

See instructional videos at [www.AlgebraNinja.com](http://www.AlgebraNinja.com)

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

1. Given functions  $f(x) = 2x - 5$  and  $g(x) = \frac{1}{2x}$  which of the following would be equivalent to  $f(g(x))$ ? [6,708]
- A.  $x-5$   
 B.  $4x^2-5$   
 C.  $\frac{1}{2(2x-5)}$   
 D.  $-4$   
 E.  $(\frac{1}{x}) - 5$
2. Given  $\sin\theta < 0$  and  $\tan\theta = \frac{\sqrt{3}}{1}$  what is  $\theta$ . [6,704]
- F.  $\frac{\pi}{4}$   
 G.  $\frac{7\pi}{6}$   
 H.  $\frac{4\pi}{3}$   
 J.  $\frac{3\pi}{2}$   
 K.  $\frac{7\pi}{4}$
3. Solve  $\log 3^x + \log 5 = \log 45$  for  $x$ . [6,707]
- A.  $\sqrt{5}$   
 B. 2  
 C. 1  
 D. .5  
 E. 0
4. Which of the below are equivalent to  $e \bullet \ln e^3$  [6,707]
- F.  $3e^3$   
 G.  $e^4$   
 H.  $3e \bullet \ln e^1$   
 J. 1  
 K. *no solution*
5. If the point (0, 3) is your starting point and (1,6) is next, followed by (2,12) write an exponential growth equation for this data: [6,702]
- A.  $y = 3(2x)^2$   
 B.  $y = 3(2)^x$   
 C.  $y = 3(x)^2$   
 D.  $y = 3(2x)$   
 E.  $y = 2(x)^3$
6. Sue has made a drawing using math functions. Her parabola  $y=(x+2)^2 - 6$  needs to be moved two spots to the left and up one spot. Which of these would work? [16,706]
- F.  $y=(x+2)^2 + 1$   
 G.  $y=(x+4)^2 - 7$   
 H.  $y= x^2 + 8x + 11$   
 J.  $y= x^2 + 2x + 1$   
 K.  $y= -2(x+2)^2 - 5$
7. In a geometric sequence with a starting value of 2 and a common ratio between terms of 1.5, what is the 12<sup>th</sup> term, rounded to the nearest whole number? [6,703]
- A. 19  
 B. 132  
 C. 173  
 D. 259  
 E.  $3.0 \times 10^6$
8. Given the general equation for a parabola  $y=ax^2+a$ , if  $a < 0$  which of the following statements must be true of the parabola?
- I. The y intercept must be negative  
 II. The roots are negative  
 III. The vertex is below the x axis. [16,705]
- F. I is true and II and III are false  
 G. II is true and I and III are false  
 H. I and II are true  
 J. II and III are true  
 K. I and III are true
9. The graph of a certain trig function has a y intercept of 1. Which of the following answers would fit this situation? [6,705]
- A. both  $y=\sin x$  and  $y=\cos x + 1$   
 B. both  $y=\tan x + 1$  and  $y=1\sin x + 1$   
 C. both  $y=\cos x$  and  $y=\sin (x + 2)$   
 D. both  $y=\tan x$  and  $y=\sin x$   
 E. both  $y=\cos x$  and  $y=\tan x$
10. Find the mean, median and mode for the following data set: {23,23,25,28,30,40} ? Round to the tenths place. [19,701]
- F. mean: 28, median: 27, mode: 23  
 G. mean: 28.2, median: 25,28 mode: 23  
 H. mean: 26.5, median: 28.2, mode: 23  
 J. mean: 28.2, median: 26.5, mode: 23  
 K. *none of the above are correct*

11. Gas prices increased from year 1 to year 2 by 3%. From year 2 to year 3 they increased by 7%. If in year 3 they were \$3.99, what was the price in year 1? [16,701]
- A. \$3.50  
 B. \$3.62  
 C. \$3.63  
 D. \$3.89  
 E. \$4.40

12. A circle is circumscribed in a square with sides of 8 units. What is the exact area that is inside the square but is not inside the circle [7,702]

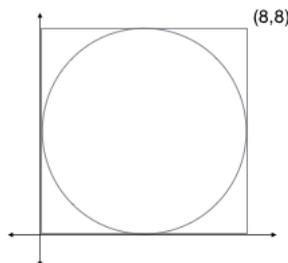
F. 13.7

G.  $4(16 - \pi)$

H.  $16 - 16\pi$

J.  $16\pi - 64$

K.  $(x - 4)^2 + (y - 4)^2 = 16$



13. Given the three horizontal lines that appear to be parallel ARE parallel, and angle f is  $60^\circ$  and angle d is  $70^\circ$ , what is sum of the measures of angles g and c? [7,704]

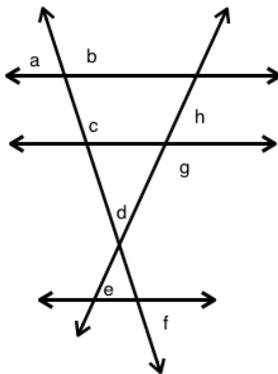
A.  $50^\circ$

B.  $180^\circ$

C.  $230^\circ$

D.  $240^\circ$

E.  $250^\circ$



14. Josh has a 90% weighted average. His homework counts for 15% of his grade and his tests count for 85%. Given that he performs 10% better on his tests than his homework, what was his percentage on tests? [19,601]

F. 91.5%

G. 90.5%

H. 90%

J. 88.5%

K. 87.5%

15. A line segment has an endpoint of (2,3) and a midpoint of (5,a). Its other endpoint? [7,511]

A. (7,3a)

B. (7, 3 + a)

C. (8,3 + a)

D. (8, 3 + 2a)

E. (8, 2a - 3)

16. The polynomial  $f(x) = x^3 + x^2 - x - 2$  is divided by  $x-2$ . What is the remainder? [1,703]
- F. -2  
 G. 2  
 H. 8  
 J. 9  
 K.  $x^2 - x$

17. The inequality  $x^2 - 5x + 4 \leq 0$  yields which of the following solution sets? [1,702]

A.  $1 \leq x \leq 4$

B.  $-1 \leq x \leq -4$

C.  $0 \leq x \leq 4$

D.  $-4 \leq x \leq 1$

E. *there is no solution*

18. The Probability of  $A \cup B$  is 95%. The probability of  $A \cap B$  is 30%. The probability of A is 55%. What is the probability of B (p(B)). [19,704]

F. 30%

G. 40%

H. 60%

J. 70%

K. 80%

19. At Samantha's Smoothies, they make a blended treat by combining 2 of 3 kinds of ice cream with 2 of 5 kinds of fruit. How many different smoothies can be made? [19,603]

A. 10

B. 25

C. 30

D. 60

E. 120

20. Use Trig Identities to simplify  $\frac{1}{\tan\theta\cos\theta}$ : [6,706]

F.  $\sin\theta$

G.  $\sec\theta$

H.  $\tan\theta$

J.  $\cot\theta$

K.  $\csc\theta$