OPERATIONS ON ALGEBRAIC FRACTIONS: PRETEST A

MTH-4110-1

Name: Shannon

Date:

Duration: 2 hours 30 minutes

Question 1 (10 marks)

Reduce the following algebraic fraction to lowest terms. Show all the steps in the solution.

$$\frac{-2b^2+11b-15}{15b-6b^2}$$

prod $= +30$
sum $= +11$
$5, 6$

$(-2b^2+5b)+(6b-15)$

$-b(2b-5)+3(2b-5)$

$(-b+3)(2b-5)$

$$= \frac{(-b+3)(2b-5)}{3b(5-2b)}$$

$$= \frac{(-b+3)(-1)(5-2b)}{3b(5-2b)} = \frac{-(-b+3)}{3b} = \boxed{\frac{b-3}{3b}}$$

Question 2 (10 marks)

Determine the product of the following algebraic fractions and reduce the result to lowest terms. Show all the steps in the solution.

$$\frac{36-x^4}{-x^4+36} \cdot \frac{3x^3+6x^2+12x+24}{x^4-2x^2-24} \cdot \frac{x^4-4x^3}{x^5+6x^3}$$

$(3x^3+6x^2)+(12x+24)$

$3x^2(x+2)+12(x+2)$

$(3x^2+12)(x+2)$

$3(x^2+4)(x+2)$

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

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

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

Question 3 (10 marks)

Perform the following operations and reduce the result to lowest terms. Show all the steps in the solution.

$$\frac{b^2-9a^2}{9-6a+a^2} \cdot \frac{9-a^2}{3b+ab-9a-3a^2} \div \frac{4(b+3a)}{3(3-a)}$$

$(3b+ab)+(-9a-3a^2)$

$b(3+a)-3a(3+a)$

$(b-3a)(3+a)$

$$\frac{(b-3a)(b+3a)}{(a-3)(a-3)} \cdot \frac{(3-a)(3+a)}{(b-3a)(3+a)} \cdot \frac{3(3-a)}{4(b+3a)}$$

$$\frac{\cancel{(b-3a)}\,\cancel{(b+3a)}}{\cancel{(a-3)}\,\cancel{(a-3)}} \cdot \frac{-\cancel{(a-3)}\,\cancel{(3+a)}}{\cancel{(b-3a)}\,\cancel{(3+a)}} \cdot \frac{-3\,\cancel{(a-3)}}{4\,\cancel{(b+3a)}} = \boxed{\frac{3}{4}}$$

Question 4 (10 marks)

Divide the following algebraic fractions and reduce the result to lowest terms. Show all the steps in the solution.

$$\frac{6x-9x^2}{3x^2-5xy+2y^2} \div \frac{3x^3-2x^2}{xy-x^2}$$

$p=6$, $s=-5$, $-2,-3$

$3x^2-5xy+2y^2$

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

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

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

$$\frac{3x(2-3x)}{(x-y)(3x-2y)} \cdot \frac{x(y-x)}{x^2(3x-2)}$$

$$\frac{-3x\,\cancel{(3x-2)}}{\cancel{(x-y)}(3x-2y)} \cdot \frac{-x\,\cancel{(x-y)}}{x^2\,\cancel{(3x-2)}}$$

$$\frac{3x^2}{x^2(3x-2y)} = \boxed{\frac{3}{3x-2y}}$$

Question 5 (10 marks)

Perform the following operations and reduce the result to lowest terms. Show all the steps in the solution.

