Unit VI – Second Degree Relations and Higher - Algebraic Fractions
Part A – Operations
Lesson 2 – Mulitplication

For each of the following, find the product, simplify your result, and note any restricted values.

1. $\dfrac{x^2 - y^2}{5x^3 y^2} \cdot \dfrac{15x^2 y^5}{4x + 4y}$

2. $\dfrac{3}{4x + 8} \cdot \dfrac{x^2 + 2x}{9}$

3. $\dfrac{^-12x - 5}{x^2 - 1} \cdot \dfrac{x^2 - 1}{2x^2 - x - 15} \cdot \dfrac{x - 3}{x + 1}$

4. $\dfrac{3x^2 + 10x - 8}{3x^2 - 17x + 10} \cdot \dfrac{5 + 9x - 2x^2}{x^2 + 3x - 4}$

5. $\dfrac{10x^3}{9y^5} \cdot \dfrac{6y^4}{15x^4}$

6. $\dfrac{x^2 + 6x}{10} \cdot \dfrac{4}{x^2 - 36}$

7. $\dfrac{a^2 + 3a - 18}{3 + 2a - a^2} \cdot \dfrac{a^3 + 1}{2a^2 + 7a - 30}$

8. $\dfrac{6a^3 b}{15xy^4} \cdot \dfrac{10x^2 y^3}{9ab^4}$

9. $\dfrac{6y^2 - 13y - 5}{^-3x - x^2} \cdot \dfrac{2xy + 6y + 5x + 15}{4y^2 - 25}$

10. $\dfrac{x^3 - 27}{8x^3} \cdot \dfrac{20x - 4x^2}{x^2 - 8x + 15}$

11. $\dfrac{x^2 + 4x - 32}{x^2 - 12x + 35} \cdot \dfrac{x^2 - 4x - 21}{16x - 4x^2} \cdot \dfrac{x^2 - 10x}{x^2 + 11x + 24}$

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For each of the following, find the product, simplify your result, and note any restricted values.

1. $\dfrac{3y^3(x-y)}{4x}$

   Restricted Values: $x \neq 0,\ y \neq 0,\ x \neq {}^{-}y$

2. $\dfrac{x}{12}$

   Restricted Values: $x \neq {}^{-}2$

3. $\dfrac{^{-}1}{x+1}\ or\ \dfrac{1}{{}^{-}x-1}$

   Restricted Values: $x \neq 1,\ x \neq {}^{-}1,\ x \neq \dfrac{{}^{-}5}{2},\ x \neq 3$

4. $\dfrac{\left({}^{-}1\right)(2x+1)}{x-1}\ or\ \dfrac{{}^{-}2x-1}{x-1}\ or\ \dfrac{2x+1}{{}^{-}x+1}\ or\ \dfrac{2x+1}{1-x}$

   Restricted Values: $x \neq \dfrac{2}{3},\ x \neq 5,\ x \neq {}^{-}4,\ x \neq 1$

5. $\dfrac{4}{9xy}$

   Restricted Values: $x \neq 0,\ y \neq 0$

6. $\dfrac{2x}{5(x-6)}$

   Restricted Values: $x \neq {}^{-}6,\ x \neq 6$

7. $\dfrac{a^2-a+1}{\left({}^{-}1\right)(2a-5)}\ or\ \dfrac{a^2-a+1}{{}^{-}2a+5}$

   Restricted Values: $a \neq {}^{-}1,\ a \neq \dfrac{5}{2},\ a \neq 3,\ a \neq {}^{-}6$

8. $\dfrac{4a^2x}{9b^3y}$

   Restricted Values: $x \neq 0,\ y \neq 0,\ a \neq 0,\ b \neq 0$

9. $\dfrac{3y+1}{{}^{-}x}\ or\ \dfrac{{}^{-}3y-1}{x}$

   Restricted Values: $x \neq 0,\ x \neq {}^{-}3,\ x \neq \dfrac{5}{2},\ x \neq \dfrac{{}^{-}5}{2}$

10. $\dfrac{x^2+3x+9}{{}^{-}2x^2}$

    Restricted Values: $x \neq 0,\ x \neq 3,\ x \neq 5$

11. $\dfrac{x-10}{\left({}^{-}4\right)(x-5)}\ or\ \dfrac{x-10}{{}^{-}4(x-5)}\ or\ \dfrac{x-10}{{}^{-}4x+20}\ or\ \dfrac{{}^{-}x+10}{4x-20}$

    Restricted Values: $x \neq 5,\ x \neq 7,\ x \neq 0,\ x \neq 4,\ x \neq {}^{-}3,\ x \neq {}^{-}8$