

Algebra Worksheet – Factoring with Negative Exponents

Factor the following:

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

$$\text{Ans: } x^{\frac{1}{2}}(x - 1)$$

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

$$\text{Ans: } 4x^{-\frac{2}{3}}(1 - 2x) = \frac{4(1 - 2x)}{x^{2/3}}$$

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

$$\text{Ans: } (x - 6)(x - 5)^{-\frac{3}{2}} = \frac{x - 6}{(x - 5)^{3/2}}$$

$$(4) \quad 12x^{\frac{-3}{4}} - 8x^{\frac{1}{4}}$$

$$\text{Ans: } 4x^{-3/4}(3 - 2x) = \frac{4(3 - 2x)}{x^{3/4}}$$

$$(5) \quad 5(4x + 3)^{-1} - 4(5x + 1)(4x + 3)^{-2}$$

$$\text{Ans: } \frac{11}{(4x + 3)^2}$$

$$(6) \quad -\frac{1}{2}(3x)(1 - x^2)^{-\frac{3}{2}}(-2x) + 3(1 - x^2)^{-\frac{1}{2}}$$

$$\text{Ans: } \frac{3}{(1 - x^2)^{3/2}}$$

Simplify the following fractions:

$$(7) \quad \frac{3(2x - 1)^2 - (3x + 5)2(2x - 1)}{(2x - 1)^4}$$

$$\text{Ans: } \frac{-13}{(2x - 1)^3}$$

$$(8) \quad \frac{20(7x + 2)(4x - 3)^4 - 7(4x - 3)^5}{(7x + 2)^2}$$

$$\text{Ans: } \frac{(4x - 3)^4(112x + 61)}{(7x + 2)^2}$$

$$(9) \quad \frac{x(8x - 1)(x^2 + 5)^{-\frac{1}{2}} - 8(x^2 + 5)^{\frac{1}{2}}}{(8x - 1)^2}$$

$$\text{Ans: } \frac{-x - 40}{(x^2 + 5)^{1/2}(8x - 1)^2}$$

$$(10) \quad \frac{2x \sqrt[3]{5x + 1} - \frac{5}{3}x^2(5x + 1)^{-\frac{2}{3}}}{(5x + 1)^{\frac{2}{3}}}$$

$$\text{Ans: } \frac{x(25x + 6)}{3(5x + 1)^{4/3}}$$