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

① $2x^2+7x+3$ $\quad p=6$ $\quad 6,1$ $\quad s=7$

$(2x^2+6x)+(1x+3)$

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

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

② $2x^2+5x+2$ $\quad p=4$ $\quad 4,1$ $\quad s=5$

$(2x^2+4x)+(1x+2)$

$2x(x+2)+1(x+2)$

$(2x+1)(x+2)$

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

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

these cancel out (like $6-6=0$)

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

$$= \frac{-2x+1}{(x+2)^2} \text{ or } \frac{1-2x}{(x+2)^2}$$

Question 6 (15 marks)

Reduce the following algebraic expressions to lowest terms, making sure to observe the order of operations. Show all the steps in the solution.

$$\left(1 + \frac{2x-y}{2x+y}\right) \div \frac{x}{4x^2+4xy+y^2}$$

$$\left(\frac{2x+y}{2x+y} + \frac{2x-y}{2x+y}\right)$$

$$\frac{2x+y+2x-y}{2x+y}$$

$$\frac{4x}{(2x+y)} \cdot \frac{(2x+y)(2x+y)}{x}$$

$$\boxed{4(2x+y)}$$

Question 7 (15 marks)

Reduce the following algebraic expressions to lowest terms, making sure to observe the order of operations. Show all the steps in the solution.

$$\frac{-h^2+3gh-2g^2}{-h^2} \div \left(\frac{2g}{h^2}-\frac{3}{h}+\frac{1}{g}\right)$$

prod = +2 sum = +3

2, 1

$(-h^2+2gh)+(1gh-2g^2)$

$-h(h-2g)+g(h-2g)$

$(-h+g)(h-2g)$

c.d. $= gh^2$

$$\frac{2g^2}{c.d.}-\frac{3gh}{c.d.}+\frac{h^2}{c.d.}$$

$$\frac{2g^2-3gh+h^2}{c.d.}$$

$$\frac{(-h+g)(h-2g)}{-h^2} \div \frac{(2g-h)(g-h)}{gh^2}$$

$$\frac{(-h+g)(h-2g)}{-h^2} \cdot \frac{gh^2}{(2g-h)(g-h)}$$

$$\frac{-1(2g-h)}{-1} \cdot \frac{g}{(2g-h)}$$

$$\boxed{g}$$

Question 8 (20 marks)

Reduce the following algebraic expressions to lowest terms. making sure to observe the order of operations. Show all the steps in the solution.

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

$3x^2-4xy+y^2$

prod = 3
sum = −4
−3, −1

$(3x^2-3xy-1xy+y^2)$

$3x(x-y)-y(x-y)$

$(3x-y)(x-y)$

$$\frac{x^3}{(x-y)} \cdot \frac{(3x-y)(x-y)}{x^3(3x-y)}$$

$= 1$

$$\frac{4x^2}{4x^2-y^2} - 1$$

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

$$\frac{4x^2}{c.d.} - \frac{(4x^2-y^2)}{c.d.}$$

$$\frac{4x^2-4x^2+y^2}{c.d.} = \boxed{\frac{y^2}{(2x-y)(2x+y)}}$$

OPERATIONS ON ALGEBRAIC FRACTIONS: PRETEST B

MTH-4110-1

Name: Shannon

Date:

Duration: 2 hours 30 minutes

Question 1 (10 marks)

Reduce the following algebraic fraction to lowest terms. Show all the steps in the solution.

$$\frac{-x^2+7x-12}{9-x^2}$$

$-x^2+7x-12$ prod $=+12$, sum $=7$, $3, 4$

$(-x^2+3x)+(4x-12)$

$-x(x-3)+4(x-3)$

$(-x+4)(x-3)$

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

$$\frac{(-x+4)(-1)(3-x)}{(3-x)(3+x)} = \frac{-(-x+4)}{3+x} = \boxed{\frac{x-4}{3+x}}$$

Question 2 (10 marks)

Divide the following algebraic fractions and reduce the result to lowest terms. Show all the steps in the solution.

$$\frac{4g^2-25h^2}{5g-10g^2} \div \frac{5h-2g}{2g^2-g}$$

$$\frac{(2g-5h)(2g+5h)}{5g(1-2g)} \cdot \frac{g(2g-1)}{(5h-2g)}$$

$$\frac{-(5h-2g)(2g+5h)}{5g(1-2g)} \cdot \frac{-g(1-2g)}{(5h-2g)} = \boxed{\frac{2g+5h}{5}}$$

Question 3 (10 marks)

