

Midterm QuizBowl Version 2

Name: \_\_\_\_\_

Date: \_\_\_\_\_

1. What is the solution set of the inequality  $5 - |x + 4| \leq -3$ ?
- A.  $-2 \leq x \leq 6$       B.  $x \leq -2$  or  $x \geq 6$   
 C.  $-12 \leq x \leq 4$       D.  $x \leq -12$  or  $x \geq 4$

2. What are the roots of the equation  $3x^2 - x + 2 = 0$ ?
- A.  $\{1, \frac{-2}{3}\}$   
 B.  $\{3, -2\}$   
 C.  $\left\{\frac{1 + 5i}{6}, \frac{1 - 5i}{6}\right\}$   
 D.  $\left\{\frac{1 + i\sqrt{23}}{6}, \frac{1 - i\sqrt{23}}{6}\right\}$

3. Simplify:  $\frac{3x^2 - 6x}{4 - x^2} \cdot \frac{3x^2 + 5x - 2}{27x^2 - 3}$
- A.  $\frac{-x}{3x + 1}$       B.  $\frac{x}{3x + 1}$   
 C.  $\frac{-x(x - 2)}{(3x - 1)(x + 2)}$       D.  $\frac{-x(x + 2)}{(3x - 1)(x + 2)}$

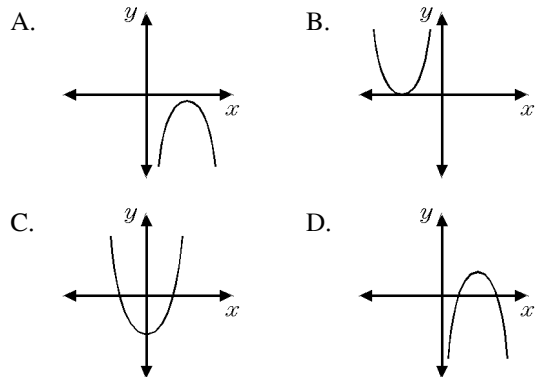
4. Juan has been told to write a quadratic equation where the sum of the roots is equal to  $-3$  and the product of the roots is equal to  $-9$ . Which equation meets these requirements?
- A.  $x^2 + 3x + 9 = 0$       B.  $x^2 - 12x + 27 = 0$   
 C.  $2x^2 + 6x - 18 = 0$       D.  $(x + 3)(x + 9) = 0$

5. Subtract and simplify:  $\frac{2x + 8}{x^2 + 6x + 8} - \frac{x + 16}{x^2 + 8x + 12}$
- A.  $\frac{x - 8}{-2x - 4}$       B.  $\frac{x - 4}{(x + 2)(x + 6)}$   
 C.  $\frac{x - 8}{(x + 4)(x + 6)}$       D.  $\frac{-x - 14}{(x + 2)(x + 6)}$

6. The remainder when  $x^3 + 2x^2 + k$  is divided by  $x + 3$  is  $-7$ . Find  $k$ .
- A.  $-16$       B.  $-22$       C.  $2$       D.  $-10$

7. What is the domain of  $f(x) = \frac{x}{2x^2 - 5x - 3}$ ?
- A.  $(-\infty, \infty)$   
 B.  $(-\infty, 0) \cup (0, \infty)$   
 C.  $(-\infty, -\frac{1}{2}) \cup (-\frac{1}{2}, 3) \cup (3, \infty)$   
 D.  $(-\infty, -3) \cup (-3, \frac{1}{2}) \cup (\frac{1}{2}, \infty)$

8. Which graph represents a parabola whose corresponding quadratic equation has imaginary roots?



9. Amir takes 5 hours to do a job. If Chani helps him they complete the job in 3 hours. How many hours would it take Chani to do the same job if she were working alone?

- A.  $\frac{2}{15}$       B.  $\frac{15}{8}$       C.  $\frac{15}{7}$       D.  $\frac{15}{2}$

10. If the equation  $x^2 - kx - 36 = 0$  has  $x = 12$  as one root, what is the value of  $k$ ?

- A.  $9$       B.  $-9$       C.  $3$       D.  $-3$

11. In 2002, New Zealand had a population of 3,962,000 with a population growth rate of 1.7% per year. Assuming the population continues to increase at the same rate, how many years (from 2002) will it take for New Zealand's population to reach 5,000,000? Round to the nearest whole year.

