

# Franklin Math Bowl

## Algebra I Exam 2006

1. The product of the first twenty positive integers divided by the product of the first seventeen positive integers is

- A. 6840      B. 380      C. 342      D. 6

2. Evaluate:  $-2x^2 - yx$  if  $x = -3$  and  $y = 2$ .

- A. 30      B. 12      C. -12      D. -24

3. The fish population at Lake Lanier is becoming overcrowded. Statisticians are catching fish at random, tagging them and then releasing them to understand their population growth. They found the ratio of tagged fish to untagged fish as 5:9. If the total population of fish is 10,000, how many are untagged? (round to the nearest fish)

- A. 6429      B. 5556      C. 3571      D. 4444

4. If  $\frac{x+y}{a-b} = \frac{7}{8}$ , find the value of:  $\frac{5x+5y}{7a-7b}$ .

- A.  $\frac{7}{8}$       B.  $\frac{5}{8}$       C.  $\frac{5}{7}$       D.  $\frac{49}{40}$

5. Cara and E.C. add a 5 foot by 4 yard rectangular deck to the back of their house. How much railing do they need to place around their deck? (The deck is attached to the house on one of the short sides.)

- A. 11 feet      B. 29 feet      C. 22 feet      D. 60 feet

6. A bookstore's markup for textbooks is 40%. What is the wholesale price for a textbook that sells for \$50.75?

- A. \$36.25      B. \$71.05      C. \$30.45      D. \$8.67

7. Simplify:  $5x - 3(2x - 2\{x - 2[1 - x]\})$

- A.  $12x - 17$       B.  $17x + 12$       C.  $12 - 17x$       D.  $17x - 12$

8 A tree is supported by a wire that is attached from the middle of its trunk diagonally to the ground. The obtuse angle formed by the wire and ground is supplementary to the acute angle the wire makes with the tree. The obtuse angle is three times the size of the acute angle. Find the measure of both angles.

- A. obtuse=  $67.5^\circ$  acute=  $22.5^\circ$     B. obtuse= $120^\circ$  acute =  $60^\circ$     C. obtuse=  $60^\circ$  acute =  $30^\circ$     D. obtuse= $135^\circ$  acute =  $45^\circ$

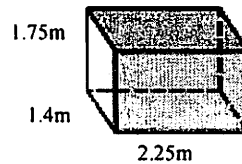
9. Find the dimensions of a rectangle with perimeter  $62m$  if the length is 5.2 times the width.

- A.  $5m$  by  $26m$     B.  $13m$  by  $12m$     C.  $5m$  by  $20.8m$     D.  $2m$  by  $10.4m$

10. Simplify completely:  $\frac{k^2 - 7k + 6}{k^2 + k - 2} \div \frac{k^2 - 14k + 48}{k^2 - 10k + 16}$

- A.  $\frac{(k-6)^2}{(k^2-4)}$     B.  $\frac{(k-6)(k-6)}{(k-2)(k+2)}$     C.  $\frac{(k-2)}{(k+2)}$     D.  $\frac{(k-1)}{(k+1)}$

11. Find the volume of the prism.



- A.  $5.51 \text{ m}^3$     B.  $6.30 \text{ m}^3$     C.  $14.18 \text{ m}^3$     D.  $12.78 \text{ m}^3$

12. Solve for x:  $\frac{3}{x} + \frac{1}{4} = 1$

- A.  $x=3$     B.  $x=4$     C.  $x = \frac{1}{4}$     D.  $x = \frac{1}{2}$

13. You and three friends travel to Washington. It takes 3 hours to travel 150 miles. If you travel to a different location at the same rate, how far will you travel in 5 hours and 15 minutes?

- A. 262.5 miles    B. 787.5 miles    C. 257.5 miles    D. 772.5 miles

14. Simplify:

$$2 + \left( \frac{2}{\left( 2 + \left( \frac{2}{(2+x)} \right) \right)} \right)$$

- A.  $2x$       B.  $\frac{(3x+8)}{(x+3)}$       C.  $\frac{(4x+9)}{(3x+8)}$       D.  $\frac{2}{(x+2)}$

15. You and your friend go to a Mexican restaurant. You order two tacos and two enchiladas and your friend orders three tacos and one enchilada. Your bill was \$4.80 and your friend's bill was \$4.00. How much was each taco and enchilada?

