

Unit #1 Review

Learning Goals for Unit 1

- Add, subtract and multiply polynomials
- Factor simple and complex trinomials, perfect squares and difference of squares
- Simplify rational expressions and state restrictions on the variable values
- Multiply and divide rational expressions and state restrictions
- Add and subtract rational expressions and state restrictions

Ex. 1 What is the LCD for the expression $\frac{y}{x} + \frac{3}{x^2} - \frac{4x}{xy}$

$LCD = x^2y$

$\frac{-12}{+4-3} \quad \frac{(-4x+4y)(-4x-3y)}{4}$

$\frac{xy^3 + 3y - 4x^2}{xy^2} = -4x^2 + xy^2 + 3y = -(x+y)(-4x-3y)$

$LCD: 12(x+3)(x-3)$

Ex. 2 What are the restrictions on $\frac{-4}{3(x+3)} + \frac{4x}{4(x-12)}$

$\frac{-16(x-3) + 12(x+3)}{12(x+3)(x-3)} = \frac{-16x+48+12x+36}{12(x+3)(x-3)} = \frac{-4x+84}{12(x+3)(x-3)} = \frac{-16x+48+12x^2+36x}{12x^2+20x+48}$

$\frac{4(3x^2+5x+12)}{12(x+3)(x-3)}$

Ex. 3 Write the area of the rectangle in simplest form.

$x \neq 0$

$\frac{x^2-9}{x} \times \frac{x^3-4x}{x^2+5x+6}$

$x(x^2-4) = x(x-2)(x+2)$

$\frac{x^2-9}{x} = \frac{(x-3)(x+3)}{x}$

$\frac{x^3-4x}{x^2+5x+6} = \frac{x(x-2)(x+2)}{(x+2)(x+3)} = \frac{x(x-2)}{(x+3)}$

$\frac{x^3-4x}{x^2+5x+6}$

Ex. 4 Why is it better to find the LCD instead of just multiplying the denominators when adding and subtracting rational expressions?

Ex. 5 Why may there be more restrictions when you divide rational expressions than when you multiply the same two expressions?

Adding, Subtracting and Multiplying Polynomials

13. Add.

a) $(5x^2 - 4x - 2) + (8x^2 + 3x - 3) = 13x^2 - x - 5$

b) $(2x^2 - 6xy + 7y^2) + (4x^2 + 3xy - 11y^2) = 6x^2 - 3xy - 4y^2$

14. Subtract.

a) $(7y^2 + 4y - 7) - (9y^2 + 3y - 3) = -2y^2 + y - 4$

b) $(3m^2 + mn - 7n^2) - (5m^2 + 2mn - 8n^2) = -2m^2 - mn + n^2$

15. Expand and simplify.

a) $4(x + 5) + 3(x - 7)$

b) $6(3s - 4t) - (7s - t) + 5$

c) $2x(x + 3) - x(3x + 8)$

d) $3y(y - 2) + 2y(3y + 4) - 4y(2y - 3)$

16. Expand and simplify.

a) $3[4 - 2(y - 3)] + 4[3(2 - y) - 5]$

b) $2x[2 - x(x - 1)] - [3 - x(x + 20)]$

$$2x[2 - x^2 + x] - [3 - x^2 - 20x]$$

$$4x - 2x^3 + 2x^2 - 3 + x^2 + 20x$$

$$-2x^3 + 3x^2 + 24x - 3$$

17. Expand and simplify.

a) $(y - 8)(y - 9)$

b) $2(7 - 3x)(4 + x)$

c) $3(3x - 1)^2$

d) $(4x + 3y)(2x - 5y)$

$$\begin{array}{r} 36 \\ -16 \\ \hline 9x^2 - 12xy + 4y^2 \\ - (3x - 2y)(3x - 2y) \\ \hline (3x - 2y)(3x - 2y) \\ = (3x - 2y)^2 \end{array}$$

