Multiple-Choice

$$q = \frac{d}{d+n}$$

1. On a manufacturer's assembly line, d parts are found to be defective and n parts are nondefective. The formula above is used to calculate a quality-of-parts ratio. What is d expressed in terms of the other two variables?

   (A) $\frac{n}{1-q}$

   (B) $\frac{nq}{1-q}$

   (C) $\frac{n}{q-1}$

   (D) $\frac{nq}{q-1}$

2. The sum of $\frac{a}{a^2-b^2}$ and $\frac{b}{a^2-b^2}$ is

   (A) $\frac{1}{a-b}$

   (B) $\frac{a}{a-b}$

   (C) $\frac{b}{a-b}$

   (D) $\frac{a+b}{a-b}$

3. If $ax + x^2 = y^2 - ay$, what is a in terms of x and y?

   (A) $y - x$

   (B) $x - y$

   (C) $x + y$

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

4. If $\frac{xy}{x+y} = 1$ and $x \neq -y$, what is x in terms of y?

   (A) $\frac{y+1}{y-1}$

   (B) $\frac{y+1}{y}$

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

   (D) $\frac{y}{y+1}$

5. What is the sum of $\frac{4x}{x-1}$ and $\frac{4x+4}{x^2-1}$, expressed in simplest form?

(A) $\frac{4x+1}{x-1}$

(B) $\frac{4(x+1)}{x-1}$

(C) $\frac{4(x^2+4x+1)}{x^2-1}$

(D) $\frac{4(x+2)}{x^2-1}$

6. If $h = \frac{x^2-1}{x+1} + \frac{x^2-1}{x-1}$, what is x in terms of h?

(A) $\frac{h}{2}$

(B) $2h + 1$

(C) $2h - 1$

(D) $\sqrt{\frac{h}{2}}$

7. If $ax^2 - bx = ay^2 + by$, then $\frac{a}{b} =$

(A) $\frac{1}{x-y}$

(B) $\frac{1}{x+y}$

(C) $\frac{x-y}{x+y}$

(D) $\frac{x+y}{x-y}$

8. If $a \neq b$ and $\frac{a^2-b^2}{9} = a + b$, then what is the value of $a - b$?

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

(B) 3

(C) 9

(D) 12

9. If $\frac{r+s}{x-y} = \frac{3}{4}$, then $\frac{8r+8s}{15x-15y} =$

(A) $\frac{32}{45}$

(B) $\frac{8}{15}$

(C) $\frac{7}{16}$

(D) $\frac{2}{5}$

10. If $x^2 = k + 1$, then $\frac{x^4-1}{x^2+1} =$

(A) k

(B) k^2

(C) $k + 2$

(D) $k - 2$

11. If $p = x(3x + 5) - 28$, then p is divisible by which of the following expressions?

(A) $3x + 4$
(B) $x - 4$
(C) $x + 7$
(D) $3x - 7$

12. If $(x + p)$ is a factor of both $x^2 + 16x + 64$ and $4x^2 + 37x + k$, where p and k are nonzero integer constants, what could be the value of k?

(A) 9
(B) 24
(C) 40
(D) 63