Perform the following operations and reduce the result to lowest terms. Show all the steps in the solution.

$$\frac{4}{8-6x+x^2} + \frac{2}{8+2x-x^2} - \frac{2}{8-2x^2}$$

x^2-6x+8 $\quad -x^2+2x+8$

$-x^2+2x+8$

$p=-8$

$s=2$

$-2, +4$

$(-x^2-2x)+(4x+8)$

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

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

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

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

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

c.d. $= (x-2)(x-4)(x+2)$

$$\frac{4(x+2)}{\text{c.d.}} + \frac{-2(x-2)}{\text{c.d.}} + \frac{1(x-4)}{\text{c.d.}}$$

$$\frac{4x+8-2x+4+x-4}{\text{c.d.}} = \boxed{\frac{3x+8}{(x-2)(x-4)(x+2)}}$$

Question 4 (10 marks)

Determine the product of the following algebraic fractions and reduce the result to lowest terms. Show all the steps in the solution.

$$\frac{g^2+g-2}{-2+g+g^2} \cdot \frac{4g-3f}{g^2-g^3} \cdot \frac{-3g^4-12g^3}{2g+g^2}$$

$(3g^2+12g)+(-4fg-16f)$

$3g(g+4)-4f(g+4)$

$(3g-4f)(g+4)$

$$\frac{(g+2)(g-1)}{(3g-4f)(g+4)} \cdot \frac{(4g-3f)}{g^2(1-g)} \cdot \frac{-3g^3(g+4)}{g(2+g)}$$

$$\frac{-(1-g)}{(3g-4f)(g+4)} \cdot \frac{(4g-3f)}{g^2(1-g)} \cdot \frac{-3g^3(g+4)}{g}$$

$$\boxed{\frac{3(4g-3f)}{3g-4f}}$$

Question 5 (10 marks)

Perform the following operations and reduce the result to lowest terms. Show all the steps in the solution.

$$\frac{9-x^2}{x^3+2x^2y} \cdot \frac{x^2-4y^2}{x-3} \div \frac{x^2-2xy+3x-6y}{2x}$$

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

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

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

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

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

$$\frac{-2x}{x^2} = \boxed{\frac{-2}{x}}$$

Question 6 (15 marks)

Reduce the following algebraic expressions to lowest terms, making sure to observe the order of operations. Show all the steps in the solution.

$$\left(\frac{4x}{x+1} - 2 + \frac{1}{x}\right) \div \frac{2x^2+2x}{4x-4-8x^2}$$

$-8x^2+4x-4$

$4(-2x^2+x-1)$

$= -4(2x^2-x+1)$

$c.d = x(x+1)$

$$\frac{4x^2}{c.d.} - \frac{2(x)(x+1)}{x(x+1)} + \frac{x+1}{x(x+1)} \qquad (x^2+x)$$

$$\frac{4x^2}{c.d.} - \frac{(2x^2+2x)}{c.d.} + \frac{x+1}{c.d.}$$

$$\frac{4x^2 - 2x^2 - 2x + x + 1}{c.d.}$$

$$\frac{(2x^2 - x + 1)}{x(x+1)} \cdot \frac{2x(x+1)}{-4(2x^2 - x + 1)}$$

$$-\frac{1}{2}$$

Question 7 (15 marks)

Reduce the following algebraic expressions to lowest terms. making sure to observe the order of operations. Show all the steps in the solution.

$$\left(\frac{b^2+3b+2}{b+1} - 1 - \frac{b+a}{b}\right) \div \frac{b^4-ab^2}{b^3}$$

$$\left(\frac{(b+2)\cancel{(b+1)}}{\cancel{(b+1)}} - 1 - \frac{b+a}{b}\right)$$

$$\frac{b+2}{1} - 1 - \frac{b+a}{b}$$

$$\frac{b(b+2)}{b} - \frac{b}{b} - \frac{(b+a)}{b}$$

$$\frac{b^2+2b-b-b-a}{b}$$

$$\left(\frac{b^2-a}{b}\right) \cdot \frac{b^3}{b^2(b^2-a)}$$

$c \cdot d = b$

$$= 1$$

Question 8 (20 marks)

