

Factor and simplify each expression. Use the method of least powers.

For help on these problems, go to: interactmath.com, then choose a book: go to Blitzer: Precalculus, 3e, then: submit. Go to Ch. 0, Section 5. See Examples 93, 95, 97, 99.

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

$$(2.) \quad x^{\frac{3}{2}} - x^{\frac{1}{4}}$$

$$(3.) \quad 4x^{-\frac{2}{3}} + 8x^{\frac{1}{3}}$$

$$(4.) \quad 12x^{-\frac{3}{4}} + 6x^{\frac{1}{4}}$$

$$(5.) \quad (x+3)^{\frac{1}{2}} - (x+3)^{\frac{3}{2}}$$

$$(6.) \quad (x^2+4)^{\frac{3}{2}} + (x^2+4)^{\frac{7}{2}}$$

$$(7.) \quad (x+5)^{-\frac{1}{2}} - (x+5)^{-\frac{3}{2}}$$

$$(8.) \quad (x^2+3)^{-\frac{2}{3}} + (x^2+3)^{-\frac{5}{3}}$$

$$(9.) \quad (4x-1)^{\frac{1}{2}} - \frac{1}{3}(4x-1)^{\frac{3}{2}}$$

$$(10.) \quad -8(4x+3)^{-2} + 10(5x+1)(4x+3)^{-1} \quad (11.) \quad x^{-\frac{3}{2}} - 2x^{-\frac{1}{2}} + x^{\frac{1}{2}}$$

$$(12.) \quad (x-5)^{-\frac{1}{2}}(x+5)^{-\frac{1}{2}} - (x+5)^{\frac{1}{2}}(x-5)^{-\frac{3}{2}} \quad (13.) \quad (x^2+1)^{\frac{1}{2}} - 10(x^2+1)^{-\frac{1}{2}}$$

Use factoring of least powers and algebra to make the left side of the equation = to the right side.

$$(14.) \quad x^2 \left[\frac{1}{2}(1-x^2)^{-\frac{1}{2}}(-2x) \right] + (1-x^2)^{\frac{1}{2}}(2x) = \frac{x(2-3x^2)}{\sqrt{1-x^2}}$$

$$(15.) \quad \frac{4(x^2+5)^{\frac{1}{2}}(x+3)^3 - x(x+3)^4(x^2+5)^{-\frac{1}{2}}}{(x^2+5)} = \frac{(x+3)^3[3x^2-3x+20]}{(x^2+5)^{\frac{3}{2}}}$$

$$(16.) \quad \frac{(x^2+4)^{\frac{1}{3}} - x(\frac{1}{3})(x^2+4)^{-\frac{2}{3}}(2x)}{(x^2+4)^{\frac{2}{3}}} = \frac{x^2+12}{3(x^2+4)^{\frac{4}{3}}}$$