Rational functions
Pre Calc RH

From SAT subject tests,

4. If $\frac{x+2y}{y}=5$, what is the value of $\frac{y}{x}$?

(A) –3 (B) $-\frac{1}{3}$ (C) $\frac{1}{3}$ (D) 3 (E) 4

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

(A) $-1 < x \le 1$
(B) $0 \le x < 1$
(C) $x \ge 0$
(D) All real numbers except -1
(E) All real numbers

6. For all $y \neq 5$, $\frac{y^3-6y^2+3y+10}{y^2-10y+25}=$

(A) $\frac{y^2-y+2}{y+5}$

(B) $\frac{y^2-y-2}{y-5}$

(C) $\frac{y^2+y-2}{y+5}$

(D) $\frac{y^2+y-2}{y-5}$

(E) $\frac{y^2-y+2}{y-5}$

13. The graph of the rational function f, where $f(x)=\frac{5}{x^2-8x+16}$, has a vertical asymptote at $x =$

(A) 0 only
(B) 4 only
(C) 5 only
(D) 0 and 4 only
(E) 0, 4, and 5

19. If $f(x)=\frac{x+2}{x-2}$, what value does $f(x)$ approach as x approaches 3.5 ?

(A) –1.00
(B) –0.43
(C) 0.27
(D) 2.07
(E) 3.67

27. Which of the following lists all and only the vertical asymptotes of the graph $y=\frac{x}{x^2-4}$?

(A) $x = 2$ only
(B) $y = 2$ only
(C) $x = 2$ and $x = -2$
(D) $y = 2$ and $y = -2$
(E) $x = 2$, $x = -2$, and $x = 0$

28. Which of the following lines are asymptotes of the graph of $y=\frac{1+x}{x}$?

I. $x = 0$
II. $y = 0$
III. $y = 1$

(A) I only
(B) II only
(C) I and II only
(D) I and III only
(E) I, II, and III

30. For all x and y such that $xy \neq 0$, let $f(x,y)=\frac{xy}{x^2+y^2}$. Then $f(x,-x) =$

(A) $-x^2$

(B) $-\frac{1}{x^2}$

(C) $-\frac{1}{2}$

(D) 0

(E) $\frac{1}{2}$

31. If $f(x, y) = \dfrac{x^2 + y^2}{x^2 - y^2}$, then $f(x, -y) =$

(A) -1

(B) 1

(C) $\dfrac{y^2 - x^2}{x^2 + y^2}$

(D) $\dfrac{x^2 + y^2}{y^2 - x^2}$

(E) $\dfrac{x^2 + y^2}{x^2 - y^2}$

32. Which of the following are the equations of lines that are asymptotes of the graph of $y = \dfrac{x^2 - 64}{(3x+4)(x-5)}$?

I. $x = -8$
II. $x = 5$
III. $y = \dfrac{1}{3}$

(A) I only
(B) II only
(C) I and II only
(D) II and III only
(E) I, II, and III

33. An insurance company has found that the proportion of claims that are resolved within t days is given by $p(t) = \left(\dfrac{t}{t+10}\right)^2$. How many days does it take to resolve 75 percent of the claims?

(A) 1 (B) 13 (C) 30 (D) 65 (E) 75

50. Which of the following describes the values of x for which $\dfrac{1-5x}{x^2+1}$ is negative?

(A) $x > 0$

(B) $x > \dfrac{1}{5}$

(C) $x < \dfrac{1}{5}$

(D) $0 < x < \dfrac{1}{5}$

(E) None of the above

50. A function f has the property that $f\left(\dfrac{x}{2}\right) = \sqrt{\dfrac{1+f(x)}{2}}$ for $0 \le x \le 1$. If $f(a) = 0$, where $0 \le a \le 1$, what is the value of $f\left(\dfrac{a}{4}\right)$?

(A) 0
(B) 0.35
(C) 0.71
(D) 0.92
(E) 0.98