Basic Knowledge of Functions

Multiple Choice Question

[19-20]

1. [19-20 Standardized test 1, #2]

What is the domain of the function $y = \left(\dfrac{3x}{2x-1}\right)^2$?

    A.   All positive real numbers.

    B.   All positive real numbers except $\dfrac{1}{2}$.

    C.   All real numbers.

    D.   All real numbers except $\dfrac{1}{2}$.

2. [19-20 Mid-year, #13]

How many integral values are there in the domain of $y = \dfrac{\sqrt{8-x}}{x+5} + \dfrac{\sqrt{x-3}}{x-5}$?

    A.   3   **B.**   4

    C.   5   **D.**   6

[22-23]

3. [S.4 22-23 Mid-Year,#10]
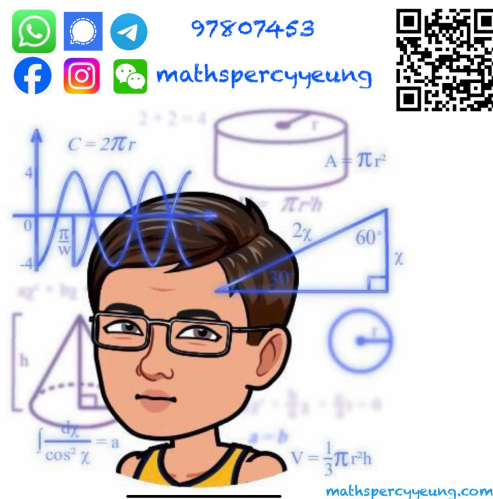
Let k be a constant. If $f(x) = x^2 - 2x + k$, then $f(k) + f(-k) =$

    A. k .
    B. $2k$.
    C. $2k^2 + k$.
    D. $2k^2 + 2k$.

4. [S.5 22-23 Final,#10]

Let $f(x) = 3(2-x)^2 - 5$. If k is a constant, then $f(k+1) + f(k-1) =$

    A. $6k^2 - 30k + 39$.

    B. $6k^2 - 24k + 14$.

    C. $6k^2 - 24k + 20$.

    D. $12k^2 - 24k + 7$.

5. **[S.6 22-23 Timed Practice 2,#7]**

Let f(x) = $2x^2 + x - 3$. If α is a constant, then f(2 − α) =
   A. $\alpha^2 - 3\alpha + 1$.
   B. $\alpha^2 - 9\alpha + 7$.
   C. $2\alpha^2 - 3\alpha + 1$.
   D. $2\alpha^2 - 9\alpha + 7$.

6. **[S.6 22-23 Timed Practice 4,#5]**

If $f(x) = 2x^2 + 4x + 2$, then $f(a - 1) - f(a + 1) =$

A.	2.	B.	$8a + 8$.
C.	$-8a - 8$.	D.	$4x^2 + 8x + 8$.

7. **[S.6 22-23 Timed Practice 5,#7]**

Let β be a constant. If f(x) = $x^2 - \beta x + \beta$, then f(β − 1) =
   A. 0.
   B. 1.
   C. 2β.
   D. $4\beta + 1$.

[23-24]
8. **[S.4 23-24 Mid-Year,#12]**

Let $f(x) = x^2 - 3x + 7$. $f(\beta + 1) - f(\beta - 1) =$

   A. $4\beta - 6$.
   B. $4\beta + 6$.
   C. -6.
   D. 6.

9. **[S.4 23-24 Final,#9]**

Let $f(x) = x^{333} - x^{33} + 1$. If k is a constant, which of the following must be true?

   A. $f(k + 1) = f(k) + f(1)$
   B. $f(k - 1) = f(k) - f(1)$
   C. $f(3) + f(-3) = 2$
   D. $f(3) - f(-3) = 0$

10. [S.5 23-24 Final,#9]

If $f(x) = 3x - x^2$, then $f(x) - f(x - 2) =$

    A. 2.
    B. $-2x^2 + 4x + 10$.
    C. $-4x - 2$.
    D. $-4x + 10$.

11. [S.6 23-24 Timed Practice 4,#6]

Let k be a constant. If $f(x) = 4k + 2x - kx^2$, then $f(-3) - f(3) =$

A. -12 .
B. 0 .
C. $18k$.
D. $26k$.

12. [S.6 23-24 Timed Practice 6,#2]

If $f(x) = 6^x$, find $f(x) + f(x+1)$.