18. Expand and simplify

a) $(m-4)(m+4) + \boxed{(m-3)^2}$ m^2-6m+9

c) $3(4y+1)^2 + 2(3y-4)(2y-3)$

b) $(x+6)^2 - (x+4)(x-7)$

d) $2(3x-2y)(x+3y) - 2(2x-y)^2$

$$= (3x^2 + 9xy - 2xy - 6y^2) - 2(4x^2 - 2xy - 2xy + y^2)$$

$$= (3x^2 - 7xy - 6y^2) - 2(4x^2 - 4xy + y^2)$$

$$= 3x^2 - 14xy - 12y^2 - 8x^2 + 8xy - 2y^2$$

$$= -5x^2 - 6xy - 14y^2$$

19. Expand and simplify.

a) $(x-3)(x^2-3x+2)$

c) $(x^2+2x+3)(x^2-x-1)$

b) $(2t+1)(3t^2-t-1)$

d) $(3z^2-2z+1)(2z^2+2z-3)$

Simplifying Rational Expressions

21. Simplify. State any restrictions on the variables.

a) $\frac{3x}{3x+9}$

b) $\frac{8y^2-10xy}{4y}$

c) $\frac{5x-5y}{7x-7y}$

d) $\frac{6x-10}{5-3x}$

e) $\frac{3w}{3w^2-12w}$

f) $\frac{3m^2-3m}{4m^2-4m}$

g) $\frac{t-2}{t^2-3t+2}$

h) $\frac{2a^2-7a-15}{a-5}$

i) $\frac{y^2-9}{y^2+y-12}$

j) $\frac{6n^2-7n-3}{12n^2+7n+1}$

22. **Alberta flag** The area of an Alberta flag can be represented by the expression $2x^2 + 4x + 2$, and its width by $x + 1$.

a) Write and simplify an expression for the length.

b) Write and simplify an expression that represents the ratio length:width for an Alberta flag.

Multiplying and Dividing Rational Expressions

23. Simplify. State any restrictions on the variables.

a) $\frac{5x^3}{2y} \times \frac{8y}{15x^2}$ b) $\frac{-4a^3}{3b} \div \frac{2a}{3b^2}$ c) $\frac{3a^2b}{-4xy} \times \frac{-5x^2y}{6ab^2}$ d) $\frac{b^2}{8x^3y} \div \frac{3b}{4xy}$

e) $\frac{3x-3}{2x+2} \times \frac{5x+5}{6x-6}$ f) $\frac{4m+8}{3n-3} \div \frac{2m+6}{7n-7}$

g) $\frac{t^2+4t+4}{t-2} \div \frac{3t+6}{t^2-5t+6}$ h) $\frac{2x^2-5x-3}{2x^2-5x+2} \times \frac{2x^2+3x-2}{x^2-4x+3}$

i) $\frac{6y^2-5y+1}{12y^2-5x-2} \div \frac{3y^2-4y+1}{4y^2+3y-1}$

g) $\frac{t^2+4t+4}{t-2} \div \frac{3t+6}{t^2-5t+6}$

$$= \frac{(t+2)^2}{t-2} \div \frac{3(t+2)}{(t-3)(t-2)} = \frac{(t+2)^2}{t-2} \times \frac{(t-3)(t-2)}{3(t+2)} \quad t \neq -2$$

$$= \frac{(t+2)(t-3)}{3} \quad t \neq \pm 2, 3$$

i) $\frac{6y^2-5y+1}{12y^2-5x-2} \div \frac{3y^2-4y+1}{4y^2+3y-1}$

$$= \frac{(2y-1)(3y-1)}{(3y-2)(4y+1)} \div \frac{(y-1)(3y-1)}{(y+1)(4y-1)}$$

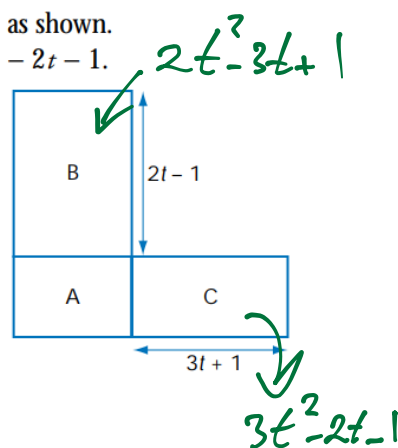
$$y \neq \frac{2}{3}, -\frac{1}{4}, -1, \frac{1}{4}$$

$$y \neq 1, \frac{1}{3}$$

$$= \frac{(2y-1)(3y-1)}{(3y-2)(4y+1)} \times \frac{(y+1)(4y-1)}{(y-1)(3y-1)} = \frac{(2y-1)(y+1)(4y-1)}{(3y-2)(4y+1)(y-1)}$$

24. **Measurement** Rectangles B and C are attached to rectangle A, as shown. The area of rectangle B is $2t^2 - 3t + 1$. The area of rectangle C is $3t^2 - 2t - 1$. The lengths of these two rectangles are as shown.