Reduce the following algebraic expressions to lowest terms. making sure to observe the order of operations. Show all the steps in the solution.

$$\frac{8a^2+16a+6}{2a^2+5a+3} \div \frac{a^3+a^2-6a}{3-2a-a^2} \cdot \frac{4a}{a^2-a-2}$$

① a^3+a^2-6a

$a(a^2+a-6)$

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

② $-a^2-2a+3$ (from $3-2a-a^2$)

prod $=-3$, sum $=-2$, $-3, +1$

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

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

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

$$\frac{a(a+3)(a-2)}{(-a+1)(a+3)} \cdot \frac{4a}{(a-2)(a+1)}$$

$$\frac{a\cancel{(a+3)}\cancel{(a-2)}}{(-a+1)\cancel{(a+3)}} \cdot \frac{4a}{\cancel{(a-2)}(a+1)}$$

$$\frac{2\cancel{(2a+3)}(2a+1)}{\cancel{(2a+3)}(a+1)} + \frac{4a^2}{(-a+1)(a+1)}$$

c.d $=(a+1)(-a+1)$

5) $$\frac{2(2a+1)(-a+1)}{\text{c.d.}} + \frac{4a^2}{\text{c.d.}}$$

$$\frac{-4a^2+2a+2}{\text{c.d.}} + \frac{4a^2}{\text{c.d.}}$$

$$\frac{2a+2}{(a+1)(-a+1)} = \frac{2\cancel{(a+1)}}{\cancel{(a+1)}(-a+1)}$$

$$= \boxed{\frac{2}{1-a}}$$

③ $8a^2+16a+6$

$2(4a^2+8a+3)$

$(4a^2+2a)+(6a+3)$ $p=12$, $s=8$, $2,6$

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

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

④ $2a^2+5a+3$

$p=6$, $s=5$, $2,3$

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

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

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

$\underline{2(2a+1)}(-a+1)$

$(4a+2)(-a+1)$

$-4a^2-2a+4a+2$

$-4a^2+2a+2$

OPERATIONS ON ALGEBRAIC FRACTIONS: PRETEST C

MTH-4110-1

Name: Shanna

Date:

Duration: 2 hours 30 minutes

Question 1 (10 marks)

Reduce the following algebraic fraction to lowest terms. Show all the steps in the solution.

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

$-x^2+4x-3$ $\quad p=3$

$(-x^2+3x)+(1x-3)$ $\quad s=4$

$-x(x-3)+1(x-3)$ $\quad 3,1$

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

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

$$\boxed{\frac{x-3}{1+x}}$$

Question 2 (10 marks)

Determine the product of the following algebraic fractions and reduce the result to lowest terms. Show all the steps in the solution.

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

① $(2x^2-3xy)+(4x-6y)$

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

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

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

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

$\frac{-(3x-2y)}{2x-3y}$ OR $\boxed{\frac{2y-3x}{2x-3y}}$

$(2x^2+4x)+(-2y-xy)$

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

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

Question 3 (10 marks)

Perform the following operations and reduce the result to lowest terms. Show all the steps in the solution.

$$\frac{4-x^2}{2x^2+xy} \cdot \frac{4x^2-y^2}{x-2} \div \frac{2x^2+4x-2y-xy}{2x^2}$$

$$\frac{(2-x)(2+x)}{x(2x+y)} \cdot \frac{(2x-y)(2x+y)}{(x-2)} \cdot \frac{2x^2}{(2x-y)(x+2)}$$

$$-\frac{\cancel{(x-2)}(2+x)}{x\cancel{(2x+y)}} \cdot \frac{\cancel{(2x-y)}\cancel{(2x+y)}}{\cancel{(x-2)}} \cdot \frac{2x^2}{\cancel{(2x-y)}\cancel{(x+2)}}$$

$$-\frac{2x^2}{x} = \boxed{-2x}$$

Question 4 (10 marks)

