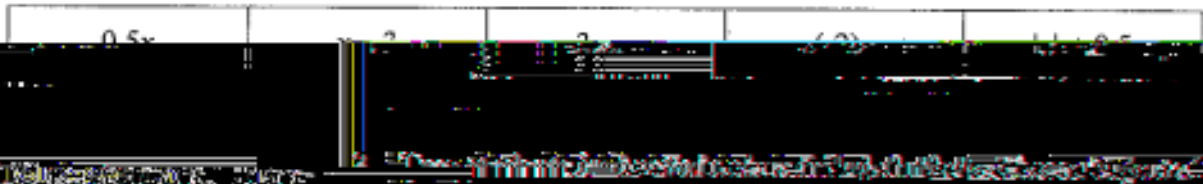


Answers must be written in the spaces provided. All students must write legibly in the correct blanks on the answer sheet and in simplest form. **Exact** answers are to be given unless otherwise



4. In the diagram,  $\overline{EB} \perp \overline{AC}$  and points  $A$ ,  $B$ , and  $C$  are collinear.  $\overline{BF}$



bisects  $\angle GBE$ . If  $\angle DBE = 38^\circ$  and  $\angle GBD = 44^\circ$ , find the

5. In the diagram,  $\angle 1 = 15^\circ$ ,  $\angle 2 = 30^\circ$ , and  $\angle 3 = 45^\circ$ . Find the

6. If the smaller base of a trapezoid is increased by 4, and the larger base is increased by 8, the area of the

10. Find the perimeter of a triangle whose vertices are  $A(1, 1)$ ,  $B(4, 4)$ , and  $C(4, 1)$ .

19. If  $\frac{a}{3-\sqrt{3}} = \frac{b}{c+d}$  where  $a$ ,  $b$ ,  $c$ , and  $d$  are integers and  $a \neq 0$ , and the minimum value of  $a$  is  $\frac{1}{2}$ , find  $a$ .
20. Circle  $A$  has center  $(6, -2)$  and radius 5. Circle  $B$  has center  $(-3, 4)$  and radius 3. Find the exact length of the

John F. Byrne Mathematical Competition  
 Individual Student Answer Sheet

1. \_\_\_\_\_

11. \_\_\_\_\_

2. \_\_\_\_\_

12. \_\_\_\_\_

5. \_\_\_\_\_

15. \_\_\_\_\_

6. \_\_\_\_\_

16. \_\_\_\_\_

7. \_\_\_\_\_

17. \_\_\_\_\_

8. \_\_\_\_\_

18. \_\_\_\_\_

10. \_\_\_\_\_

20. \_\_\_\_\_

7. 342 Dollar sign optional

17. 1000

8. 3

18. 1680

9. 507

19. 324

10. 360

20.  $\sqrt{53}$  Must be in this form