- Write a rational expression that represents the width of rectangle B.
- Write a rational expression that represents the width of rectangle C.
- Write and simplify the product of the expressions you wrote in parts a) and b).
- What type of rectangle is A? Explain.



$$a) \frac{A}{l} = \frac{lw}{l} \quad w = \frac{2t^2 - 3t + 1}{2t - 1}$$

$$\frac{A}{l} = w$$

$$b) \frac{3t^2 - 2t - 1}{3t + 1}$$

$$c) \frac{2t^2 - 3t + 1}{2t - 1} \cdot \frac{3t^2 - 2t - 1}{3t + 1} = \frac{(t-1)(t-1)}{2t-1} \cdot \frac{(t-1)(3t+1)}{3t+1} = (t-1)^2$$

Adding and Subtracting Rational Expressions

25. Simplify. State any restrictions on the variables.

$$a) \frac{5}{x} + \frac{1}{x} - \frac{8}{x} = \frac{-2}{x}$$

$$b) \frac{2m+1}{m-2} + \frac{3m-5}{m-2}$$

$$c) \frac{4z-3}{z^2} - \frac{3z-1}{z^2}$$

$$d) \frac{2t}{3} - \frac{3t}{4} + \frac{t}{6}$$

$$e) \frac{4x+1}{5} + \frac{2x-1}{4}$$

$$f) \frac{2a-3b}{6} - \frac{3a-2b}{4}$$

$$g) \frac{4}{2y-5} + \frac{2}{5-2y}$$

$$h) \frac{x^2+5}{x^2-4} - \frac{x^2-2}{4-x^2}$$

$$i) \frac{2x+5}{x^2+3x+2} - \frac{x+4}{x^2+3x+2}$$

$$c) \neq \frac{5}{2} \quad = \frac{4}{2y-5} + \frac{2}{-1(2y-5)} = \frac{4}{2y-5} - \frac{2}{2y-5} = \frac{2}{2y-5}$$

$$= (t-1)^2 \Rightarrow A \text{ is a square}$$

26. **Measurement** The perimeter of a triangle is $\frac{9x+1}{4}$. If two of the side lengths are $\frac{x+1}{2}$ and $\frac{2x-1}{2}$, what is the third side length?

$$A = l \times w \quad A_r = \frac{bh}{2}$$

$$= b \times h \div 2$$

$$e) \frac{2}{t^2 + 3t + 2} - \frac{1}{t^2 + t - 2}$$

$$S_3 = P - S_1 - S_2$$

$$\frac{2}{(t+2)(t+1)} - \frac{1}{(t+2)(t-1)}$$

$$\frac{2(t+2)(t-1) - 1(t+2)(t+1)}{(t+2)(t+1)(t-1)}$$

$$2t-2 - t-1$$

$$t-3$$

27. Simplify. State any restrictions on the variables.

LCM: $(x+2)(x+1)$

$$a) \frac{2x}{y^2} + \frac{4}{y^2} - \frac{1}{y^2} = \frac{2x+4-1}{y^2}$$

$$b) \frac{4}{x^2} - \frac{5}{xy} + \frac{2}{y^2}$$

$$c) \frac{a}{2a-2} + \frac{2}{3a-3}$$

$$\frac{-6}{-6+1}$$

$$d) \frac{2}{x+3} - \frac{4}{x+1}$$

$$e) \frac{2}{t^2 + 3t + 2} - \frac{1}{t^2 + t - 2}$$

$$f) \frac{x+1}{3x^2 + 4x + 1} + \frac{2x-1}{3x^2 - 5x - 2}$$

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

$$\frac{(x+1)(3x+1)}{(x+1)(3x+1)}$$

$$(x-2)(3x+1)$$

$$(x+1)(3x-2)(3x+1) + (2x-1)(x+1)(3x+1)$$

$$9x^2 + 3x - 6x - 2$$

$$6x^2 + 2x - 3x - 1$$

$$(x+1)(9x^2 - 3x - 2)$$

$$(x+1)(6x^2 - x - 1)$$

$$9x^3 - 3x^2 - 2x + 9x^2 - 3x - 2$$

$$6x^3 - x^2 - x + 6x^2 - x - 1$$

$$9x^3 + 6x^2 - 5x - 2$$

$$6x^3 + 5x^2 - 2x - 1$$

$$3(3x-3)$$

$$= \frac{3(x-1)}{(x-2)(3x+1)}$$

$$17x^3 + 11x^2 - 7x - 1$$

ANSWERS:

13. a) $13x^2 - x = 5$ b) $6x^2 - 3xy - 4y^2$ 14. a) $-2y^2 + y - 4$
b) $-2m^2 - 2mn + n^2$ 15. a) $7x - 1$ b) $11s - 23t + 5$
c) $x^2 - 2x$ d) $y^2 + 14y$ 16. a) $-18y + 34$
b) $-2x^3 + 3x^2 + 24x - 3$ 17. a) $y^2 - 17y + 72$
b) $-6x^2 - 10x + 56$ c) $2/x^2 - 18x + 3$ d) $8x^2 - 14xy - 15y^2$
18. a) $2m^2 - 6m - 7$ b) $15x + 64$ c) $60y^2 - 10y + 27$
d) $-2x^2 + 22xy - 14y^2$ 19. a) $x^3 - 6x^2 + 11x - 6$
b) $6t^3 + t^2 - 3t - 1$ c) $x^4 + x^3 - 5x - 3$

d) $6z^4 + 2z^3 - 11z^2 + 8z - 3$

20. $(2x+3)(x+1) - (2x+1)(x-1) = 6x+4$ 21. a) $\frac{x}{x+3}$,

$x \neq -3$ b) $\frac{4y-5x}{2}$, $y \neq 0$ c) $\frac{5}{7}$, $x \neq y$ d) -2 , $x \neq \frac{5}{3}$ e) $\frac{1}{w-4}$,

$w \neq 0$, 4 f) $\frac{3}{4}$, $m \neq 0, 1$ g) $\frac{1}{t-1}$, $t \neq 1, 2$ h) $2a+3$, $a \neq 5$

i) $\frac{y+3}{y+4}$, $y \neq 3, -4$ j) $\frac{2n-3}{4n+1}$, $n \neq -\frac{1}{3}, -\frac{1}{4}$

22. a) $\frac{2x^2+4x+2}{x+1} = 2(x+1)$ b) $2(x+1):(x+1) = 2:1$

23. a) $\frac{4x}{3}$, $x, y \neq 0$ b) $-2a^2b$, $a, b \neq 0$ c) $\frac{5ax}{8b}$, $a, b, x, y \neq 0$

d) $\frac{b}{6x^2}$, $b, x, y \neq 0$ e) $\frac{5}{4}$, $x \neq \pm 1$ f) $\frac{14(m+2)}{3(m+3)}$, $m \neq -3$, $n \neq 1$

g) $\frac{(t+2)(t-3)}{3}$, $t \neq \pm 2, 3$ h) $\frac{(x+2)(2x+1)}{(x-1)(x-2)}$, $x \neq 1, 2, 3, \frac{1}{2}$

i) $\frac{(2y-1)(4y-1)(y+1)}{(3y-2)(4y+1)(y-1)}$, $y \neq \pm 1, \frac{1}{3}, \frac{2}{3}, \pm \frac{1}{4}$

24. a) $\frac{2t^2-3t+1}{2t-1}$ b) $\frac{3t^2-2t-1}{3t+1}$

c) $\frac{2t^2-3t+1}{2t-1} \times \frac{3t^2-2t-1}{3t+1} = (t-1)^2$, $t \neq -\frac{1}{3}, \frac{1}{2}$

d) It is a square; the length and the width both equal $t-1$.

25. a) $\frac{-2}{x}$, $x \neq 0$ b) $\frac{5m-4}{m-2}$, $m \neq 2$ c) $\frac{z-2}{z^2}$, $z \neq 0$ d) $\frac{t}{12}$

e) $\frac{26x-1}{20}$ f) $\frac{-5a}{12}$ g) $\frac{2}{2y-5}$, $y \neq \frac{5}{2}$ h) $\frac{2x^2+3}{x^2-4}$, $x \neq \pm 2$

i) $\frac{1}{x+2}$, $x \neq -1, -2$ 26. $\frac{3x+1}{4}$ 27. a) $\frac{y+4}{y^2}$, $y \neq 0$

b) $\frac{4y^2-5xy+2x^2}{x^2y^2}$, $x, y \neq 0$ c) $\frac{3a+4}{6(a-1)}$, $a \neq 1$

d) $\frac{-2(x+5)}{(x+3)(x+1)}$, $x \neq -1, -3$

e) $\frac{t-3}{(t-1)(t+1)(t+2)}$, $t \neq \pm 1, -2$ f) $\frac{3(x-1)}{(3x+1)(x-2)}$,

