 15 factor each of the following.

7. $x^2 - 2x - 8$ $(x-4)(x+2)$
8. $z^2 - 10z + 21$ $(z-7)(z-3)$
9. $y^2 + 16y + 60$ $(y+10)(y+6)$
10. $5x^2 + 14x - 3$ $(5x-1)(x+3)$
11. $6t^2 - 19t - 7$ $(2t-7)(3t+1)$
12. $4z^2 + 19z + 12$ $(4z+3)(z+4)$
13. $x^2 + 14x + 49$ $(x+7)^2$
14. $4w^2 - 25$ $(2w-5)(2w+5)$
15. $81x^2 - 36x + 4$ $(9x-2)^2$

For problems 16 – 18 factor each of the following.

16. $x^6 + 3x^3 - 4$ $(x^3+4)(x^3-1) = (x^3+4)(x-1)(x^2+x+1)$
17. $3z^5 - 17z^4 - 28z^3$ $z^3(3z^2 - 17z - 28) = z^3(3z+4)(z-7)$
18. $2x^{14} - 512x^6$ $2x^6(x^8 - 256) = 2x^6(x^4 - 16)(x^4 + 16)$
 $= 2x^6(x^2 - 4)(x^2 + 4)(x^4 + 16)$
 $= 2x^6(x-2)(x+2)(x^2+4)(x^4+16)$

Rational Expressions

For problems 1 – 3 reduce each of the following to lowest terms.

$$1. \frac{x^2 - 6x - 7}{x^2 - 10x + 21} = \frac{(x-7)(x+1)}{(x-7)(x+3)} = \frac{x+1}{x+3} \quad \text{ev: } \{7, 3\}$$

$$2. \frac{x^2 + 6x + 9}{x^2 - 9} = \frac{(x+3)(x+3)}{(x+3)(x-3)} = \frac{x+3}{x-3} \quad \text{ev: } \{3, -3\}$$

$$3. \frac{2x^2 - x - 28}{20 - x - x^2} = \frac{(2x+7)(x-4)}{-(x+5)(x-4)} = -\frac{2x+7}{x+5} \quad \text{ev: } \{-5, 4\}$$

For problems 4 – 7 perform the indicated operation and reduce the answer to lowest terms.

$$4. \frac{x^2 + 5x - 24}{x^2 + 6x + 8} \cdot \frac{x^2 + 4x + 4}{x^2 - 3x} = \frac{(x+8)(x-3)}{(x+4)(x+2)} \cdot \frac{(x+2)(x+2)}{x(x-3)} = \frac{(x+8)(x+2)}{x(x+4)} \quad \text{ev: } \{-4, -2, 0, 3\}$$

$$5. \frac{x^2 - 49}{2x^2 - 3x - 5} \div \frac{x^2 - x - 42}{x^2 + 7x + 6} = \frac{(x-7)(x+7)}{(2x-5)(x+1)} \cdot \frac{(x+6)(x+1)}{(x-7)(x+6)} = \frac{x+7}{2x-5} \quad \text{ev: } \left\{\frac{5}{2}, -1, 7, -6\right\}$$

$$6. \frac{x^2 - 2x - 8}{2x^2 - 8x - 24} \div \frac{x^2 - 9x + 20}{x^2 - 11x + 30} = \frac{(x-4)(x+2)}{2(x+2)(x-6)} \cdot \frac{(x-5)(x-6)}{(x-5)(x-4)} = \frac{1}{2} \quad \text{ev: } \{-2, 6, 5, 4\}$$

$$7. \frac{\frac{3}{x+1}}{\frac{x^2 + 11x + 10}{(x+10)(x+1)}} = \frac{3(x+10)}{x+4} = \frac{3x+30}{x+4} = \frac{3(x+10)}{x+4} \quad \text{ev: } \{-1, 10, -4\}$$

For problems 8 – 12 perform the indicated operations.

$$8. \frac{3}{x-4} + \frac{x}{2x+7} = \frac{3(2x+7) + x(x-4)}{(x-4)(2x+7)} = \frac{6x+21+x^2-4x}{(x-4)(2x+7)} = \frac{x^2+2x+21}{(x-4)(2x+7)}$$

$$9. \frac{2}{3x^2} - \frac{1}{9x^4} + \frac{2}{x+4} = \frac{6x^2(x+4) - (x+4) + 18x^4}{9x^4(x+4)} = \frac{6x^3+24x^2-x-4+18x^4}{9x^4(x+4)} = \frac{18x^4+6x^3+24x^2-x-4}{9x^4(x+4)}$$

$$10. \frac{x}{x^2+12x+36} - \frac{x-8}{x+6} = \frac{x - (x-8)(x+6)}{(x+6)^2} = \frac{x - (x^2-2x-48)}{(x+6)^2} = \frac{-x^2+3x+48}{(x+6)^2}$$

$$11. \frac{1}{x^2-13x+42} + \frac{x+1}{x-6} - \frac{x^2}{x-7} = \frac{1 + (x+1)(x-7) - x^2(x-6)}{(x-7)(x-6)} = \frac{1 + x^2 - 6x - 7 - x^3 + 6x^2}{(x-7)(x-6)} = \frac{-x^3 + 7x^2 - 6x - 6}{(x-7)(x-6)}$$

$$12. \frac{x+10}{(3x+8)^3} + \frac{x}{(3x+8)^2} = \frac{x+10+x(3x+8)}{(3x+8)^3} = \frac{x+10+3x^2+8x}{(3x+8)^3} = \frac{3x^2+9x+10}{(3x+8)^3}$$