Divide the following algebraic fractions and reduce the result to lowest terms. Show all the steps in the solution.

$$\frac{9a^2-16b^2}{3a^2-9a^3} \div \frac{4b-3a}{3a^2-a}$$

$$\frac{(3a-4b)(3a+4b)}{3a^2(1-3a)} \cdot \frac{a(3a-1)}{(4b-3a)}$$

$$-\frac{\cancel{(4b-3a)}(3a+4b)}{3a^2\cancel{(1-3a)}} \cdot \frac{-a\cancel{(1-3a)}}{\cancel{(4b-3a)}}$$

$$\frac{a(3a+4b)}{3a^2} = \boxed{\frac{3a+4b}{3a}}$$

Question 5 (10 marks)

Perform the following operations and reduce the result to lowest terms. Show all the steps in the solution.

$$\frac{3}{3-4t+t^2} + \frac{4}{3+2t-t^2} - \frac{2}{2-2t^2}$$

$t^2-4t+3 \quad -t^2+2t+3$

$$\frac{3}{(t-3)(t-1)} + \frac{4}{(-t+3)(t+1)} - \frac{2\,1}{2(1-t^2)}$$

$$\frac{3}{(t-3)(t-1)} + \frac{-4}{(t-3)(t+1)} - \frac{1}{(1-t)(1+t)}$$

$$\frac{-3}{(t-3)(1-t)} + \frac{-4}{(t-3)(t+1)} - \frac{1}{(1-t)(1+t)}$$

c.d = $(t-3)(1-t)(t+1)$

$$\frac{-3(t+1)}{\text{c.d.}} + \frac{-4(1-t)}{\text{c.d.}} - \frac{(t-3)}{\text{c.d.}}$$

$$\frac{-3t-3}{\text{c.d.}} + \frac{-4+4t}{\text{c.d.}} - \frac{(t-3)}{\text{c.d.}}$$

$$\frac{-3t-3-4+4t-t+3}{\text{c.d.}}$$

$$\boxed{\frac{-4}{(t-3)(1-t)(t+1)}}$$

Question 6 (15 marks)

Reduce the following algebraic expressions to lowest terms. making sure to observe the order of operations. Show all the steps in the solution.

$$\left(\frac{g}{g+3} + 2 - \frac{1}{g}\right) \div \frac{12+4g}{6g^2+10g-6}$$

① $6g^2+10g-6$

$2(3g^2+5g-3)$

c.d. $= g(g+3)$

$$\frac{g^2}{\text{c.d.}} + \frac{2(g)(g+3)}{\text{c.d.}} - \frac{(g+3)}{\text{c.d.}} \qquad (g^2+3g)$$

$$\frac{g^2}{\text{c.d.}} + \frac{2g^2+6g}{\text{c.d.}} - \frac{(g+3)}{\text{c.d.}}$$

$$\frac{1g^2+2g^2+6g-1g-3}{\text{c.d.}}$$

$$\frac{(3g^2+5g-3)}{g(g+3)} \cdot \frac{4(3+g)}{2(3g^2+5g-3)}$$

$$\frac{\cancel{(3g^2+5g-3)}}{g\cancel{(g+3)}} \cdot \frac{4\cancel{(3+g)}}{2\cancel{(3g^2+5g-3)}}$$

$$\frac{4}{2g} = \boxed{\frac{2}{g}}$$

Question 7 (15 marks)

Reduce the following algebraic expressions to lowest terms. making sure to observe the order of operations. Show all the steps in the solution.

$$\left(\frac{f^2+7f+12}{f+4} - 1 - \frac{2f+h}{f}\right) \div \frac{f^3-fh}{f}$$

$$\frac{(f+3)(f+4)}{(f+4)} - 1 - \frac{2f+h}{f}$$

$$\frac{f+3}{1} - 1 - \frac{2f+h}{f} \qquad c \cdot d = f$$

$$\frac{f(f+3)}{f} - \frac{f}{f} - \frac{(2f+h)}{f}$$

$$\frac{f^2+3f-1f-2f-h}{f}$$

$$\frac{(f^2-h)}{f} \cdot \frac{f}{f(f^2-1)}$$

$$= \boxed{\frac{1}{f}}$$

Question 8 (20 marks)

Reduce the following algebraic expressions to lowest terms. making sure to observe the order of operations. Show all the steps in the solution.

