

MATH 5. Handout 25

REVIEW

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

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

Square root

Square root of a (denoted \sqrt{a}) is a number whose square is equal to a .

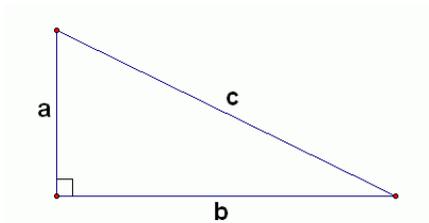
For example: square root of 25 is 5, because $5^2 = 25$.

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

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

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

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



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

Exponents Properties

- $a^0 = 1$
- $a^m \cdot a^n = a^{m+n}$
- $a^m \div a^n = \frac{a^m}{a^n} = a^{m-n}$
- $(ab)^n = a^n \cdot b^n$
- $\left(\frac{a}{b}\right)^n = \frac{a^n}{b^n}$
- $a^n = \frac{1}{a^{-n}}$
- $(a^m)^n = a^{m \cdot n}$

Homework

1. Binary numbers:

- a) Write as binaries: 35, 11, 40
- b) Write as decimals: 101010, 11100011

2. Solve equations:

- a) $\frac{3}{4}(x + 8) = 10$
- b) $\frac{1}{2}(x + 1) = x - 3$
- c) $\frac{1}{2}x + \frac{1}{3}x = x - \frac{1}{12}$

3. A piece of cable 8-cm long weighs 48 grams. What will a 10-cm length of the same cable weigh?

4. 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 king or queen of spades
- (b) A non-face card (number 2 through 10)
- (c) Anything but the queen of clubs

5. Open parenthesis and simplify:

- a) $3(a - 5) - 2(2a - 9) =$
- b) $12x - 3(4x + 2) =$
- c) $a(a + b) + b(a + 1) =$
- d) $3a(b + ac) - 3a^2c - 2ab =$

6. Simplify:

- a) $\left(\frac{2a^2b^5}{3a^3b^3}\right)^3 =$
- b) $(5z^2 \cdot 2z^3 \cdot z)^2 =$

$$\text{c) } \frac{(-yb)^6}{(yb)^2} =$$

7. Solve equations:

$$\text{a) } \frac{3}{8}x = \frac{18}{3}$$

$$\text{b) } |2x - 5| = 1$$

$$\text{c) } \frac{x-2}{x-1} - 4 = -2$$