$x \neq -1, -\frac{1}{3}, 2$ 28. a) $y < 6$ b) $w > 2$ c) $x \geq -1$ d) $z \leq 2$

1. Simplify.

- a) $(7x^2 - 2x + 1) + (9x^2 - 4x + 5)$
 $(4x^2 - 6x + 7) = 12x^2 - 12x + 13$
- b) $(7a^2 - 4ab + 9b^2)$
 $(+a^2 - 2ab - 6b^2) = 8a^2 - 6ab - 3b^2$

4. Expand and simplify.

- a) $-3(7x - 5)(4x - 7)$
b) $-(y^2 - 4y + 7)(3y^2 - 5y - 3)$
c) $2(a + b)^3$
d) $3(x^2 - 2)^2(2x - 3)^2$

$$\begin{array}{r} (x^4 - 2x^2 - 2x^2 - 9) \\ 3(x^4 - 4x^2 + 4)(4x^2 - 6x + 9) \end{array}$$

$$4x^6 - 12x^5 + 9x^4 - 16x^4 + 48x^3 - 36x^2 + 16x^2 - 48x + 36$$

$$4x^6 - 12x^5 - 7x^4 + 48x^3 - 20x^2 - 48x + 36$$

6. Simplify.

- a) $(2x^4 - 3x^2 - 6) + (6x^4 - x^3 + 4x^2 + 5)$
b) $(x^2 - 4)(2x^2 + 5x - 2)$
c) $-7x(x^2 + x - 1) - 3x(2x^2 - 5x + 6) = -7x^3 - 7x^2 + 7x - 3x^3 + 15x^2 - 18x = -10x^3 - 8x^2 - 11x$
d) $-2x^2(3x^3 - 7x + 2) - x^3(5x^3 + 2x - 8)$
e) $-2x[5x - (2x - 7)] + 6x[3x - (1 + 2x)]$
f) $(x + 2)^2(x - 1)^2 - (x - 4)^2(x + 4)^2$
g) $(x^2 + 5x - 3)^2$

7. Factor.

a) $12m^2n^3 + 18m^3n^2 = 6m^2n^2 [2n + 3m]$

b) $x^2 - 9x + 20 = (x-4)(x-5)$

c) $3x^2 + 24x + 45$

d) $50x^2 - 72$

e) $9x^2 - 6x + 1$

f) $10a^2 + a - 3$

9. Simplify. State any restrictions on the variables.

a) $\frac{10a^2b + 15bc^2}{-5b}$

b) $\frac{30x^3y^3 - 20x^2z^2 + 50x^2}{10x^2}$

$3y^3 - 2z^2 + 5$

c) $\frac{xy - xyz}{xy}$

d) $\frac{16mnr - 24mnp + 40kmn}{8mn}$

10. Simplify. State any restrictions on the variables.

a) $8xy^2 + 12x^2y - \frac{6x^3}{2xy}$

b) $\frac{7a - 14b}{2(a - 2b)}$

c) $\frac{m + 3}{m^2 + 10m + 21}$ $\frac{m+3}{(m+7)(m+3)} = \frac{1}{m+7}$ $m \neq -3, -7$

d) $\frac{4x^2 - 4x - 3}{4x^2 - 9}$

e) $\frac{3x^2 - 21x}{7x^2 - 28x + 21}$

f) $\frac{3x^2 - 2xy - y^2}{3x^2 + 4xy + y^2}$

13. Simplify. State any restrictions on the variables.

a) $\frac{x^2}{2xy} \times \frac{x}{2y^2} \div \frac{(3x)^2}{xy^2}$ $\frac{x^2}{2xy} \cdot \frac{x}{2y^2} \cdot \frac{xy^2}{9x^2} = \frac{x^4 y^2}{36 x^2 y^4}$

b) $\frac{x^2 - 5x + 6}{x^2 - 1} \times \frac{x^2 - 4x - 5}{x^2 - 4} \div \frac{x - 5}{x^2 + 3x + 2}$ $= \frac{x}{36y}$

c) $\frac{1 - x^2}{1 + y} \times \frac{1 - y^2}{x + x^2} \div \frac{y^3 - y}{x^2}$

d) $\frac{x^2 - y^2}{4x^2 - y^2} \times \frac{4x^2 + 8xy + 3y^2}{x + y} \div \frac{2x + 3y}{2x - y}$

