PRINCESS SHEKINAH INTERNATIONAL SCHOOL, IHIAGWA.

SECOND TERM FIRST CONTINUOUS ASSESSMENT EXAMINATION FOR 2019/2020 SESSION.

CLASS: YEAR 10

SUBJECT: FURTHER MATHEMATICS

SECTION A: OBJECTIVES

1. Find the domain of $f(x) = \frac{x}{3-x}$ where $x \in R$, the set of real numbers.
   A. $\{x: x \in R, x \neq 3\}$
   B. $\{x: x \in R, x \neq 1\}$
   C. $\{x: x \in R, x \neq -3\}$
   D. $\{x: x \in R, x \neq 0\}$
   E. $\{x: x \in R, x \neq -2\}$
2. Given that $p = \{x: x \; is \; a \; factor \; of \; 6\}$ if the domain of $g(x) = x^2 + 3x - 5$, find the range of $g(x)$.
   A. $\{-1, 5, 13\}$
   B. $\{-2, 15, 1\}$
   C. $\{5, 13, 49\}$
   D. $\{1, 2, 3, 6\}$
   E. $\{-1, 5, 13, 49\}$
3. if $h(x) = x^3 - \frac{1}{x^3}$ evaluate $h(a) - h\left(\frac{1}{a}\right)$
   A. a^3
   B. $\frac{1}{a^3}$
   C. 0
   D. $2a^3 - \frac{2}{a^3}$
   E. 1
4. Simplify $\frac{\sqrt{3}}{\sqrt{3}-1} + \frac{\sqrt{3}}{\sqrt{3}+1}$
   A. $\frac{1}{2}$
   B. $\sqrt{3}$
   C. 3
   D. $2\sqrt{3}$
   E. 1
5. Solve the equation $\sqrt{2x^2 - 1} = 7$
   A. ± 5
   B. ± 4
   C. ± 2
   D. ± 8
   E. ± 3
6. Simplify: $\frac{1+\sqrt{8}}{3-\sqrt{2}}$
   A. $7 + \sqrt{2}$
   B. $7 + 7\sqrt{2}$
   C. $1 - 7\sqrt{2}$
   D. $7 + 5\sqrt{2}$
   E. $7 - 7\sqrt{2}$

