BLUE MATH LESSON 9B: COMPLEX NUMBERS
Race to the Finish

Directions: Answer each question below.

HOMEWORK SET (NO CALCULATOR)

1. $i^{312} =$
   A) $-i$
   B) i
   C) -1
   D) 1

2. If $i^x = 1$, which of the following could be the value of x ?
   A) 6
   B) 21
   C) 44
   D) 50

3. Which of the following values of x satisfies the equation $x^3 = -8i$?
   A) $2i$
   B) $-2i$
   C) $8i$
   D) $-8i$

4. If $Z_1 = 2 - i$ and $Z_2 = -1 + 2i$, then $Z_1 + Z_2 = ?$
   A) $3 + i$
   B) $3 - i$
   C) $1 - 3i$
   D) $1 + i$

5. If $x = 6 + 7i$ and $y = 5 - 5i$, then $12x + 17y = ?$
   A) 158
   B) $157 + 169i$
   C) $157 - i$
   D) $29 + 2i$

6. $(-12 + 11i)^2 = ?$
   A) $144 - 121i$
   B) $265 - 264i$
   C) $23 - 264i$
   D) $144 + 121i$

7. Which of the following expressions is equal to 13?
   A) $(2 + 3i)(2 - 3i)$
   B) $9 + 4i^2$
   C) $-13i^4$
   D) $(2 - 3i)^2$

8. If $x^2 = -16$, then $x =?$
   A) $\pm 4i$
   B) $-4i$
   C) $4 \pm i$
   D) $4 - i$

HW

9. $\frac{1-i}{4-7i} = ?$
   A) $\frac{5+6i}{8}$
   B) $\frac{2}{65}$
   C) $\frac{-3-11i}{65}$
   D) $\frac{11+3i}{65}$

10. If $Z_1 = 6 - i$, and $Z_2 = 5 + 2i$, then $Z_1^2 - Z_2^2 = ?$
    A) 10
    B) 20
    C) $11 + 9i$
    D) $14 - 32i$

11. $3(i-3) + 2(i+3) =$
    A) $5i - 3$
    B) $5i + 3$
    C) $6i - 3$
    D) $6i + 3$

12. If $x^2 = -1$, then $x =?$
    A) ± 1
    B) -1
    C) $\pm i$
    D) $-i$

13. If $x = 42 + 22i$ and $y = -12 + 6i$, then $x - 4y = ?$
    A) $30 + 28i$
    B) $90 - 2i$
    C) $-6 + 28i$
    D) 88

14. $\frac{1-i}{1+i} \times \frac{1}{i-1} =$
    A) $\frac{-1-i}{2}$
    B) $\frac{-1+i}{2}$
    C) $\frac{1-i}{2}$
    D) Undefined

15. The graph of a quadratic function with two imaginary roots crosses the x-axis in how many places?
    A) 0
    B) 1
    C) 2
    D) More than 2

16. If a, b and $\sqrt{(a-bi)(a+bi)}$ are each integers, then the ordered pair (a, b) could equal which of the following?
    A) (1, 1)
    B) (1, 2)
    C) (3, 4)
    D) (4, 4)

17. If $X = 3 + i$, and $Y = 4 - 3i$, what is the value of $3X + Y$?

19. The equation $(x - 5)(x + 5) = -74$ has two solutions, both of which are complex numbers. What is the product of these two solutions?

$$2i^2 + 4i^4 + 6i^6 + 8i^8 + 10i^{10}$$

18. The above expression is equal to an integer x. What is the value of $-x$?

20. The product $(7 - 2i)(6 + 3i) = a + bi$, where a and b are real numbers. What is the value of $a + b$?