

Algebra 2H: Rational Expressions and Equations
Group A

1. There are 20 questions in this test:
 - a. The first 10 questions are worth 3 points each. These relate directly to the present chapter, and are expected to take more time per question.
 - b. The second 10 questions are worth 1 point each. Most of these are related to subjects we covered during the semester.
2. Extra-credit: There is one extra-credit question, worth 1pt. It is a harder question.
3. You have 50 minutes (one Block) to complete the test (more if you have accommodations).

You are allowed to use calculator.

Good luck!!

-Zachi

=== Start of test

1) Simplify. Remember to note excluded values.

$$\frac{x^2+8x+12}{x^2+5x+6} \cdot \frac{(x+3)^2}{x^2+3x-18}$$

2) Simplify. Remember to note excluded values.

$$\frac{9-x^2}{x^2+5x+6} \div \frac{x^2-3x}{10+5x}$$

3) Simplify. Remember to note excluded values.

$$\frac{x+3}{x-3} - \frac{x+1}{x-5}$$

4) Simplify. NO need to note excluded values.

$$\frac{8x^3-1}{4x^2-2x+1} - \frac{4x^2}{2x-1} + \frac{x+3}{2x^2+5x-3}$$

5) Solve.

$$\frac{x+2}{x^2-4} = \frac{-4x}{8(x-2)}$$

6) Solve.

$$\frac{1}{2y} - \frac{2}{5y} = \frac{1}{10y} - 3$$

7) Divide using long division.

$$(6x^4 + 5x^3 + 3x^2 - 3x - 2) \div (3x - 2)$$

8) Divide using long division.

$$(10x^4 + 4x^3 + 5x^2 - 3x + 2) \div (5x + 2)$$

9) Divide using synthetic division.

$$(3a^4 + 8a^3 + 3a^2 + 3a + 12) \div (a + 2)$$

10) Divide using synthetic division.

$$(3x^4 - 28x^2 + 8x - 15) \div (x - 3)$$

==== Review questions!!

11) Determine if the below is a geometric series, arithmetic series, or neither, and write the next term.

a) $8, -2, \frac{1}{2}, -\frac{1}{8}, \dots$

Arithmetic / Geometric / Neither , Next term = _____

b) $-1, 2, 5, 8, \dots$

Arithmetic / Geometric / Neither , Next term = _____

12) Assume the first term given is element number 0 in the sequences below.

a) Find the 20'th term in:
 $2, 0, -2, -4, \dots$

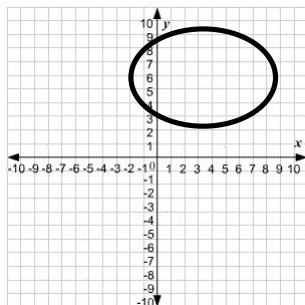
b) Find the 6'th term in:
 $81, 27, 9, 3, \dots$ (you can leave the result as a 'power of', and not calculate it explicitly.)

13) Find the following sum

$$\sum_{n=5}^{54} (2n - 8) = ?$$

14) For each of the following, find the most specific name from "Relation", "Function", or "1-1 function"

a)

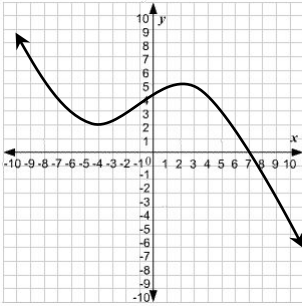


I) Relation

II) Function

III) 1-to-1 function

b)



I) Relation

II) Function

III) 1-to-1 function

15) Let $f(x) = \frac{x}{2} + 5$, and $g(x) = 2x + 6$.

a) Write $f(g(x))$?

b) Write $g(f(x))$?

16) Given the line $2y = \frac{x}{2} + 4$.

a) What is the slope of the line?

b) Find the perpendicular line, going through the point (0,0).

17) Solve the system of equations:

$$\begin{cases} 5x - 9y = 7 \\ 7y - 3x = -5 \end{cases}$$

18) Solve

$$x^2 + 2x = 8$$

19) Simplify

$$\left(\frac{-3x^3y^{-3}}{y^{-2.9}} \right)^3$$

20) Simplify. Remember to note excluded values.

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

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Extra-credit

21) Find $r^3 + \frac{1}{r^3}$ if $r + \frac{1}{r} = \sqrt{2}$.

=== End of test