    A. 6^{x+1}

    B. 6^{x+2}

    C. 6^{2x+1}

    D. $7(6^x)$

13. [S.6 23-24 Timed Practice 6,#8]

If $f(x) = (x-3)^2$, then $f(x-3) =$

    A. $x^2 - 12x + 36$.

    B. $x^2 - 6x + 3$.

    C. $x^2 + 6x + 9$.

    D. $x^2 - 36$.

~End~

Ch.4 Basic Knowledge of Functions
Conventional Questions

[19-20]

1. **[19-20 Standardized test 1, #3]**

   Let $g(x) = 6x^2 - x + k$. It is given that $g(2) = 24$.

   (a) Find $g(-3)$.   (3 marks)

   (b) Solve $g(-2x) = 13x^2 + 4$. Give your answers in surd form if necessary.   (3 marks)

2. **[19-20 Mid-year, #10]**

   Let $f(x) = ax^2 + bx + 7$, where a and b are real constants.

   (a)   If $f(-1) = 6$ and $f(3) = 34$, find the values of a and b.   (2 marks)

   (b)   If $g\left(\dfrac{x}{2}\right) = f(x)$, find $g(x)$.   (2 marks)

[20-21]

3. **[20-21 Mid-year, #3]**

   Let $(x) = ax^2 - 4x + 2$. If $(3) = 17$, find the value of (-1).   **(4 marks)**

4. **[20-21 Final Exam, #4]**

   Let $h(x) = 2x^2 - 18x + k$. It is given that $h(-2) = 53$.

   (a) Find the value of k.

   (b) Find the value(s) of t such that $h(t-1) = -31$.   **(5 marks)**

[22-23]

5. **[S.5 22-23 Mid-year,#5]**

   Let $f(x) = 6x^2 + 5x - 21$.

   (a) Find the x-intercept(s) and the y-intercept of the graph of $y = f(x)$.   **(2 marks)**

   (b) Solve the equation $f(a+1) - f(a-1) = 2$.   **(2 marks)**

Basic Knowledge of Functions

6. **[S.5 22-23 Mid-year,#15]**

It is given that $g(x) = 12x^3 + ax^2 + bx + 6$, where a and b are constants, and $g\left(\dfrac{1}{2}\right) = 0$. When $g(x)$ is divided by $2x - 1$, the quotient is $px^2 + 5x + q$, where p and q are constants.

   (a) Find p and q. **(3 marks)**

   (b) Ann claims that the equation $12x^3 + (a + 8)x^2 + (b - 4)x + 6 = 0$ has 3 distinct real roots. Do you agree? Explain your answer. **(3 marks)**

[23-24]

7. **[S.4 23-24 Mid-Year,#5]**
   Suppose $f(x) = 3x - 8$ and $g(x) = 3$. Find $f(-3) \times g(-3)$. **(2 marks)**

8. **[S.4 23-24 Mid-Year,#6]**
   The number of reported cases of a flu in the xth month after the outbreak can be modelled by the function $C(x) = -x^2 + kx + 150$, where k is a real constant. It is given that there were 250 reported cases in the 5$^{\text{th}}$ month after the outbreak.
   (a) Find the value of k.
   (b) Write down the number of reported cases in the 10$^{\text{th}}$ month after the outbreak.
   (c) In which month after the outbreak would the number of reported cases be 0?
   (5 marks)

9. **[S.4 23-24 Final,#6]**
   Let $f(x) = 7k - 3x^2$, where k is a constant. If $f(5) = 9$, find the value of $f(-1)$.
   (3 marks)

10. **[S.5 23-24 Mid-year,#6]**
    Let $f(x) = k - 3x$, where k is a constant. It is given that $f(1) = a$ and $f(a) = 5$.
    (a) Find the values of a and k.
    (b) Write down the value of $f(a - k)$.
    (4 marks)

~**End**~