15. Simplify and state any restrictions on the variables.

a) $\frac{1}{2x} - \frac{7}{3x^2} + \frac{4}{x^3}$

b) $\frac{3x}{x+2} + \frac{4x}{x-6}$

c) $\frac{6x}{x^2 - 5x + 6} - \frac{3x}{x^2 + x - 12}$

d) $\frac{2(x-2)^2}{x^2 + 6x + 5} \times \frac{3x+15}{(2-x)^2}$

e) $\frac{(x-2y)^2}{x^2 - y^2} \div \frac{(x-2y)(x+3y)}{(x+y)^2}$

f) $\frac{2b-5}{b^2 - 2b - 15} + \frac{3b}{b^2 + b - 30} \times \frac{b^2 + 8b + 12}{b+3}$

$$(m-1)(3m-2)$$

5. Factor.

a) $3m(m-1) + 2m(1-m)$

b) $x^2 - 27x + 72$

c) $15x^2 - 7xy - 2y^2$

d) $(2x-y+1)^2 - (x-y-2)^2$

e) $\frac{5xy-10x-3y+6}{p^2 - m^2 + 6m - 9}$ $5x[y-2] - 3[y-2]$

f) $(5x-3)(y-2)$

$$\frac{(15x-10y)(15+3y)}{5 \quad 3}$$

$$(3x-2y)(5+y)$$

ANSWERS:

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1. a) $12x^2 - 12x + 13$ b) $8a^2 - 6ab + 3b^2$
 2. Answers will vary. For example, $f(x) = x^2 + x$, $g(x) = 2x$
 3. a) no b) probably c) 32 or 33
 4. a) $-84x^2 + 207x - 105$
 b) $-3y^4 + 17y^3 - 38y^2 + 23y + 21$
 c) $2a^3 + 6a^2b + 6ab^2 + 2b^3$
 d) $12x^6 - 36x^5 - 21x^4 + 144x^3 - 60x^2 - 144x + 108$
 5. $V = \left(\frac{1}{3}\right)\pi(r+x)^2(h+2x)$
 $V = \left(\frac{1}{3}\right)\pi(2hrx + r^2h + 2r^2x + 4rx^2 + 2x^3 + x^2h)$
 6. a) $8x^4 - x^3 + x^2 - 1$
 b) $2x^4 + 5x^3 - 10x^2 - 20x + 8$
 c) $-13x^3 + 8x^2 - 11x$
 d) $-5x^6 - 6x^5 - 2x^4 + 22x^3 - 4x^2$
 e) $-20x$
 f) $2x^3 + 29x^2 - 4x - 252$
 g) $x^4 + 10x^3 + 19x^2 - 30x + 9$
 7. a) $6m^2n^2(2n+3m)$ d) $2(5x+6)(5x-6)$
 b) $(x-5)(x-4)$ e) $(3x-1)^2$
 c) $3(x+3)(x+5)$ f) $(2a-1)(5a+3)$
 8. a) $2x^2y(y^3-3x^3y^2+4x)$ d) $(5x-6)(3x-7)$
 b) $(x+4)(2x+3)$ e) $(a^2+4)(a+2)(a-2)$
 c) $(x+2)(x-5)$ f) $-(m+4n)(3m+2n)$
 9. a) $-2a^2 - 3c^2$; $b \neq 0$ c) $1-z$; $x \neq 0$, $y \neq 0$
 b) $3y^3 - 2x^2 + 5$; $x \neq 0$ d) $2r - 3p + 5k$; $m \neq 0$, $n \neq 0$
 10. a) $\frac{8xy^3 + 12x^2y^2 - 3x^2}{y}$, $x \neq 0$, $y \neq 0$
 b) $\frac{7}{2}$, $a \neq 2b$
 c) $\frac{1}{m+7}$, $m \neq -7$, -3
 d) $\frac{2x+1}{2x+3}$, $x \neq -\frac{3}{2}$, $\frac{3}{2}$
5. a) $m(m-1)$ d) $(x+3)(3x-2y-1)$
 b) $(x-3)(x-24)$ e) $(y-2)(5x-3)$
 c) $(5x+y)(3x-2y)$ f) $(p-m+3)(p+m-3)$