

WEDNESDAY QUIZ
THURSDAY/FRIDAY NO CLASS

• DOMAIN OF AN ALGEBRAIC EQUATION

- denominator of a rational expression cannot be zero.
- radicand of an even-index radical expression cannot be negative.

e.g. (1) $\frac{3x}{2x-8}$ domain is the value of x for which $2x-8 \neq 0$.

set $2x-8 = 0$.

$$2x = 8$$

$$\boxed{x = 4}$$

In this case, domain is all real numbers except 4.

(2) $\frac{3x^2-7}{3x+21}$ domain is the value of x for which $3x+21 \neq 0$.

set $3x+21 = 0$.

$$3x = -21$$

$$\boxed{x = -7}$$

Therefore, the domain is all real number ~~at~~ except -7.

(3) $\sqrt{3x-15}$ domain is the value of x for which $3x-15 \geq 0$.

set $3x-15 \geq 0$.

$$3x \geq 15$$

$$\boxed{x \geq 5}$$

Therefore the domain is anything ~~is~~ greater than or equal to 5.

If you are asked to find the domain of a fraction, you'll answer: "All real numbers except!"

If you're asked to find the domain of a ^{even-index} radical expression, answer: "All real numbers greater than or equal to (\geq)"

WEBASSIGN PRACTICES.

P.5-1. $9x^2 - 8x + 5$.

(1). there is no fraction

(2) there is no radical

So the domain is all real numbers.

P.5-2. $9x^2 - 4, x > 0$.

(1). no fraction

(2) no radical.

BUT $x > 0 \Rightarrow$ domain is all positive real numbers.

P.5-3 $\frac{x+2}{6x+4}$.

(1). $(6x+4)$ cannot be zero.

(2) no radical.

Set $6x+4=0$.

$$6x = -4$$

$$x = -\frac{4}{6} = -\frac{2}{3}$$

Therefore the domain is all real number except $-\frac{2}{3}$.

P.5-4. $\sqrt{x+4}$

(1) no fraction

(2) $x+4$ cannot be negative.

Set $x+4 \geq 0$

$$x \geq -4$$

Therefore the domain is $x \geq -4$.

P.5-5 $\sqrt{3x+2}$.

Set $3x+2 \geq 0$.

$$3x \geq -2 \Rightarrow x \geq -\frac{2}{3}$$

Limitations on the Domain of an Algebraic Expression

(Domain means, "acceptable values for x".)

FRACTIONS

1. No value is allowed in the domain that causes the denominator to be zero.

Consider $\frac{3x}{2x-8}$

Strategy #1: Set the denominator equal to zero and solve. When you solve the equation, you have just discovered what x CANNOT be. Your domain is everything except that (those) value(s).

RADICALS

2. No value is allowed in the domain that results in a negative number under a radical with an even index (ex. A square root; a fourth root; etc.)

Consider $\sqrt{3x-15}$

Strategy #2: Take the radicand (what's under the radical) and set it "greater than or equal to" zero. Solve the inequality. This IS your domain. Remember that there is only a potential problem with the domain when the index is even.

Questions to ask when you're looking for THE DOMAIN

- 1) Will any value of x result in a zero denominator? If "yes", follow Strategy #1 above.
- 2) Will any value of x result in a negative number under a radical with an even index? If "yes", follow Strategy #2 above.

If you answer "no" to both questions, your Domain is All Real Numbers.

