Multiplication & Division of Rational Expressions

Perform the indicated operations and reduce to lowest terms.

1) $\dfrac{12a^2b^4}{16a^5bc^2}$

2) $\dfrac{4x^2y^3}{16xy^5}$

3) $\dfrac{32a^2}{7xb^2} \bullet \dfrac{21x^2b^4}{8a^3}$

4) $24a^2b^3 \bullet \dfrac{16x^3b}{9a}$

5) $\dfrac{38xy^2z}{81a^2b^3} \div \dfrac{19ac^2}{27y^2}$

6) $\dfrac{4x^2y^3z^2}{12xy^4} \div \dfrac{24xy^5}{16xy}$

7) $\dfrac{32x^2c}{12a^2b} \bullet \left(\dfrac{17a^2x^2}{34b^2c} \bullet \dfrac{16x}{9a} \right)$

8) $\dfrac{32x^2c}{12a^2b} \div \left(\dfrac{17a^2x^2}{34b^2c} \bullet \dfrac{16x}{9a} \right)$

9) $\dfrac{4x+8}{3x-6} \bullet \dfrac{6x-12}{8x+16}$

10) $\dfrac{x-3}{2x^2-5x-3} \bullet (8x+4)$

11) $(8x+4) \div \dfrac{x-3}{2x^2-5x-3}$

12) $\dfrac{2x^2-5x-12}{3x^2-11x-4} \bullet \dfrac{3x^2-14x-5}{2x^2-7x-15}$

13) $\dfrac{2a^2+ab-3b^2}{a^2-b^2} \bullet \dfrac{2a-2b}{2a^2+5ab+3b^2}$

14) $\dfrac{9x^2-9x+2}{2x-6x^2} \bullet \dfrac{6x^3}{3x-2}$

15) $\dfrac{x^2-y^2}{y^3x-x^3y} \bullet \left(x^2+2xy+y^2\right)$

16) $\dfrac{4x^2-4x-3}{8x+4x^2} \bullet \dfrac{16x^2}{4x^2-6x}$

17) $\dfrac{6x^2+x-2}{4x^2-8x+3} \bullet \left(\dfrac{x-1}{3x+2} \bullet \dfrac{8x-12}{2x-2}\right)$

18) $\dfrac{9y^2+9y+2}{3y^2-2y-1} \div \left(\dfrac{y-1}{3y^2+4y+1} \bullet \dfrac{3y+2}{y+1}\right)$

19) $\dfrac{3a+2b}{2a^2+3ab} \bullet \dfrac{2a^2+ab-3b^2}{9a^2-4b^2} \bullet \dfrac{3a^2b^2-2ab^3}{a-b}$

20) $\dfrac{4x^2-12x+9}{8x^3-27} \div \dfrac{4x^2-9}{12x^3+18x^2+27x}$

Answers: 1) $\dfrac{3b^3}{4a^3c^2}$ 2) $\dfrac{x}{4y^2}$ 3) $\dfrac{12xb^2}{a}$ 4) $\dfrac{128ab^4x^3}{3}$ 5) $\dfrac{2xy^4z}{3a^3b^3c^2}$ 6) $\dfrac{2xz^2}{9y^5}$ 7) $\dfrac{64x^5}{27ab^3}$

8) $\dfrac{3bc^2}{a^3x}$ 9) 1 10) 4 11) $4(2x+1)^2$ 12) 1 13) $\dfrac{2(a-b)}{(a+b)^2}$ 14) $-3x^2$ 15) $-\dfrac{(x+y)^2}{xy}$

16) $\dfrac{2(2x+1)}{2+x}$ 17) 2 18) $\dfrac{(3y+1)(y+1)^2}{(y-1)^2}$ 19) b^2 20) $\dfrac{2x}{2x+3}$