

1. $\left(\frac{1+\frac{1}{2}}{1-\frac{1}{2}}\right)^2 =$

- a. 9 b.
- $\frac{1}{9}$
- c. 3 d.
- $\frac{1}{3}$
- e. not given

2. $\left(3 + \frac{1}{x}\right) + \left(x + \frac{1}{3}\right) =$

- a.
- $\frac{x}{3}$
- b.
- $\frac{3}{x}$
- c.
- $3x$
- d.
- $\frac{1}{3x}$
- e. not given

3. If $x = \frac{1}{4}$ and $y = -1\frac{1}{2}$, then find the value of $\frac{x^2+4xy+4y^2}{x+2y}$

- a. -4.25 b. -3.875 c. -3.5 d. -2.875 e. not given

4. Find the numerical value of $(-3)^{-2} + (-2)^{-1} + (-1)^0 + 0^1 + 1^2 + 2^3 + 3^4$.

- a.
- $90\frac{4}{9}$
- b.
- $90\frac{5}{9}$
- c.
- $90\frac{7}{18}$
- d.
- $90\frac{11}{18}$
- e. not given

5. If $\frac{1}{x} = \frac{1}{25n} + \frac{1}{50n} + \frac{1}{75n} + \frac{1}{100}$ then $x =$

- a.
- $300n$
- b. 25 c.
- $12n$
- d.
- $8n$
- e. not given

6. The expression $\frac{x^2-3x+2}{x^2-5x+6} + \frac{x^2-5x+4}{x^2-7x+12}$, when simplified, is

- a.
- $\frac{(x-1)(x-6)}{(x-3)(x-4)}$
- b.
- $\frac{x+3}{x-3}$
- c.
- $\frac{x+1}{x-1}$
- d. 1 e. not given

7. When $x = 8$ the value of $\frac{3^0x+4x^{-1}}{x^{\frac{-2}{3}}}$ has a value of

- a. 34 b. 32 c. 18 d. 8 e. not given

8. When the following set of rational numbers are ordered from the smallest in value to the largest in value, which fraction is to the right of $\frac{-7}{9}$?

$$\left\{ \frac{-2}{3}, \frac{7}{-9}, \frac{-8}{11}, \frac{13}{-16}, \frac{-16}{21} \right\}$$

- a. $\frac{-2}{3}$ b. $\frac{-8}{11}$ c. $\frac{13}{-16}$ d. $\frac{-16}{21}$ e. not given

9. When $0.14\overline{32}$ is written as a rational number in lowest terms, the sum of the numerator and the denominator is ...

- a. 551 b. 1761 c. 2833 d. 3339 e. not given

10. If $1 + \frac{1}{1 + \frac{1}{1 + \frac{1}{1 + \frac{1}{2}}}} = \frac{a}{b}$ where a and b are relatively prime, then a + b =

- a. 21 b. 17 c. 15 d. 13 e. not given

11. If $s = \frac{at}{a+t}$, then t =

- a. $\frac{as}{a-s}$ b. $\frac{as}{a+s}$ c. $\frac{a-s}{as}$ d. $\frac{a+s}{as}$ e. not given

12. Which real value(s) of x are NOT in the domain of this function?

$$f(x) = \frac{\frac{\frac{x}{x-\frac{1}{x}}}{x-\frac{1}{x}}}{1-\frac{1}{1-\frac{1}{x}}}$$

- I. 0 II. -1 III. $-\sqrt{2}$ IV. 1

- a. I only b. I and IV only c. I, II, and IV only d. I, II, III, and IV
e. not given

13. If $\frac{3^{3^3}}{(3^3)(3^3)^2(3^3)^3} = 3^x$, the value of x is

- a. 12 b. 9 c. 6 d. -9 e. not given

14. Given $R(x) = \frac{3x-1}{4x+2}$, find $R\left(\frac{x-1}{x+2}\right)$.

- a. $\frac{x+2}{6x}$ b. $\frac{2x-5}{x+2}$ c. $\frac{6x}{x+2}$ d. $\frac{2x-5}{6x}$ e. not given

15. Given $\frac{x+3}{2} + \frac{y-1}{3} = 5$ and $\frac{x+4}{3} - \frac{2y-3}{5} = 2$

The equations that can be used to solve the given equations for x and y are

- a. $5x + 6y = 1$ b. $5x - 6y = 19$ c. $5x + 6y = -27$ d. $3x + 2y = 23$
 $3x - 2y = 23$ $3x + 2y = 23$ $3x + 2y = -2$ $5x - 6y = 1$