Complex Numbers

Perform the indicated operation and write your answer in standard form.

$$1. (4-5i)(12+11i) \quad 48-60i+44i-55i^2 = 103-16i$$

$$2. (-3-i)-(6-7i) \quad -9+6i$$

$$3. (1+4i)-(-16+9i) \quad 17-5i$$

$$4. 8i(10+2i) \quad 80i+16i^2 = -16+80i$$

$$5. (-3-9i)(1+10i) \quad -3-39i-90i^2 = 87-39i$$

$$6. (2+7i)(8+3i) \quad 16+62i+21i^2 = -5+62i$$

$$7. \frac{(7-i)(2-10i)}{(2+10i)(2-10i)} = \frac{14-72i+10i^2}{4-100i^2} = \frac{4-72i}{104} = \frac{1}{26} - \frac{9}{13}i$$

$$8. \frac{1+5i}{-3i} \cdot \frac{i}{i} = \frac{i+5i^2}{-3i^2} = \frac{i-5}{3} = \frac{-5+i}{3} = -\frac{5}{3} + \frac{1}{3}i$$

$$9. \frac{(6+7i)(8+i)}{(8-i)(8+i)} = \frac{48+62i+7i^2}{64-i^2} = \frac{41+62i}{65}$$

Solving Equations and Inequalities

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Preliminaries

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Integer Exponents

For problems 1 – 4 evaluate the given expression and write the answer as a single number with no exponents.

1. $-6^2 + 4 \cdot 3^2$

2. $\frac{(-2)^4}{(3^2 + 2^2)^2}$

3. $\frac{4^0 \cdot 2^{-2}}{3^{-1} \cdot 4^{-2}}$

4. $2^{-1} + 4^{-1}$

For problems 5 – 9 simplify the given expression and write the answer with only positive exponents.

5. $(2w^4v^{-5})^{-2}$

6. $\frac{2x^4y^{-1}}{x^{-6}y^3}$

7. $\frac{m^{-2}n^{-10}}{m^{-7}n^{-3}}$

8. $\frac{(2p^2)^{-3}q^4}{(6q)^{-1}p^{-7}}$

9. $\left(\frac{z^2y^{-1}x^{-3}}{x^{-8}z^6y^4}\right)^{-4}$

Rational Exponents

For problems 1 – 6 evaluate the given expression and write the answer as a single number with no exponents.

1. $36^{\frac{1}{2}}$

2. $(-125)^{\frac{1}{3}}$

3. $-16^{\frac{3}{2}}$

4. $27^{-\frac{5}{3}}$

5. $\left(\frac{9}{4}\right)^{\frac{1}{2}}$

6. $\left(\frac{8}{343}\right)^{-\frac{2}{3}}$

For problems 7 – 10 simplify the given expression and write the answer with only positive exponents.

7. $\left(a^3 b^{-\frac{1}{4}}\right)^{\frac{2}{3}}$

8. $x^{\frac{1}{4}} x^{-\frac{1}{5}}$

9. $\left(\frac{q^3 p^{-\frac{1}{2}}}{q^{-\frac{1}{3}} p}\right)^{\frac{3}{7}}$

10. $\left(\frac{m^{\frac{1}{2}} n^{-\frac{1}{3}}}{n^{\frac{2}{3}} m^{-\frac{7}{4}}}\right)^{-\frac{1}{6}}$

Real Exponents

For problems 1 – 3 simplify the given expression and write the answer with only positive exponents.

1. $(x^{0.1} y^{-0.3})^{-2.4}$

2. $(x^{-0.15})^3 (y^4)^{-1.8}$

3. $\left(\frac{p^{3.2} q^{-0.7}}{q^{-6.4} p^{-1.9}}\right)^{-1.5}$

Radicals

For problems 1 – 3 write the expression in exponential form.

1. $\sqrt[3]{y}$

2. $\sqrt[3]{x^2}$

3. $\sqrt[6]{ab}$

4. $\sqrt{w^2v^3}$

For problems 5 – 7 evaluate the radical.

5. $\sqrt[4]{81}$

6. $\sqrt[3]{-512}$

7. $\sqrt[3]{1000}$

For problems 8 – 12 simplify each of the following. Assume that x , y and z are all positive.

8. $\sqrt[3]{x^8}$

9. $\sqrt{8y^3}$

10. $\sqrt[4]{x^7y^{20}z^{11}}$

11. $\sqrt[3]{54x^6y^7z^2}$

12. $\sqrt[4]{4x^3y} \sqrt[4]{8x^2y^3z^5}$

For problems 13 – 15 multiply each of the following. Assume that x is positive.