- A. 2 years                      B. 14 years  
C. 18 years                      D. 137 years

12. The inverse function of  $\{(2, 6), (-3, 4), (7, -5)\}$  is

- A.  $\{(-2, 6), (3, 4), (-7, -5)\}$   
B.  $\{(2, -6), (-3, -4), (7, 5)\}$   
C.  $\{(6, 2), (4, -3), (-5, 7)\}$   
D.  $\{(-6, -2), (-4, 3), (5, -7)\}$

13. Solve:  $\frac{2}{z+2} + \frac{13}{z^2-4} = \frac{z}{z-2}$

- A. 3 or -3                      B. -2 or 2  
C. 3 or -4                      D. -3 or 4

14. One of the three real roots of the equation  $6x^3 - 29x^2 + 36x - 9 = 0$  is 3. The sum of the other two roots is:

- A.  $\frac{7}{6}$       B. 11      C. 2      D.  $\frac{11}{6}$

15. Which function results by shifting the graph of  $y = \ln(x + 3) - 6$  to the left 4 units and down 3 units?

- A.  $y = \ln(x + 7) - 9$       B.  $y = \ln(x - 1) - 9$   
C.  $y = \ln(x + 7) - 3$       D.  $y = \ln(x - 1) - 3$

16. Which cubic polynomial *best* describes the data in the table?

x	-3	-2	-1	0	1	2	3	4
y	-12	0	0	-6	-12	-12	0	30

- A.  $y = x^3 + 6x^2 - 7x - 6$   
B.  $y = x^3 - 7x + 6$   
C.  $y = x^3 - 7x - 6$   
D.  $y = -x^3 - 7x + 6$

17. If  $f(x) = \frac{1}{2}\sqrt{x} - 4$ , then  $f^{-1}(x) =$

- A.  $\frac{1}{2}x^2 + 4$                       B.  $2x^2 - 4$   
C.  $(2x + 8)^2$                       D.  $2(x + 4)^2$

18. An expression is shown below.

$$\log \sqrt[4]{\frac{x^{16}}{y^4}}$$

What is the value of the expression when  $\log x = 8$  and  $\log y = 1$ ?

- A. 7      B. 15      C. 16      D. 31

19. Which polynomial function has as zeros 3 and  $4 + i$ ?

- A.  $f(x) = x^3 - 11x^2 + 41x - 51$   
B.  $f(x) = x^3 - 5x^2 - 7x + 51$   
C.  $f(x) = x^3 + 5x^2 - 7x - 51$   
D.  $f(x) = x^3 + 11x^2 + 41x + 51$

20. What is the solution set for the equation shown below?

$$|3 - x| - 8 = 8$$

- A.  $\{-5, 11\}$                       B.  $\{-13, 3\}$   
C.  $\{-13, 19\}$                       D.  $\{-19, 0\}$

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|------------|---------|
| 1.         |         |
| Answer:    | D       |
| 2.         |         |
| Answer:    | D       |
| 3.         |         |
| Answer:    | A       |
| Objective: | A.APR.7 |
| 4.         |         |
| Answer:    | C       |
| 5.         |         |
| Answer:    | B       |
| Objective: | A.APR.7 |
| 6.         |         |
| Answer:    | C       |
| 7.         |         |
| Answer:    | C       |
| 8.         |         |
| Answer:    | A       |
| 9.         |         |
| Answer:    | D       |
| 10.        |         |
| Answer:    | A       |
| 11.        |         |
| Answer:    | B       |
| Objective: | A.CED.1 |
| 12.        |         |
| Answer:    | C       |
| 13.        |         |
| Answer:    | A       |
| 14.        |         |
| Answer:    | D       |
| 15.        |         |
| Answer:    | A       |
| 16.        |         |
| Answer:    | C       |
| 17.        |         |
| Answer:    | C       |
| Objective: | AII.7g  |
| 18.        |         |
| Answer:    | D       |
| 19.        |         |
| Answer:    | A       |
| 20.        |         |
| Answer:    | C       |