7. Express $\frac{8-3\sqrt{6}}{2\sqrt{3}+3\sqrt{2}}$ $\quad in\ the\ form\ p\sqrt{3}+q\sqrt{2}$

A. $7\sqrt{3}-\frac{17}{3}\sqrt{2}$

B. $-\frac{17}{3}\sqrt{3}+7\sqrt{2}$

C. $\frac{17}{3}\sqrt{3}-7\sqrt{2}$

D. $-7\sqrt{3}-\frac{17}{3}\sqrt{2}$

E. $\frac{17}{3}\sqrt{3}-\frac{7}{3}\sqrt{2}$

8. If $\frac{5}{\sqrt{2}}-\frac{\sqrt{8}}{8}=m\sqrt{2}\ where\ m\ is\ a\ constant. Find\ m.$

A. $1\frac{1}{2}$

B. $1\frac{1}{4}$

C. $\frac{1}{2}$

D. 2

E. 1

9. By how much does $\sqrt{12}+\sqrt{18}\ exceed \sqrt{3}+\sqrt{2}$

A. $2(\sqrt{3}-\sqrt{2})$

B. $2(\sqrt{3}+\sqrt{2})$

C. $\sqrt{3}+2\sqrt{2}$

D. $\sqrt{2}-4\sqrt{3}$

E. $3\sqrt{2}-4\sqrt{3}$

10. If a, b are rationales and $a\sqrt{2}+b\sqrt{3}=\ \sqrt{98}+\sqrt{108}-\sqrt{48}-\sqrt{72}$, then the value of

A. $1,2$

B. $1,3$

C. $2,1$

D. $2,3$

E. $1,2$

11. Given that $(\sqrt{3}-5\sqrt{2})(\sqrt{3}+\sqrt{2})=x+y\sqrt{6}$. Find the value of $x\ and\ y$.

A. $x=-\frac{1}{2}, y=3$

B. $x=3, y=4$

C. $x=5, y=-4$

D. $x=2, y=3$

12. Simplify $(1+2\sqrt{3})^2-(1-2\sqrt{3})^2$

A. 0

B. $2\sqrt{3}$

C. 13

D. $8\sqrt{3}$

E. $2-4\sqrt{3}$

13. If $f(x)=\frac{4}{x}-1, x\neq 0$ find $f^{-1}(7)$.

A. $-\frac{3}{7}$

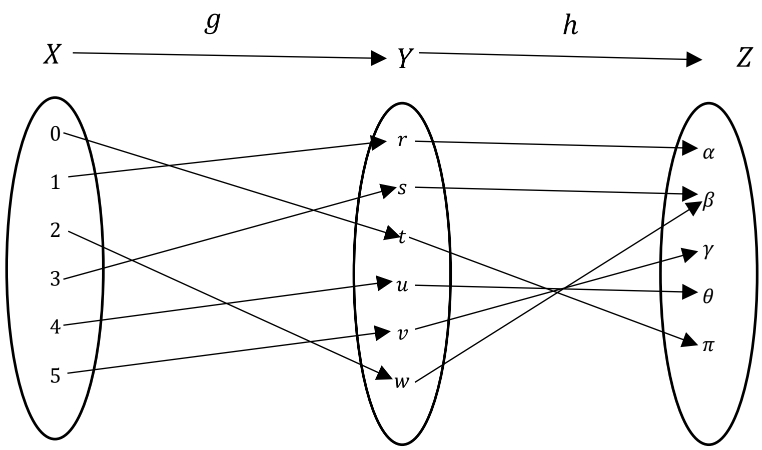
B. 0

C. $\frac{1}{2}$

D. -1

E. 4

14. If $y = 4x - 1$, list the range of the domain $\{-2 \leq x \leq 2\} where\ x\ is\ an\ integer$.
    A. $\{-9, -1, 2, 3, 4\}$
    B. $\{-9, -2, 0, 1, 7\}$
    C. $\{-5, -4, -3, -2, \}$
    D. $\{-9, -5, -1, 3, 7\}$
    E. $\{-5, -1, 2, 3, 7\}$



In the diagram, $g: x \to y$ and $h: y \to z$ use the diagram to answer question 15 and 16

15. Find $h(g(3))$.
    A. s
    B. β
    C. $\{s, \beta\}$
    D. $\{s, w, \beta\}$
    E. α
16. $g \circ h$ is
    A. one to one
    B. onto
    C. a relation
    D. a series
    E. constant.
17. A function is defined by $f(x) = \frac{3x+1}{x^2-1}, x \neq \pm 1$. Find $f(-3)$
    A. $-1\frac{1}{4}$
    B. -1
    C. 0
    D. $\frac{4}{5}$
    E. 1
18. The inverse of a function is given by $f^{-1}: x \to \frac{x+1}{4}$. Find f.
    A. $f: x \to 4x - 1$
    B. $f: x \to 4x + 1$
    C. $f: x \to 4x - \frac{1}{2}$
    D. $f: x \to x - \frac{1}{4}$
    E. $f: x \to 4x - \frac{3}{4}$
19. The functions $f\ and\ g$ are defined on the set, R of real numbers by $f: x \to x^2 - x - 6$ and $g: x \to x - 1$. Find $f \circ g(3)$.

A. -8
B. -6
C. -5
D. -4
E. -3

20. Simplify $\frac{1}{2}\sqrt{32} - \sqrt{18} + \sqrt{2}$

A. $\sqrt{2}$
B. $10\sqrt{2}$
C. $20\sqrt{2}$
D. $\frac{10}{\sqrt{2}}$
E. -1

SECTION B (THEORY)
ANSWER ONLY ONE QUESTION FROM THIS SECTION

1. a. Solve $7 + \sqrt{a-3} = 1$

   b. Express $\frac{5-2\sqrt{10}}{3\sqrt{5}+\sqrt{2}}$ in the form $m\sqrt{2} + n\sqrt{5}$ where m and n are rational numbers.

2. Two function g and h are defined on set are defined on the set R of real numbers by $g: x \to x^2 - 2\ and$ $h: x \to \frac{1}{x+2}, x \neq -2$. Find;

   (a) h^{-1}, the inverse of h

   (b) $g \circ h$ when $x = -\frac{1}{2}$