Algebra 2H
Handout 9BH

Extra (fun) problems
Sections 9.4 and 9.5

Do all work on your own paper and express answers in simplest form.

1. $\dfrac{x^{n+2}-x^{n}y^{2}}{y^{n+2}-y^{n}x^{2}}$

2. $\dfrac{x^{2c}+x^{c}-2}{x^{c}y^{b+2}} \div \dfrac{x^{2c}-1}{x^{c+4}y^{b+6}}$

3. $\dfrac{3x^{2}+14x+8}{4x^{2}+18x-10} \cdot \left(\dfrac{3x^{2}+20x+12}{12x^{2}+66x-36} \right)^{-1}$

4. $\dfrac{x^{5}-x^{3}+x^{2}-1-\left(x^{3}-1\right)(x+1)^{2}}{\left(x^{2}-1\right)^{2}}$

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

6. $\dfrac{2x+1}{4x^{2}}-\dfrac{x+3}{3x^{2}}$

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

8. $\dfrac{6}{x}-\dfrac{5}{x+4}$

9. $\dfrac{x}{2x+1}-\dfrac{2}{x+2}$

10. $4-x+\dfrac{5}{x+7}$

11. $\dfrac{3x+2}{3x-6}-\dfrac{x+2}{x^{2}-4}$

12. $\dfrac{2x}{x^{2}-8x+16}+\dfrac{x+3}{3x^{2}-10x-8}$

13. $\left(\dfrac{x}{b}-\dfrac{b}{x}\right) \div \dfrac{x-b}{x}$

14. $\dfrac{x+2}{x-1}-\dfrac{2}{x+6}-\dfrac{14}{x^{2}+5x-6}$

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

16. $\dfrac{x}{x^{2}-4}+\dfrac{2}{x^{2}-2x}-\dfrac{x+1}{x^{2}+2x}$

17. $\left(x-a+\dfrac{2a^{2}}{x+a}\right)\left(\dfrac{1}{x^{2}}-\dfrac{1}{a^{2}}\right) \div \left(x^{3}-\dfrac{ax^{3}+a^{4}}{x+a}\right)$

18. $\dfrac{\dfrac{1}{a}+\dfrac{1}{x}}{\dfrac{x}{a}-\dfrac{a}{x}}$

19. $\dfrac{\dfrac{1}{x}-\dfrac{1}{y}}{\dfrac{1}{x^{2}}-\dfrac{1}{y^{2}}}$

20. $\dfrac{\dfrac{1}{3x}-\dfrac{4}{x+2}}{\dfrac{x}{x+2}+\dfrac{1}{x}}$

21. $\dfrac{\dfrac{1}{x-1}+\dfrac{1}{x+1}}{\dfrac{1}{x-1}-\dfrac{1}{x+1}}$

22. $\dfrac{\dfrac{1}{x^{2}-1}+1}{\dfrac{1}{x-1}+1}$

23. $\dfrac{\dfrac{6}{x-1}-3}{\dfrac{3}{x}}$

24. $\dfrac{\dfrac{1}{x}+\dfrac{1}{2x+1}}{\dfrac{4}{2x+1}}$

25. $\dfrac{\dfrac{4}{x^{2}-25}+\dfrac{2}{x-5}}{\dfrac{1}{x+5}+\dfrac{1}{x-5}}$

26. $\dfrac{x^{-3}-x}{x^{-2}-1}$

27. $\dfrac{\dfrac{4}{2x^{2}-x-1}-\dfrac{4}{x-1}}{\dfrac{8x+1}{2x^{2}+x}}$

28. $\dfrac{(x+a)\left(x^{-1}-a^{-1}\right)}{(x-a)\left(x^{-1}+a^{-1}\right)}$

29. $\dfrac{1+\dfrac{2+\dfrac{1}{x}}{x}}{1+\dfrac{1}{x}}$

30. $\dfrac{\dfrac{1}{x-1}}{x+\dfrac{1}{x-\dfrac{1}{x}}}$

31. Find the values of A, B, and C so that $\dfrac{x^{2}+2}{x(x+1)(x+2)}=\dfrac{A}{x}+\dfrac{B}{x+1}+\dfrac{C}{x+2}$

Answers:

1. $\frac{-x^n}{y^n}$
2. $\frac{x^4 y^4\left(x^c+2\right)}{x^c+1}$
3. $\frac{3(x+4)}{x+5}$
4. $\frac{-2x}{x-1}$
5. $\frac{x^2+9x-12}{3x^2}$
6. $\frac{2x-9}{12x^2}$
7. $x+3$
8. $\frac{x+24}{x(x+4)}$
9. $\frac{x^2-2x-2}{(2x+1)(x+2)}$
10. $\frac{-x^2-3x+33}{x+7}$
11. $\frac{3x-1}{3(x-2)}$
12. $\frac{7x^2+3x-12}{(3x+2)(x-4)^2}$
13. $\frac{x+b}{b}$
14. $\frac{x}{x-1}$
15. $\frac{-2x^2+5x+5}{(x+1)\left(x^2-x+1\right)}$
16. $\frac{3}{x(x-2)}$
17. $\frac{-1}{a^2 x^2}$
18. $\frac{1}{x-a}$
19. $\frac{xy}{y+x}$
20. $\frac{-11x+2}{3\left(x^2+x+2\right)}$
21. x
22. $\frac{x}{x+1}$
23. $\frac{-x(x-3)}{x-1}$
24. $\frac{3x+1}{4x}$
25. $\frac{x+7}{x}$
26. $\frac{1+x^2}{x}$
27. $\frac{-8x^2}{(8x+1)(x-1)}$
28. -1
29. $\frac{x+1}{x}$
30. $\frac{x+1}{x^3}$
31. $A = 1, B = -3, C = 3$