1. <u>Simplify (use only positive exponents):</u>

a) $\left(3x^5 y^3\right)^4\left(-2x^2 y\right)^2$ **c)**   **b)** $\dfrac{28x^{10} y^3}{7x^4 y^8}$ $\dfrac{y^0 x^{-3}}{y^5 x^{-8}}$

2. <u>Factor completely:</u>

a) $40x^3 y^2 + 30x^3 y^3 - 20x^2 y^2$ **b)** $5x^2 - 45$

c) $3x^2 - 7x + 2$ **d)** $x^2 - 3xy - 40y^2$

3. <u>Perform the indicated operations (write all answers in lowest terms):</u>

a) $\dfrac{a^2 - 8a + 15}{a^2 - 7a + 6} \cdot \dfrac{a^2 - 36}{a^2 + 3a - 18}$ **b)** $\dfrac{y^2 - 16}{y^2 + 4y} \div \dfrac{y^2 - 7y + 12}{y^2 - 6y + 9}$

c) $\dfrac{2x+1}{x-3} - \dfrac{4x+7}{4x-12}$ **d)** $\dfrac{4}{x^2 - 25} - \dfrac{8}{x^2 - 11x + 30}$

4. <u>Solve:</u>

a) $\dfrac{4}{x} + 3 = \dfrac{5}{3}$ **b)** $\dfrac{16}{x^2 + 3x - 18} + \mathbf{e)}\dfrac{3}{x+6} = \dfrac{-8}{x-3}$ $1 - \dfrac{7}{x} = \dfrac{-10}{x^2}$

5. <u>Divide by long division:</u> $x^3 - 3x^2 + 4x - 5 \div x - 2$

6. **a)** <u>Simplify:</u> $\sqrt{28x^6 y^7}$ **b)** <u>Rationalize:</u>**7.** $\sqrt{\dfrac{5x}{24}}$ <u>Combine:</u> $2\sqrt{54} - 3\sqrt{6} + 4\sqrt{24}$

8. <u>Multiply and Simplify:</u>

a) $\left(2\sqrt{5} - 4\right)\left(2\sqrt{3} - 1\right)$ **b)** $\left(\sqrt{3} + \sqrt{2}\right)^2$

9. <u>Rationalize:</u> $\dfrac{10}{\sqrt{21} + \sqrt{11}}$ **10.** <u>Solve and Check:</u> $\sqrt{10x - 4} = 6$

11. <u>Solve using the quadratic formula:</u>

a) $3x^2 - 5x - 2 = 0$ **b)** $3x^2 - 8x + 2 = 0$ **c)** $20x^2 - 13x + 2 = 0$

12. <u>Solve graphically:</u> $\begin{array}{l} x + 3y = 6 \\ x - y = 2 \end{array}$ **13.**   <u>Solve algebraically:</u> $\begin{array}{l} 2x + 5y = 4 \\ 3x - 2y = -13 \end{array}$

Answers

1. **a)** $324x^{24}y^{14}$ **c)**   **b)** $\dfrac{4x^6}{y^5}$ $\dfrac{x^5}{y^5}$

2. **a)** $10x^2y^2\left(4x+3xy-2\right)$ **b)** $5(x+3)(x-3)$ **c)** $(3x-1)(x-2)$ **d)** $(x-8y)(x+5y)$

b)   3. **a)** $\dfrac{a-5}{a-1}$ **c)** $\dfrac{y-3}{y}$ **d)** $\dfrac{4x+3}{4(x-3)}$ $\dfrac{-4(x-16)}{(x+5)(x-5)(x-6)}$

b)   4. **a)** $x=-3$ **c)** $x=-5$ $x=5$ or $x=2$

5. $x^2-x+2\,\dfrac{-1}{x-2}$

6. **a)** $2x^3y^3\sqrt{7y}$ **b)** $\dfrac{\sqrt{30x}}{12}$
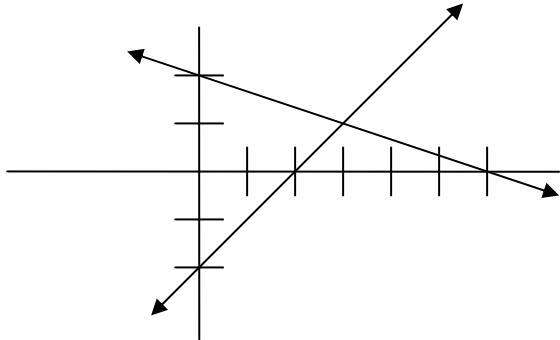
7. $11\sqrt{6}$

8. **a)** $4\sqrt{15}-2\sqrt{5}-8\sqrt{3}+4$ **b)** $5+2\sqrt{6}$

9. $\sqrt{21}-\sqrt{11}$

10.   x = 4

11. **a)** $\left\{2,\dfrac{-1}{3}\right\}$ **b)** $\left\{\dfrac{4+\sqrt{10}}{3},\dfrac{4-\sqrt{10}}{3}\right\}$ **c)** $\left\{\dfrac{2}{5},\dfrac{1}{4}\right\}$

12. $(3,1)$

13. $(-3,2)$