① $\dfrac{3b^2+7b-6}{b^2+5b+6} + \dfrac{3b(b+1)(b-2)}{② \; 2+b-b^2} \cdot \dfrac{b}{b^2-4}$

① $3b^2+7b-6$ $\quad p=-18$, $s=7$, $-2, +9$

$\dfrac{(b+3)(3b-2)}{(b+2)(b+3)} + \dfrac{3b(b+1)(b-2)}{(-b+2)(b+1)} \cdot \dfrac{b}{(b-2)(b+2)}$

$\dfrac{(3b^2-2b)+(9b-6)}{b(3b-2)+3(3b-2)}$

$\dfrac{(b+3)(3b-2)}{② \; -b^2+b+2}$

$\dfrac{(-b+2)(b+1)}{}$

$\dfrac{3b(b+1)(b-2)}{(-b+2)(b+1)} \cdot \dfrac{b}{(b-2)(b+2)}$

$\dfrac{3b-2}{(b+2)} + \dfrac{3b^2}{(-b+2)(b+2)}$ $\quad$ c.d. $=(b+2)(-b+2)$

$\dfrac{(3b-2)(-b+2)}{\text{c.d.}} + \dfrac{3b^2}{\text{c.d.}}$

$\dfrac{-3b^2+8b-4}{\text{c.d.}} + \dfrac{3b^2}{\text{c.d.}}$

$\dfrac{8b-4}{(b+2)(-b+2)} = \boxed{\dfrac{4(2b-1)}{(b+2)(-b+2)}}$

OPERATIONS ON ALGEBRAIC FRACTIONS: PRETEST D

MTH-4110-1

Name: Shannon

Date:

Duration: 2 hours 30 minutes

Question 1 (10 marks)

Reduce the following algebraic fraction to lowest terms. Show all the steps in the solution.

$$\frac{-2f^2+9f-4}{4f-8f^2}$$

$-2f^2+9f-4$ prod = 8, sum = 9, 8, 1

$(-2f^2+8f)+(1f-4)$

$-2f(f-4)+1(f-4)$

$(-2f+1)(f-4)$

$$\frac{(-2f+1)(f-4)}{4f(1-2f)}$$

$$= \boxed{\frac{f-4}{4f}}$$

Question 2 (10 marks)

Divide the following algebraic fractions and reduce the result to lowest terms. Show all the steps in the solution.

① $\dfrac{8x-6x^2}{6x^2-11xy+4y^2} \div \dfrac{3x^4-4x^3}{x^2y-2x^3}$

① $6x^2-11xy+4y^2$ prod = 24, sum = −11, −3, −8

$(6x^2-3xy)(-8xy+4y^2)$

$3x(2x-y)-4y(2x-y)$

$(3x-4y)(2x-y)$

$$\frac{2x(4-3x)}{(3x-4y)(2x-y)} \cdot \frac{x^2(y-2x)}{x^3(3x-4)}$$

$$\frac{2x(-1)(3x-4)}{(3x-4y)(2x-y)} \cdot \frac{-x^2(2x-y)}{x^3(3x-4)} = \frac{2x^3}{(3x-4y)x^3} = \boxed{\frac{2}{3x-4y}}$$

Question 3 (10 marks)

Perform the following operations and reduce the result to lowest terms. Show all the steps in the solution.

$$\text{①}\ \frac{b+5}{2b^2+13b+15} - \frac{2b-3}{b^2+8b+16} - \text{②}\frac{b+4}{2b^2+11b+12}$$

$$\frac{\cancel{b+5}}{\cancel{(b+5)}(2b+3)} - \frac{2b-3}{(b+4)(b+4)} - \frac{\cancel{(b+4)}}{\cancel{(b+4)}(2b+3)}$$

$$\frac{1}{2b+3} - \frac{2b-3}{(b+4)(b+4)} - \frac{1}{2b+3}$$

These 2 cancel each other out.

