DIRECTIONS: Please write your answers on the Individual Answer Sheet provided. This part of the contest is 45 minutes long. Questions 1-4 are each worth 1 point. Questions 5-8 are each worth 2 points. Questions 9-11 are each worth 3 points. Calculators and other electronics MAY NOT be used.

1. Simplify $\sqrt{-9} + \sqrt{-16}$
   Ans: $7i$

2. Factor $2x^3 - x^2 - 8x - 5$
   Ans: $(2x - 5)(x+1)^2$

3. Convert the base 10 number $29 \frac{13}{64}$ to binary
   Ans: 11101.0011012

4. What is $\cos(179\pi/6)$?
   Ans: $\sqrt{3}/2$

5. If $f(x) = \frac{3x - 2}{x + 1}$ what is the inverse function $f^{-1}(x)$?
   Ans: $(2 + x)/(3 - x)$

6. Find $x$ such that $\sqrt{x + 23} + \sqrt{x} = 23$
   Ans: $x=121$

7. What is the units digit of the number $1 + 9 + 9^2 + 9^3 + \ldots + 9^{1988} + 9^{1989}$?
   Ans: 0

8. Solve for $x$: $(\log_{10} x)^3 = \log_{10} x^4$
   Ans: 100, $1/100$, 1
9. 5 years ago, the ratio of a father’s and his son’s ages was 3:1. 
15 years from now, the ratio will be 2:1.
What is the father’s current age? 

Ans: 65

10. Find any x which satisfies

$$\left(\frac{1}{25}\right)^x = (125)^x \left(\frac{1}{25}\right)$$

Ans: x = 1, 2/3

11. Simplify \( \log_{10} (\sqrt[3]{5})^{\sqrt{2}} (\sqrt[3]{20})^{\sqrt{2}} \) 

Ans: \( 2\sqrt{2} \)