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Advanced Algebra Foundations Review

Make your best effort on the following problems without using a calculator.

**Show how to simplify**

1) $\left(\frac{8x^{-4}y^{2}}{-2x^{2}y^{-5}}\right)^{-3}$ 2) $\frac{x^{-3}y^{4}}{-2^{-2}x^{5}y}∙\left(\frac{3y^{-2}}{x^{4}}\right)^{-2}$ 3) $2∙9^{\frac{-3}{2}}$

4) $\left(2^{\frac{1}{2}}x^{\frac{1}{4}}y^{\frac{2}{3}}\right)^{2}∙\left(4^{-2}x^{\frac{-4}{3}}y^{2}\right)^{\frac{1}{4}}$ 5) $\frac{\left(-8x^{\frac{3}{2}}\right)^{\frac{-1}{3}}}{\left(16x^{\frac{-1}{2}}\right)^{\frac{3}{2}}}$

**Show how to factor completely.**

6) $2x^{3}+8x^{2}+5x+20$ 7) $a^{4}b^{5}-a^{2}b^{9}$

8) $25x^{2}-100y^{2}$ 9) $x^{2}+2xy-8y^{2}$

10) $6x^{2}+25x+14$ 11) $27x^{3}+125y^{9}$

**Show how to Simplify**

12) $\frac{3\sqrt{60x^{6}y^{9}}}{\sqrt{5xy^{3}}}$ 13) $\frac{\sqrt[3]{12a^{5}b^{2}}}{\sqrt[3]{16a^{3}b^{4}}}$

14) $\frac{3\sqrt{2}+\sqrt{2}}{4-\sqrt{6}}$

**Show how to perform the indicated operation.**

15) $\frac{3}{x+6}-\frac{4x}{x^{2}-36}-\frac{2}{6-x}$ 16) $\frac{16x^{4}-y^{4}}{8x^{3}+64}÷\frac{4x^{2}-y^{2}}{8x^{3}-16x^{2}+32x}$

17) $\frac{1-\frac{y^{2}}{x^{2}}}{1+\frac{y}{x}}$ 18) $-4i\left(3+4i\right)^{2}$

19) $\left(-6i^{4}\right)\left(2i^{3}\right)\left(-3i^{4}\right)$ 20) $\frac{3+\sqrt{-27}}{6}$

21. $\frac{2+3i}{1-4i}$

**Show how to solve the following quadratic equations by factoring.**

22) $4x^{2}+4x-15$ = 0 23) $2x^{2}-8x=0$

24) $16x^{2}-49=0$

**Show how to solve the quadratic equation by using square roots.**

25) $-4x^{2}-80=0$

**Show how to solve the quadratic equation by using the quadratic formula.**

26) $x^{2}-6x=20$ 27) $2x^{2}+8x-8=0$

**For the following equations, find the discriminant and the number and types of solutions.**

28) $3x^{2}-3x+9=0$ 29) $5x^{2}-10x=6$

**Show how to solve the quadratic equation by completing the square.**

30) $2x^{2}+12x-14=0$