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

$$\boxed{\frac{3-2b}{(b+4)^2}}$$

① $2b^2+13b+15$

prod = 30 sum = 13

3, 10

$(2b^2+3b)+(10b+15)$

$b(2b+3)+5(2b+3)$

$(b+5)(2b+3)$

② $2b^2+11b+12$

prod = 24 sum = 11

3, 8

$(2b^2+3b)+(8b+12)$

$b(2b+3)+4(2b+3)$

$(b+4)(2b+3)$

Question 4 (10 marks)

Determine the product of the following algebraic fractions and reduce the result to lowest terms. Show all the steps in the solution.

$$\frac{-x^4+9}{3x-15} \cdot \frac{2x^3+10x^2+8x+40}{x^4+x^2-12} \cdot \frac{x^3-5x^2}{x^5+3x^3}$$

$9-x^4$

$(2x^3+10x^2)+(8x+40)$

$2x^2(x+5)+8(x+5)$

$(2x^2+8)(x+5)$

$2(x^2+4)(x+5)$

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

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

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

$5f - 25d + fd - 5d^2$

$5(f - 5d) + d(f - 5d)$

$(5+d)(f-5d)$

Question 5 (10 marks)

Perform the following operations and reduce the result to lowest terms. Show all the steps in the solution.

$$\frac{f^2 - 25d^2}{25 - 10d + d^2} \cdot \frac{25 - d^2}{5f - 25d + fd - 5d^2} \div \frac{10d + 2f}{25 - 5d}$$

$$\frac{(f-5d)(f+5d)}{(d-5)(d-5)} \cdot \frac{(5-d)(5+d)}{(5+d)(f-5d)} \cdot \frac{5(5-d)}{2(5d+f)}$$

$$\frac{(f-5d)(f+5d)}{(d-5)(d-5)} \cdot \frac{-(d-5)(5+d)}{(5+d)(f-5d)} \cdot \frac{-5(d-5)}{2(5d+f)}$$

$\frac{5}{2}$ or $2\frac{1}{2}$

Question 6 (15 marks)

Reduce the following algebraic expressions to lowest terms, making sure to observe the order of operations. Show all the steps in the solution.

$$\left(1 + \frac{x-2y}{x+2y}\right) \div \frac{x}{x^2+3xy+2y^2}$$

$$\frac{x+2y}{x+2y} + \frac{x-2y}{x+2y}$$

$$\frac{x+2y+x-2y}{x+2y}$$

$$\frac{2x}{(x+2y)} \cdot \frac{(x+2y)(x+y)}{x} = \boxed{2(x+y)}$$

Question 7 (15 marks)

Reduce the following algebraic expressions to lowest terms. making sure to observe the order of operations. Show all the steps in the solution.

$$\frac{4y^2 - x^2}{-2xy} \div \left(\frac{2x}{y^2} - \frac{5}{y} + \frac{2}{x}\right)$$

c.d. $= xy^2$

$$\frac{2x^2}{c.d.} - \frac{5xy}{c.d.} + \frac{2y^2}{c.d.}$$

$$\frac{2x^2 - 5xy + 2y^2}{c.d.}$$

$2x^2 - 5xy + 2y^2$

$p = 4 \quad s = -5$

$-4, -1$

$(2x^2 - 4xy - 1xy + 2y^2)$

$2x(x - 2y) - y(x - 2y)$

$(2x - y)(x - 2y)$

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

$$\frac{(2y - x)(2y + x)}{-2xy} \cdot \frac{xy^2}{(2x - y)(x - 2y)}$$

$$\frac{-(x - 2y)(2y + x)}{-2xy} \cdot \frac{xy^2}{(2x - y)(x - 2y)}$$

$$\boxed{\frac{y(2y + x)}{2(2x - y)}}$$