

## Rational expressions

### SAT subject test

1.  $\frac{[(n-1)!]^2}{[n!]^2}$

- a.  $\frac{1}{n}$
- b.  $\frac{1}{n^2}$
- c.  $\frac{n-1}{n}$
- d.  $\left(\frac{n-1}{n}\right)^2$
- e.  $(n-1)^2$

2. Under which of the following condition is  $\frac{a-b}{ab}$  positive?

- a.  $0 < a < b$
- b.  $a < b < 0$
- c.  $b < a < 0$
- d.  $b < 0 < a$
- e. None of the above

3. What is the domain of the function  $f$  defined by  $f(x) = \frac{x^2}{x^2+1}$ ?

- a.  $-1 < x \leq 1$
- b.  $0 \leq x < 1$
- c.  $x \geq 0$
- d. All real numbers except -1
- e. All real numbers

## Math Competitions

4. If  $\frac{1}{x} - \frac{1}{y} = \frac{1}{z}$ , then  $z$  equals:

- a.  $y - x$
- b.  $x - y$
- c.  $\frac{y-x}{xy}$

d.  $\frac{xy}{y-x}$

e.  $\frac{xy}{x-y}$

5. Of the following expressions the one equal to  $\frac{a^{-1}b^{-1}}{a^{-3}-b^{-3}}$  is:

- a.  $\frac{a^2b^2}{b^2-a^2}$
- b.  $\frac{a^2b^2}{b^3-a^3}$
- c.  $\frac{ab}{b^3-a^3}$
- d.  $\frac{a^3-b^3}{ab}$
- e.  $\frac{a^2b^2}{a-b}$

6. Simplify

$$3 + \frac{1}{3 + \frac{1}{3 + \frac{1}{3 + \dots}}}$$

7. Simplify

$$1 + \frac{3}{2 + \frac{3}{1 + \frac{3}{2 + \frac{3}{1 + \dots}}}}$$