Algebra and Geometry 1. Homework 11.

1. Evaluate:

$$\left(\frac{3.\overline{4}+6\frac{5}{9}}{5\frac{7}{8}-2\frac{1}{4}-0.5}:\left(12\frac{8}{11}-8\frac{50}{99}\right)\right)\cdot\left(2\frac{3}{8}-1\frac{5}{8}\right);$$

2. Find the product of two monomials, right the resulting monomial in a standard form;
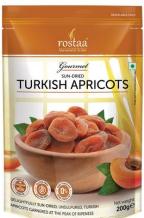
   Example:

   $$3ab\cdot 2a=6a^2b;\qquad 1\frac{1}{5}a^2b^3\cdot 1\frac{1}{9}ab^2=\frac{6}{5}a^2b^3\cdot\frac{10}{9}ab^2=\frac{2\cdot 2}{3}a^3b^5=\frac{4}{3}b^5a^3$$

   a. $9ce^2\cdot 6ce$;

   b. $7c^2ek\cdot 5c^3e^4k$;

   c. $\frac{1}{2}ck^2\cdot\frac{2}{3}ck$

   d. $4ap^2\cdot 5a^2p$;

   e. $(-5)c^3k\cdot 5c^2k^2$;

   f. $\left(-2\frac{1}{4}\right)p^2x^2\cdot 1\frac{1}{3}px^3$

3. Simplify the following expressions (combine like terms):

   a. $7a+(2a+3b)$;
   b. $9x+(2y-5x)$;
   c. $(5x+7a)+4x$;
   d. $(5x-7a)+5a$;
   e. $(3x-6y)-4y$;
   f. $(2a+5b)-7b$;
   g. $3m-(5n+2m)$;
   h. $6p-(5p-3a)$;

4. Multiply polynomials.

   a. $(a+2)(a+2)$;
   b. $(3+y)(y+4)$;
   c. $(3+x)(3-x)$;
   d. $(x-y)(x+y)$;
   e. $(2a+c)(a+ac)$;
   f. $(a+1)(a+3)$;
   g. $(c+d)(c-2d)$;
   h. $(y-2)(3-y)$;
   i. $(x-m)(x-m)$;
   j. $(2d+3l)(2d+3l)$;

5. The ratio of boys to girls in 6th grade is $\frac{9}{11}$. The ratio of girls to boys in 7th grade is $\frac{31}{29}$. There are 100 and 120 students in 6th and 7th grades correspondingly, what is a ratio of boys to girls at the dance for 6 and 7 grade students, if all students came to the dance.

6. Dry apricots contain 22% of water. How much fresh apricot were used to produce a 200 g package of dry apricot if fresh apricots contain 85% of water?

7. Write the monomial B by which the given monomial A should be multiply in order to get the monomial C. $A \cdot B = C$

Example:
$A = 2a^2b^3; C = 6a^5b^4;$
$A \cdot B = C;\quad C:A = B = (6a^5b^4):(2a^2b^3) = 3a^3b;$
$Check: (2a^2b^3) \cdot (3a^3b) = 6a^5b^4$

   a. $A = 3k^2x;\quad C = k^3x^2$
   b. $A = 4c^3d^2;\quad C = c^3d^4$
   c. $A = 5x^5y^7;\quad C = 10x^7y^8$

8. Solve the following equations:
   a. $2^x \cdot 2^{2x} = 64;$ b. $3^n \cdot 9 = 81;$ c. $5^p = 1$

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pipes fill together a pool in 1 h and 20 minutes. If the fist pipe is open for 10 minutes, and the second pipe is open for 12 minutes, the pool will be filled on $\frac{2}{15}$. How fast each pipe will fill the pool?

10. Solve the following equations (hint: use the property of proportions):

   a. $\dfrac{x}{7.2} = \dfrac{1\frac{1}{9}}{0.25};$ b. $\dfrac{2\frac{1}{3}}{0.6x} = \dfrac{2.5}{1\frac{2}{7}};$ c. $\dfrac{\frac{7}{12}}{0.14} = \dfrac{50x}{4.8};$ d. $\dfrac{1\frac{3}{17}}{13.75} = \dfrac{2\frac{2}{11}}{3x}$

11. There are 255 seats in a theater. 170 tickets were sold for a movie. Which percent of the total number of seats will be empty if only 90% of the people, who bought tickets will show up for the movie?

12. Parliament elections were held on Fruit Island. Everyone who voted for the Tangerine party love tangerines. Of those who voted for other parties, 90% do not like tangerines. How many percent of the votes did the Tangerine party got, if it is known that exactly 46% of the islanders love tangerines?

13. A few consecutive natural numbers are written on the board. Exactly 52% of them are even. How many even numbers are written on the board?

14. Fill the table:

x	-5	-4	-3	-2	-1	0	1	2	3	4	5
2^x											
$\left(\frac{1}{2}\right)^x$											

15. Represent the followimg expressions as an exponent with base 2:
    Example:
    $$\left(\frac{16^n}{16^{2n}}\right)^2 = \left(\frac{1}{16^n}\right)^2 = \frac{1}{16^{2n}} = \frac{1}{(2^4)^{2n}} = \frac{1}{2^{8n}} = 2^{-8n}$$

    a. $4^x \cdot 4^y$;   b. $8^x : 8^y$;   c. $\left(\left(\frac{1}{4}\right)^x\right)^y$;   d. $4^{-n} \cdot 4^{2n}$;   e. $((0.25)^{-2})^n$

16. Simplify the expressions:
    a. $m^3 \cdot m^2 + m \cdot m^4$;

    c. $2x \cdot xy - 3x^2 \cdot \frac{1}{2}y$;

    b. $(2mn^2)^3 + 3m^2n^6m$;

    d. b. $(3x^2y^4)^3 + 7x^4y^3 \cdot \frac{1}{14}x^2y^9$

17. Draw three arbitrary triangles. In the first one draw medians, in the second one, draw bisectors, in the third triangle draw altitudes.

18. Copy the figure (use compass and ruler):