

GEORGIA SOUTHERN UNIVERSITY
2004 MATHEMATICS TOURNAMENT
JUNIOR VARSITY WRITTEN TEST

1. Solve for x : $5x - 2 = 2x + 16$

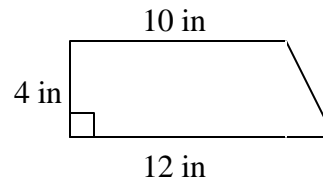
- a) 3
- b) 9
- c) 6
- d) 18
- e) none of these

2. A group of nine students line up single-file for lunch. How many different ways can this occur if the four girls line up first ?

- a) 1362880
- b) 20
- c) 24
- d) 2880
- e) none of these

3. Find the area of the trapezoid.

- a) 40 square inches
- b) 48 square inches
- c) 50 square inches
- d) 88 square inches
- e) none of these



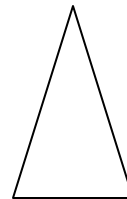
4. Find the slope of a line whose equation is $\frac{3}{8}x + \frac{1}{2}y = 7$.

- a) $-\frac{3}{4}$
- b) $\frac{3}{8}$
- c) $-\frac{3}{8}$
- d) $-\frac{3}{16}$
- e) none of these

5. Find a point on the x-axis that is a distance of 5 units from the point (9,3).
- (4,0)
 - (12,0)
 - (14,0)
 - (10,0)
 - none of these
6. Bill can spend at most \$300 for a compact disc player and some compact discs. If he can buy a player for \$175 and discs for \$12.95 each, what is the greatest number of discs he can buy ?
- 7
 - 8
 - 9
 - 10
 - none of these

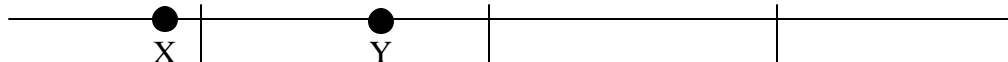
7. An isosceles triangle (shown below) has a base that is half the length of the two congruent sides. Find the area of the triangle if the base is 10 inches.

- 100 sq. in.
- $25\sqrt{15}$ sq. in.
- $25\sqrt{3}$ sq. in.
- $50\sqrt{3}$ sq. in.
- none of these



8. The measure of one of the acute angles of a right triangle is one-half the measure of the other angle. Find the measure of the smallest angle in the triangle.
- 20°
 - 30°
 - 45°
 - 60°
 - none of these

9. Which of the values below could represent the product XY ?



-1

0

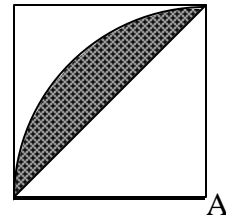
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- a) -1.2
- b) -.5
- c) .5
- d) .9
- e) 1.2

10. Find the area of the shaded portion of the figure below, if each side of the square measures

4 inches. Note: The center of the circle is at point A.

- a) $8\pi - 16$ square inches
- b) $4\pi - 8$ square inches
- c) $8\pi - 8$ square inches
- d) $2\pi - 4$ square inches
- e) none of these



11. Mr. Marty gave a 3-question True-False quiz to his class. What is the probability that a student

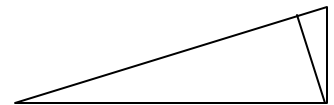
would answer every question correctly, if he is guessing ?

- a) $\frac{1}{3}$
- b) $\frac{1}{4}$
- c) $\frac{1}{6}$
- d) $\frac{1}{8}$
- e) none of these

12. Right triangle ABC with right angle at C is shown below.

D B

If $BC = 5$ and $AC = 12$, find the measure of altitude CD .



A

C

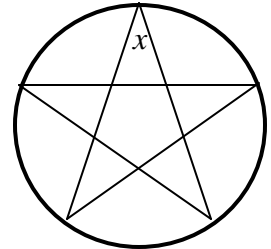
- a) 4
- b) $\frac{30}{13}$
- c) $\frac{60}{13}$
- d) 4.5
- e) none of these

13. Domino's pizza offers 14 different toppings for its pizzas. The local Domino's is running a special on large 2-topping pizzas for \$8.99 each. An organization on campus plans to order every possible pizza with two different toppings from Domino's for its Homecoming party. How much will their bill total (before tax and delivery charges) ?

- a) \$91
- b) \$1636.18
- c) \$818.09
- d) \$125.86
- e) none of these

14. A five-pointed star is constructed by joining pairs of points equally spaced around a circle. Find the measure of the angle indicated by x .

