

Name: _____

Date: _____

1. Simplify and determine the NPV.

a) $\frac{-35a^2b^3c^4}{40abc^7}$	b) $\frac{12-3m}{20-5m}$
c) $\frac{6x^2-8x}{4x}$	d) $\frac{m^2+2mn-3n^2}{3m^2+9mn}$
e) $\frac{a^2+10ab+24b^2}{a^2-36b^2}$	f) $\frac{2x^3-28x^2-102x}{18x-2x^3}$

2. Simplify and determine the NPV.

a) $\frac{(2m)^2}{5n} \times \frac{10m}{8n} \div \frac{15m}{(4n)^2}$ $= \frac{16m^2}{15} \quad NPV : m \neq 0, n \neq 0$	b) $\frac{2x^2-3x-20}{2x^2+5x-12} \times \frac{2x^2-15x+18}{2x^2-7x-30}$ $= \frac{(x-4)}{(x+4)} \quad NPV : x \neq -4, \frac{-5}{2}, \frac{3}{2}, 6$
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$$\frac{2x-1+\frac{3x}{x+1}}{3x-\frac{x}{x+1}}$$

c)

$$\frac{2y-5+\frac{3y^2-3y}{y+1}}{3y-1-\frac{2y+1}{y+1}}$$

d)

$$\text{e) } \frac{9a^2+42ab+49b^2}{2a^2-13ab+20b^2} \times \frac{4a^2-25b^2}{9a^2-49b^2} \div \frac{2a+5b}{3a^2-19ab+28b^2}$$

$$\text{f) } \frac{2x^2+5xy+2y^2}{3x^2-8xy-3y^2} \times \frac{x^2-9y^2}{x^2-4y^2} \div \frac{3x^2+11xy+6y^2}{2x^2-3xy-2y^2}$$

3. Simplify and state all NPVs.

a) $\frac{6x-11y}{9x} + \frac{3x-16y}{6y}$	b) $\frac{2x+3y^2}{8xy} - 3 - \frac{5x^2-2y}{6x^2}$
c) $\frac{7x}{x^2-x-12} - \frac{4x}{x^2+2x-3}$	d) $\frac{3a+2}{a^2+10a+21} + \frac{5a-4}{15+2a-a^2}$
e) $\frac{5m+25}{2m^2+13m+15} - \frac{2m-5}{m^2-4}$	f) $\frac{3x+y}{2x^2-11xy-21y^2} + \frac{x-2y}{2x^2+11xy+12y^2} - \frac{2x+y}{x^2-3xy-28y^2}$

4. Solve.

a) $\frac{x+15}{5} = \frac{2}{x} + \frac{x+1}{5}$

b) $\frac{2x+1}{3x-2} = \frac{4x+3}{6x-5}$

c) $\frac{1}{x+2} + \frac{4}{2x-1} = 1$

d) $\frac{9x^2}{x^2-25} = \frac{4x}{x-5} + \frac{x}{x+5}$

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

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

5. The average speed of an airplane is five times as fast as the average speed of a passenger train. To travel 2000km, the bus requires 20 hours more than the plane. Determine the average speeds of the train and the plane.

6. The average speed of an express train is 40 km/h faster than the average speed of a bus. To travel 1200km, the bus requires 50% more time than the train. Determine the average speeds of the train and the bus.

7. Each week, Angela flies her small plane 500 km from Lethbridge to Moose Jaw. After a brief stopover, she returns to Lethbridge. On both trips, the air speed is 180 km/h. On the flight out there is a constant 20 km/h tail wind, and on the return trip a constant head wind of the same speed. Calculate the time needed for a round trip.