- e. not given

16. After rationalizing the numerator of $\frac{\sqrt{3}-\sqrt{2}}{\sqrt{3}}$, the denominator, in simplest form is

- a. $3 + \sqrt{6}$ b. $3 - \sqrt{6}$ c. $9 - \sqrt{6}$ d. $\sqrt{3} + \sqrt{6}$ e. not given

17. Find all the values of x where the graph of $y = \frac{x^3+2x^2-5x-6}{x+3}$ will intersect the x - axis.

- a. $x = 1$ and $x = 2$ b. $x = 1$ and $x = -2$ c. $x = -1$ and $x = 2$ d. $x = -1$ and $x = -2$
 e. not given

18. Simplify: $\frac{a^3-1}{a^2-1} \cdot \frac{a^2+2a+1}{a^3+1} \cdot \frac{a^2-a+1}{a+1}$

- a. $\frac{a^2+a+1}{a+1}$ b. $\frac{a^2-a+1}{a+1}$ c. $a + 1$ d. $a - 1$ e. not given

19. What is the smallest possible integer that is in the set of

$$\frac{x+34}{8} + \frac{4x-2}{20} > \frac{1}{4}x + 21$$

- a. 224 b. 225 c. -225 d. -224 e. not given

20. There are two values of n such that $\frac{2}{n-3} + \frac{2}{n} = 1$. What is the sum of these two values of n ?

- a. 7 b. 9 c. 11 d. 13 e. not given

21. $\left(\frac{1}{x} + \frac{1}{y}\right)\left(\frac{x}{x+y}\right) =$

- a. $\frac{1}{y}$ b. $\frac{1}{x}$ c. $\frac{x}{y}$ d. $\frac{y}{x}$ e. not given

22. Simplify: $\left[\frac{x+4+\frac{4}{x}}{x+1-\frac{2}{x}}\right]\left(\frac{6x-6}{x+2}\right)$, assume a nonzero denominator.

- a. 2 b. 4 c. 6 d. 8 e. not given

23. When a certain rational number less than 10 is divided by 4, the result is the same as when 4 is subtracted from the number. What is the number?

- a. $\frac{4}{5}$ b. $\frac{4}{3}$ c. $\frac{16}{5}$ d. $\frac{16}{3}$ e. not given

24. Solve the following system of equations for x :

$$\frac{2}{x} + \frac{2}{3y} = \frac{1}{6} \text{ and } \frac{3}{x} + \frac{2}{y} = 0$$

- a. -4 b. -6 c. 6 d. $\frac{1}{6}$ e. not given

25. Find the least positive integral value of n for which $\frac{n-12}{5n+23}$ is a non-zero reducible fraction.

- a. 0 b. 83 c. 95 d. 120 e. not given

26. Simplify: $\frac{x+(y^2-x^2)^{\frac{1}{2}}}{1+x(y^2-x^2)^{\frac{-1}{2}}}$

- a. 1 b. $\frac{x-x^2+y^2}{1+x}$ c. $\sqrt{y^2-x^2}$ d. -1 e. not given

27. Find the value of x for which the following would be true?

$$\frac{17}{85} + \frac{19}{95} + \frac{21}{105} + \frac{23}{115} + \frac{25}{125} + \frac{x}{135} = 1$$

- a. 27 b. 18 c. 9 d. 3 e. not given

28. Solve for r if $S = \frac{a-rL}{1-r}$

- a. $\frac{S-L}{S-a}$ b. $\frac{S-a}{S-L}$ c. $\frac{a}{L}$ d. $\frac{L}{a}$ e. not given

29. Solve for x: $\frac{1}{\frac{1}{x-1}-1} - 1 = 1$. Assume non-zero denominators.

- a. $\frac{-2}{5}$ b. $\frac{-5}{8}$ c. $\frac{8}{5}$ d. $\frac{5}{2}$ e. not given

30. $\frac{2x+3}{x-5} - \frac{3x-2}{x+5} + \frac{2x^2-24x}{x^2-25} = \frac{ax+b}{cx+d}$ when expressed in simplest form, find the numerical value of abcd.

- a. -5 b. 5 c. 10 d. 12 e. not given