- a) 72°
- b) 36°
- c) 24°
- d) 30°
- e) 18°



15. If the product of the integers w , x , y , and z is 770, and if $1 < w < x < y < z$, what is the value of $w + z$?

- a) 13
- b) 18
- c) 16
- d) 10
- e) none of these

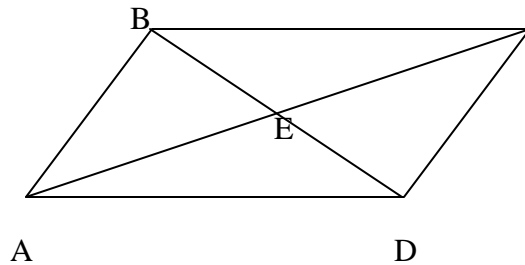
16. In a triangle, the largest angle is twice the measure of the smallest angle. The third angle has a

measure that is 20° more than the measure of the smallest angle. Find the measure of the largest angle.

- a) 80°
- b) 40°
- c) 170°
- d) 60°
- e) none of these

17. In parallelogram ABCD shown below with diagonals intersecting at point E, which of the following triangles have the same area:

C



- a) ABD and AED
- b) ABE and ACD
- c) ABC and CDE
- d) ABE and BEC
- e) none of the above

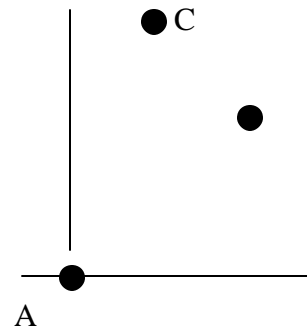
18. Three cities (A, B, and C) are located on a map in the shape of a triangle. From city A, city C is located $N 28^\circ E$. From city B, city C is located $N 47^\circ W$. If the measure of angle ABC is 100° , find the direction ($N ___ E$) from city A to city B.

Remember that the drawing is not drawn to scale.

- a) $N 33^\circ E$
- b) $N 47^\circ E$
- c) $N 52^\circ E$
- d) $N 75^\circ E$

B

- e) none of these



19. Find two consecutive even integers such that the sum of their squares is 100.

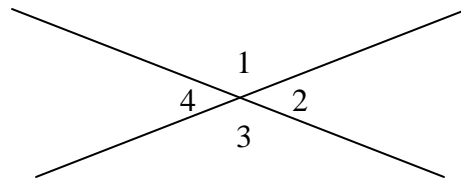
- a) - 6 and 8
- b) 4 and 6
- c) - 6 and - 4
- d) - 8 and - 6
- e) none of these

20. Write an equation in slope-intercept form that passes through the points (3, -7) and (-2,8).

- a) $y = -3x - 16$
- b) $y = -3x + 4$
- c) $y = -3x + 2$
- d) $y = -3x - 10$
- e) none of these

21. Given that the measure of $\angle 2 = 2x - 15$ and that the measure of $\angle 3 = 5x - 22$, find the measure of $\angle 1$.

- a) 31°
- b) 62°
- c) 133°
- d) 149°
- e) none of these



22. Determine the coordinates of the vertex of the parabola $y = x^2 - 6x + 14$.

- a) (-3, -5)
- b) (-3,5)
- c) (3, -5)
- d) (3,5)
- e) none of these

23. A garden in the shape of a circle is surrounded by a sidewalk that is 2 meters wide.

The diameter of the garden is 40 meters. What is the area of the sidewalk ?

- a) $4p \text{ m}^2$
- b) $44p \text{ m}^2$
- c) $84p \text{ m}^2$
- d) $400p \text{ m}^2$
- e) none of these

24. Suppose that a scuba diver begins his dive at sea level and that the pressure on the diver at depth d feet is given by the formula $p = 64d + 2112$, where p represents total pressure in pounds per square foot. If a diver descends to a depth d , the pressure on the diver is 4672 pounds per square foot. What is the diver's depth ?

- a) 40 ft.
- b) 30 ft.
- c) 106 ft.
- d) 80 ft.
- e) none of these

25. Factor the following trinomial completely: $12x^2 + 7x - 12$.

- a) $(6x - 4)(2x + 3)$
- b) $(3x - 1)(4x + 12)$
- c) $3(x - 1)(x + 4)$
- d) $(3x + 4)(4x - 3)$
- e) none of these

26. If the midpoints of adjacent sides of a parallelogram are connected, the resulting quadrilateral will be a

- a) square
- b) rhombus
- c) parallelogram
- d) rectangle
- e) none of these

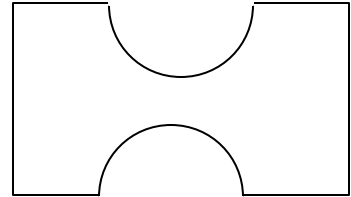
27. Suppose you sold 580 tickets for your senior play. Student tickets sold for \$4 each and general admission tickets sold for \$6 each. You made \$2576 from the ticket sales. How many student tickets did you sell ?

