Math 5c: Classwork 25
Homework #25 is due May 12-th.

REVIEW

May 5, 2019

- ***Binary numbers. Powers of 2:***

n	0	1	2	3	4	5	6	7	8	9
2^n	1	2	4	8	16	32	64	128	256	516

Numbers in decimal notation can be presented like this

$351 = 1 \cdot 2^8 + 0 \cdot 2^7 + 1 \cdot 2^6 + 0 \cdot 2^5 + 1 \cdot 2^4 + 1 \cdot 2^3 + 1 \cdot 2^2 + 1 \cdot 2^1 + 1 \cdot 2^0 = 101011111b$

Recall: Square root of a (denoted $\sqrt{a}$ is a number whose square is equal to a. For example: square root of 25 is 5, because $5^2 = 25$.
We discussed that

$$\sqrt{ab} = \sqrt{a} \cdot \sqrt{b}$$

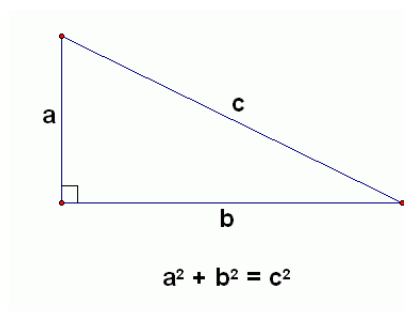$$\sqrt{a + b} \neq \sqrt{a} + \sqrt{b}$$

$$\sqrt{a^2} = a$$

$$\sqrt{8} = \sqrt{4 \cdot 2} = \sqrt{4} \cdot \sqrt{2} = \sqrt{2^2} \cdot \sqrt{8} = 2 \cdot \sqrt{2}$$

$$\sqrt{a^8} = \sqrt{(a^4)^2} = a^4$$

Square roots naturally appear in geometry:

Pythagorean Theorem: In a right triangle with legs a, b and hypotenuse c, one has

$$a^2 + b^2 = c^2 \quad \text{or} \quad c = \sqrt{a^2 + b^2}$$

$a^2 + b^2 = c^2$

Review Exponents Properties/Rules:

1. $a^0 = 1$

2. $a^m \cdot a^n = a^{m+n}$

3. $a^m \div a^n = \dfrac{a^m}{a^n} = a^{m-n}$

4. $(ab)^n = a^n \cdot b^n$

5. $\left(\dfrac{a}{b}\right)^n = \dfrac{a^n}{b^n}$

6. $a^n = \dfrac{1}{a^{-n}}$

7. $(a^m)^n = a^{m \cdot n}$

Proportions

To make 13 cookies you need 2 cups of flour. How much flour you need to make 20 cookies?

13 cookies – 2 cups
20 cookies – x cups

$$\frac{13}{20} = \frac{2}{x}$$

$$13x = 2 \cdot 20$$

Classwork 25: REVIEW

1. Binary numbers:
    a. Write as binaries: 35, 11, 40
    b. Write as Decimals: 101010b, 11100011b

2. Solve equations:

   a) $\dfrac{3}{8}x = \dfrac{1}{3}$ 　　　　　　 b) $|2x - 5| = 1$ 　　　　　 c) $\dfrac{x-2}{x-1} = 3$

3. Simplify:

   $\dfrac{6^5 \cdot 2^4}{3^5 \cdot 2^2} =$ 　　　　 $\dfrac{42^2}{6^2} =$ 　　　　 $\dfrac{9^2 \cdot 2^4}{6^2} =$ 　　　 $\sqrt{\dfrac{4^2}{5^{10}}} =$ 　　　 $\sqrt{12} =$

4. A piece of cable 8.5 cm long weighs 52 grams. What will a 10-cm length of the same cable weigh?

5. Find a simple fraction form for the following repeating decimals:

   a) $0.\overline{73}$ 　　　　　　　　 b) $0.\overline{81}$

6. The standard card deck has 4 suits (hearts, diamonds, spades, and clubs); each suit has 13 different card values: 2 through 10, jack, queen, king, and ace. If you randomly draw one card, what is the probability of getting

(a) The queen of spades

(b) A face card (i.e., jack, queen, or king)

(c) Anything but the queen of hearts

7. Open parenthesis, simplify:

(a) $3(a-5) - 2(2a-9) =$

(b) $12x - 3x(x+4) =$

(c) $5x - 5(7-a+x) =$

(d) $-3z - (z-4) + 2(2z-5) =$

(e) $a(a+b) + b(a+1) =$

(f) $2a(a-2) - a(a-1) =$

Open parenthesis, simplify.

$(2x-3)^2 =$ $(4x-5)(4x+5) =$

Homework 25: REVIEW

1. Simplify:

(a) $\left(\dfrac{5a^2b^5}{4a^3b^3}\right)^3 =$

(b) $\left(2z^2 \cdot 3z^3 \cdot z\right)^2 =$

(c) $\dfrac{(-ab)^8}{(ab)^2} =$

(d) $\left(\dfrac{3ab^3}{15b}\right)^2 \cdot \dfrac{75c}{a^2b^6} =$

(d) $\left(\dfrac{3a^5b^2}{21ab}\right)^2 \cdot \dfrac{7^4}{a^{16}b^2} =$

2. Solve equations:

a) $7x = 2$

b) $12x = 6$

c) $7x = 14$

d) $21x = 7$

e) $\dfrac{3}{8}x = \dfrac{1}{3}$

f) $\dfrac{11}{113}x = \dfrac{121}{3}$

g) $\dfrac{3}{4}(x+8) = 10$

h) $\dfrac{1}{2}(x+1) = x - 3$

i) $\dfrac{1}{2}x + \dfrac{1}{3}x = x - \dfrac{1}{12}$

j) $\dfrac{3x+2a}{2a-5x} = -1$

3. Open parenthesis, simplify:

$3a(b + ac) - c(3a^2 - 2) + 2ab =$

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

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

4. Find legs....

Find the length of legs, if hypotenuse is 10?