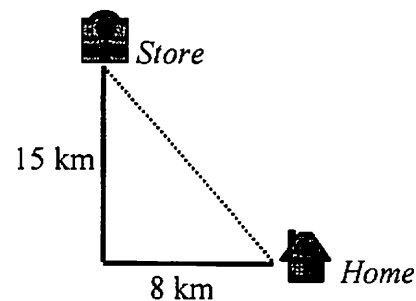
- A. taco = \$1.60      B. taco = \$ .80      C. taco = \$1.40      D. taco = \$ .60  
ench. = \$ .80      ench. = \$1.60      ench. = \$ .60      ench. = \$1.40

16. Solve.  $\sqrt{x-7} + 4 = -5$

- A. 8      B. -14      C. 14      D. No solution

17. To get to the store from his house, Billy biked 8 kilometers due west and then 15 kilometers due north. On the way back he cut across a field, taking the shortest possible route home. How far did Billy bike on the round-trip?

- A. 46 km      B. 40 km      C. 23 km      D. 17 km



18. Find the midpoint of the line segment connecting the two points.  $(-9, -15), (-6, 16)$

- A.  $(15, -1)$       B.  $\left(-\frac{3}{2}, -\frac{31}{2}\right)$       C.  $\left(-\frac{15}{2}, \frac{1}{2}\right)$       D.  $(-15, 1)$

19. Which of the following is equal to the expression  $x^3 - 2x^2 - 11x + 22$ ?

- A.  $(x-2)(x-11)$       B.  $(x-2)(x^2+11)$       C.  $(x-2)(x+11)$       D.  $(x-2)(x^2-11)$

20. Two cars leave Atlanta, GA. heading north towards Chattanooga, 105 miles away. Car 1 travels 65 mph up and 70 mph back. At what constant speed in mph must car 2 travel in order to return to Atlanta at the same time as car 1? Assume there is zero-turn around time and round to the nearest whole number.

- A. 66                      B. 67                      C. 69                      D. 70

21. Which of the following is the simplest form of  $\left(xy^{\frac{1}{3}}x^{\frac{2}{3}}\right)^3$ ?

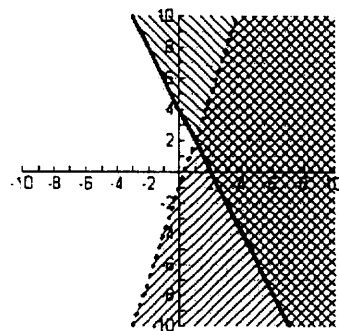
- A.  $x^6y$                       B.  $x^6y^{\frac{1}{9}}$                       C.  $x^5y$                       D.  $x^5y^{\frac{10}{3}}$

22. Which of the following is the simplest form of  $\frac{2}{3-\sqrt{6}}$ ?

- A.  $\frac{6+\sqrt{12}}{3}$                       B.  $\frac{6+2\sqrt{6}}{3}$                       C.  $\frac{6+2\sqrt{6}}{15}$                       D.  $\frac{6+\sqrt{12}}{15}$

23. Which system of inequalities is graphed?

- A.  $y < 3x - 1$   
 $2x + y \geq 4$                       B.  $y < 3x + 1$   
 $2x - y \geq -4$
- C.  $y < 3x - 1$   
 $2x - y \geq -4$                       D.  $y < 3x - 1$   
 $2x - y \geq 4$



24. Rewrite  $\frac{5 \times 10^{-2}}{8 \times 10^{-6}}$  in scientific notation.

- A.  $6.25 \times 10^5$                       B.  $6.25 \times 10^{-7}$                       C.  $6.25 \times 10^3$                       D.  $6.25 \times 10^{-9}$

25. Kirsten runs twice as fast as she walks. When going to school one day she walks for twice the amount of time that she runs, and it takes her twenty minutes. The next day she runs twice the time she walks. How long did it take her to get to school on the second day?

- A. 5 mins.                      B. 20 mins.                      C. 40 mins.                      D. 16 mins.