- a) 128
- b) 452
- c) 462
- d) 123
- e) none of these

28. Find the perimeter of a rhombus whose diagonals measure 10 cm and 24 cm.

- a) 52 cm
- b) 240 cm
- c) 68 cm
- d) 120 cm
- e) none of these

29. Two semi-circles of equal size have been removed from a 10 inch by 14 inch sheet of paper, as shown. The semicircles have a diameter of 6 inches. Find the perimeter of the remaining figure.



- a) $48+12p$ in.
- b) $36+12p$ in.
- c) $48+6p$ in.
- d) $36+6p$ in.
- e) none of these

30. Which of the following graphs represents the correct solution to the following double inequality ?
 $-7 \leq -2x + 21 < 31$

- a)
- b)
- c)
- d)

e) none of these

31. Find the domain of the function $f(x) = \frac{\sqrt{x-7}}{x+14}$.

- a) $x \geq 7$
- b) $x \neq -14$
- c) $7 < x$
- d) $x \leq 7$
- e) none of these

32. Y is a two digit number with tens digit t and units digit u and the table shows multiplication for

products of t and u (for example, $t * u = b$). Find Y^2 .

- a) $a + 2b + 10c$
- b) $10a + 20b + c$
- c) $10(a + 2b + c)$
- d) $100a + 20b + c$
- e) none of these

*	t	u
t	a	b
u	b	c

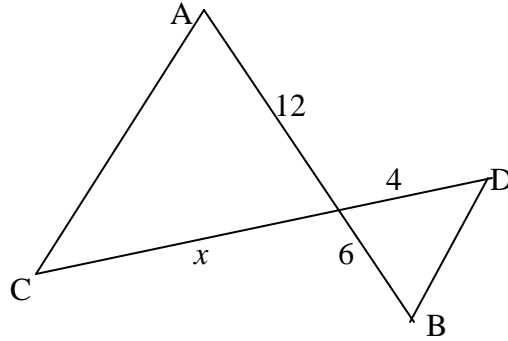
33. Simplify the complex fraction

$$\frac{\frac{3}{x^2 - 11x + 30} + \frac{1}{x^2 + x - 42}}{\frac{2}{x^2 + 2x - 35} + \frac{1}{x^2 - 8x + 12}}$$

- a) $\frac{4x^2 - 3x + 2}{3(2x - 1)(x + 4)}$
- b) $\frac{3x^2 - 14 - 11}{4(x + 4)(x - 2)}$
- c) $\frac{4(x + 4)(x - 2)}{3x^2 - 14x - 11}$
- d) $\frac{3(2x - 1)(x + 4)}{4x^2 - 3x + 2}$
- e) none of these

34. In the drawing shown, $AC \parallel BD$.
Solve for x :

- a) 18
- b) 8
- c) 9
- d) 14
- e) none of these



35. Solve for x : $x^4 - 25x^2 + 114 = 7x^2 - 142$

- a) 4
- b) ± 4
- c) ± 16
- d) 16
- e) none of these

36. A cu. ft. of garp weighs $3\frac{3}{4}$ pounds. How many cu. ft. of garp are in a filled 15 pound sack ?

- a) 4
- b) 3
- c) 5
- d) 6
- e) none of these

37. A class consists of both boys and girls. There are 36 students in the class, and exactly

$\frac{1}{3}$ of the boys and $\frac{1}{4}$ of the girls walk to school. What is the greatest possible number of students in this class who walk to school ?

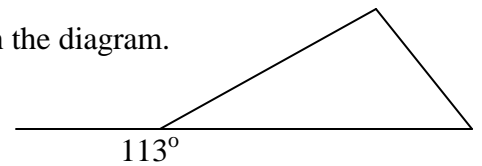
- a) 9
- b) 10
- c) 11
- d) 12
- e) none of these

38. A survey of 600 people discovered that 400 listened to radio station WABC, 200 listened to radio station WDEF, and 100 listened to both. If one of the survey respondents is randomly

chosen, what is the probability that person listens to station WABC or station WDEF ?

- a) 1
- b) $\frac{2}{3}$
- c) $\frac{1}{3}$
- d) $\frac{5}{6}$
- e) none of these

39. Find the measure of the angle whose value is labeled x in the diagram.



55°

- a) 12°
- b) 35°
- c) 58°
- d) 67°
- e) none of these

40. Solve for x : $\frac{3+x}{2-x} \leq 0$.

- a) $-3 \leq x < 2$
- b) $-3 < x < 2$
- c) $x \leq -3$
- d) $x \leq -3$ or $x > 2$
- e) none of these

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Answer Key

1. C	11. D	21. C	31. A
2. D	12. C	22. D	32. D
3. E 44 sq. in.	13. C	23. C	33. C
4. A	14. B	24. A	34. B
5. E (5,0) or (13,0)	15. A	25. D	35. B
6. C	16. A	26. C	36. A
7. B	17. D	27. B	37. C
8. B	18. A	28. A	38. D
9. C	19. D	29. D	39. C
10. B	20. C	30. B	40. D