Math 5e, Spring 2026 Homework 18

due February 2

Instructions: Some of the problems we solved in class, and some are new. Please try to solve all problems, do your best, and show your work. Write on separate sheets of paper, not between the lines of this handout!

Solving rational equations

We reviewed solving equations and rational equations by multiplying both sides of the equation by the denominator.

$$\frac{(x+1)}{3} = 7$$
$$\frac{(x+1)}{3} \times 3 = 7 \times 3$$
$$(x+1) = 21$$
$$x = 20$$

Formulas for fast multiplication

We also revised the ***identities***: $(a+b)^2 = a^2 + 2ab + b^2$

$(a-b)^2 = a^2 - 2ab + b^2$

$(a+b)(a-b) = a^2 - b^2$

And ***factorizing***:

$$a(b+c) = ab + ac$$

… and used them to solve equations.

Equations with exponents:

We solve equations where the unknown is the exponent in the power $a^x = a^c$ and found out that if we have equal bases, we need only compare the exponents (powers) to find the unknown: $x = c$.

So, we need to rewrite the equations so that both sides have the same base.

Homework problems

1. Solve the following equations for x:

   a) $\frac{5y-12}{3-2y} = 2$ Hint: multiply both sides by $(3-2y)$. *Remember that* $(3-2y) \neq 0$!

   b) $\frac{8-2x}{3x-1} = 3$

   c) $\frac{3x+a}{2a-5x} = -1$

2. Solve the equation: $(x-3)^2 - (x-5)(x+5) = 4$

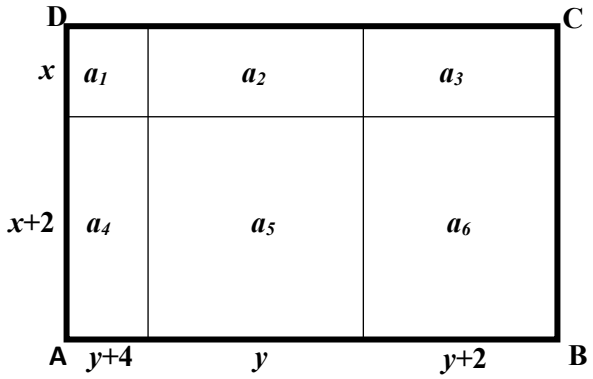
3. Simplify the fractions using the above identities and factoring rules:

   (a) $\frac{y^2-16}{3y+12} =$

   (b) $\frac{a^2+10a+25}{a^2-25} =$

   (c) $\frac{15z^2-9z}{25z^2-9} =$

4. ABCD below is a rectangle split into 6 smaller rectangles by 3 parallel lines. Find:
   (a) The area of each rectangle
   (b) The sum of the areas of the 6 rectangles
   (c) The total area ABCD
   (d) Compare (b) and (c)



5. Find *n* for
   (a) $3^{-n} = 3$
   (b) $3^{-n} = {}^{1}/_{3}$
   (c) $9^{-n} = 81$

6. Practice the attached Math Kangaroo paper (Do not submit!)