13. $\sqrt{x}(4 - 3\sqrt{x})$

14. $(2\sqrt{x} + 1)(3 - 4\sqrt{x})$

15. $(\sqrt[3]{x} + 2\sqrt[3]{x^2})(4 - \sqrt[3]{x^2})$

For problems 16 – 19 rationalize the denominator. Assume that x and y are both positive.

16. $\frac{6}{\sqrt{x}}$

17. $\frac{9}{\sqrt[3]{2x}}$

18. $\frac{4}{\sqrt{x} + 2\sqrt{y}}$

19. $\frac{10}{3 - 5\sqrt{x}}$

Polynomials

For problems 1 – 10 perform the indicated operation and identify the degree of the result.

1. Add $4x^3 - 2x^2 + 1$ to $7x^2 + 12x$
2. Subtract $4z^6 - 3z^2 + 2z$ from $-10z^6 + 7z^2 - 8$
3. Subtract $-3x^2 + 7x + 8$ from $x^4 + 7x^3 - 12x - 1$
4. $12y(3y^4 - 7y^2 + 1)$
5. $(3x + 1)(2 - 9x^2)$
6. $(w^2 + 2)(3w^2 + w)$
7. $(4x^6 - 3x)(4x^6 + 3x)$
8. $3(10 - 4y^3)^2$
9. $(x^2 + x - 2)(3x^2 - 8x - 7)$
10. Subtract $3(x^2 + 1)^2$ from $6x^3 - 9x^2 - 13x - 4$

Factoring Polynomials

For problems 1 – 4 factor out the greatest common factor from each polynomial.

1. $6x^7 + 3x^4 - 9x^3$

2. $a^3b^8 - 7a^{10}b^4 + 2a^5b^2$

3. $2x(x^2 + 1)^3 - 16(x^2 + 1)^5$

4. $x^2(2 - 6x) + 4x(4 - 12x)$

For problems 5 & 6 factor each of the following by grouping.

5. $7x + 7x^3 + x^4 + x^6$

6. $18x + 33 - 6x^4 - 11x^3$

For problems 7 – 15 factor each of the following.

7. $x^2 - 2x - 8$

8. $z^2 - 10z + 21$

9. $y^2 + 16y + 60$

10. $5x^2 + 14x - 3$

11. $6t^2 - 19t - 7$

12. $4z^2 + 19z + 12$

13. $x^2 + 14x + 49$

14. $4w^2 - 25$

15. $81x^2 - 36x + 4$

For problems 16 – 18 factor each of the following.

16. $x^6 + 3x^3 - 4$

17. $3z^5 - 17z^4 - 28z^3$

18. $2x^{14} - 512x^6$

Rational Expressions

For problems 1 – 3 reduce each of the following to lowest terms.

$$1. \frac{x^2 - 6x - 7}{x^2 - 10x + 21}$$

$$2. \frac{x^2 + 6x + 9}{x^2 - 9}$$

$$3. \frac{2x^2 - x - 28}{20 - x - x^2}$$

For problems 4 – 7 perform the indicated operation and reduce the answer to lowest terms.

$$4. \frac{x^2 + 5x - 24}{x^2 + 6x + 8} \cdot \frac{x^2 + 4x + 4}{x^2 - 3x}$$

$$5. \frac{x^2 - 49}{2x^2 - 3x - 5} \div \frac{x^2 - x - 42}{x^2 + 7x + 6}$$

$$6. \frac{x^2 - 2x - 8}{2x^2 - 8x - 24} \div \frac{x^2 - 9x + 20}{x^2 - 11x + 30}$$

$$7. \frac{\frac{3}{x+1}}{\frac{x+4}{x^2 + 11x + 10}}$$

For problems 8 – 12 perform the indicated operations.

$$8. \frac{3}{x-4} + \frac{x}{2x+7}$$

$$9. \frac{2}{3x^2} - \frac{1}{9x^4} + \frac{2}{x+4}$$

$$10. \frac{x}{x^2 + 12x + 36} - \frac{x-8}{x+6}$$

$$11. \frac{1}{x^2 - 13x + 42} + \frac{x+1}{x-6} - \frac{x^2}{x-7}$$

12.
$$\frac{x+10}{(3x+8)^3} + \frac{x}{(3x+8)^2}$$

Complex Numbers

Perform the indicated operation and write your answer in standard form.

1. $(4-5i)(12+11i)$

2. $(-3-i)-(6-7i)$

3. $(1+4i)-(-16+9i)$

4. $8i(10+2i)$

5. $(-3-9i)(1+10i)$

6. $(2+7i)(8+3i)$

7. $\frac{7-i}{2+10i}$

8. $\frac{1+5i}{-3i}$

9. $\frac{6+7i}{8-i}$

Solving Equations and Inequalities**Introduction**

Here are a set of practice problems for the Solving Equations and Inequalities chapter of my Algebra notes. If you are viewing the pdf version of this document (as opposed to viewing it on the web) this document contains only the problems themselves and no solutions are included in this document. Solutions can be found in a number of places on the site.