Real Numbers, Distributive Property, Simplifying Radicals and Pythagorean Theorem Test

Study Guide

2.1: Use Integers and Rational Numbers

- Be able to classify numbers as whole, integer, rational and irrational using all names that apply

	Rational	Irrational	Integer	Whole
-5	Yes	No	Yes	No
0.6	Yes	No	No	No
175	Yes	No	Yes	Yes
$-\frac{26}{4}$	Yes	No	No	No
$0.6\overline{1}$	Yes	No	No	No
$\sqrt{18}$	No	Yes	No	No

*don't forget that decimals that END or REPEAT are RATIONAL. It is possible for these types of decimals to be written as fractions.

*Square roots of non-perfect squares, like square root of 18 are Irrational. They are never ending, never repeating decimals, which cannot be written as fractions.

- **Be able to order numbers from least to greatest**

Ex: $-\frac{1}{5}, 6, -0.25, \sqrt{3}$

$-0.25, -\frac{1}{5}, \sqrt{3}, 6$

- **Be able to find absolute value and opposites of numbers**

Ex: Evaluate: $-x + |x|$ if $x = -0.75$

$-(-.75) + 0.75 = 1.5$

2.5: Apply the Distributive Property

- **Be able to use the distributive property and identify and combine like terms**

Ex: $(p-3)(-8)$

$8p + 24$

Ex: $3(m+5)-10$

$3m + 5$

Ex: $6r-2(r+4)$

$4r - 8$

*don't forget to rewrite subtraction as adding the opposite prior to beginning each problem. This will help avoid sign errors.

- **Be able to simplify division problems using the distributive property**

Ex: $\frac{6x-14}{2}$

$3x - 7$

Ex: $\frac{-24a-10}{-8}$

$3a + \frac{5}{4}$

Ex: $\frac{9z-6}{-3}$

$-3z + 2$

2.7: Find Square Roots and Compare Real Numbers

- **Be able to evaluate square roots, estimate square roots and order square roots**

Ex: $x^2 = 49$

$x = \pm 7$

Ex: Estimate $-\sqrt{72}$ between 2 integers

-8 and -9

*this is asking for ALL possible values x can be

Which are positive and negative.

11.2: Simplify Radical Expressions

- **Be able to write radical expressions in simplest form, including rationalizing the denominator**

Ex: $\sqrt{20} \cdot \sqrt{15}$

$\sqrt{300} = 10\sqrt{3}$

Ex: $\sqrt{\frac{125}{4x^3}}$

$\frac{5\sqrt{6x}}{2x^2}$

Ex: $\sqrt{27xy} \cdot \sqrt{5y^3}$

$3y^2\sqrt{15x}$

- **Be able to perform operations with radicals**

Ex: $2\sqrt{7} + 4\sqrt{7}$

$6\sqrt{7}$

Ex: $5\sqrt{3} - 2\sqrt{10} + 4\sqrt{10} - 3\sqrt{3}$

$2\sqrt{3} + 2\sqrt{10}$

Ex: $8\sqrt{3}(1 - \sqrt{3})$

$8\sqrt{3} - 24$

Ex: $\sqrt{4}(3\sqrt{15} + \sqrt{5})$

$3\sqrt{60} + \sqrt{20}$

$12\sqrt{15} + 2\sqrt{5}$

Ex: $\sqrt{5} + 5\sqrt{3} - 2\sqrt{27}$

$\sqrt{5} + 5\sqrt{3} - 6\sqrt{3}$

$\sqrt{5} - 1\sqrt{3}$

11.4: Apply the Pythagorean Theorem

- Be able to use the Pythagorean Theorem to find missing sides of right triangles

Ex: $a = 30$, $b = 40$

$30^2 + 40^2 = c^2$
$900 + 1600 = c^2$
$2500 = c^2$
$50 = c$

Ex: A leg: 15; Hypotenuse: 25

$15^2 + b^2 = 25^2$
$225 + b^2 = 625$
$b^2 = 400$
$b = 20$

- **Be able to use the Pythagorean Theorem to decide if three sides could form a right triangle**

Ex: 9, 15, 20

$9^2 + 15^2 = 20^2$
$81 + 225 = 400$
$306 = 400$
No

Ex: 12, 72, 71

$12^2 + 71^2 = 72^2$
$144 + 5041 = 5184$
$5185 = 5184$
No

- **Use Pythagorean Theorem to solve real-world problems**

Ex: The playing bed of a pool table is in the shape of a rectangle, which measures 154 inches by 20 inches. What is the length of the diagonal of the table? Round your answer to the nearest inch.

Diagonal: 155.3 inches

Solve a real-world distributive property problem.

You are making and selling friendship bracelets and necklaces. You want to sell 50 items in all, b of which are friendship bracelets. You are selling bracelets for $2 and necklaces for $3.

A) Write an expression to represent the total amount of money you will make. (You can only use one variable and you are still selling both items!)

$2b + 3(50 - b)$

$2b + 150 - 3b$

$-1b + 150$

B) How much money will you make if you sell 30 bracelets?

$-1(30) + 150$

$-30 + 150$

$120

*You could also do $30 \cdot 2 + 20 \cdot 3 = 60 + 60 = \$120$, but the fact that this comes out the same as plugging 30 into the expression means your expression is correct.