

No Calculators

Problems 19-20 Time limit: 10 minutes.

19. If  $a$  is  $\frac{7}{12}$  of  $b$  and  $b$  is  $\frac{9}{14}$  of  $c$ , find the value of  $\frac{c}{a}$ .

20. If  $\sin^2 A = \frac{2 + \sqrt{3}}{4}$  and  $\angle A$  is acute, find the degree measure of  $\angle A$ .

Problems 21-22 Time limit: 10 minutes.

21. If eight identical sheep-shearers can shear 108 identical sheep in 6 days, how many identical sheep can 10 identical sheep-shearers shear in 34 days?

22. If  $\sin 2x = \frac{2}{3}$ , find the value of  $\sin^8 x + \cos^8 x$  as a fraction.

Problems 23-24 Time limit: 10 minutes.

23. If  $\log_4 3 = a$  and  $\log_4 5 = b$  and  $\log_4 11 = c$ , find  $\log_{11} 75$  in terms of  $a$ ,  $b$ , and  $c$ .

24. The sum of the areas of two similar pentagons is 928. The lengths of a pair of two corresponding sides of the two pentagons are 8 and 20. Find the area of the larger pentagon.

Answers:

19.  $\frac{8}{3}$

20.  $75^\circ$

21. 765

22.  $\frac{47}{81}$

23.  $\frac{a+2b}{c}$

24. 800