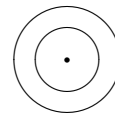


## Sample Mathematics Placement Exam

1. What is the area in square inches of the region between two concentric circles of radii 5 inches and 3 inches? See figure.

(a)  $2\pi$       (b)  $4\pi$       (c)  $9\pi$       (d)  $16\pi$       (e)  $25\pi$

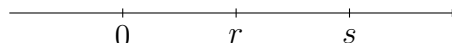


2. An article usually sells for \$8.00 but is on sale at 20% off. If there is a sales tax of 5%, the total cost to the buyer of the article is

(a) \$6.00      (b) \$6.08      (c) \$6.40      (d) \$6.72      (e) \$6.80

3. Let two numbers  $r$  and  $s$  be located on a number line as shown below. Which one of the following is true?

(a)  $r > s > 0$       (b)  $s < 0 < r$       (c)  $0 > s > r$   
 (d)  $0 > r > s$       (e)  $0 < r < s$



4. If  $\frac{4}{3}x - \frac{1}{2} = 0$ , then  $x =$

(a)  $\frac{3}{8}$       (b)  $\frac{2}{3}$       (c)  $\frac{3}{2}$       (d)  $\frac{11}{6}$       (e)  $\frac{8}{3}$

5.  $-5[4a - (-3)(2a)] =$

(a)  $-70a$       (b)  $-50a$       (c)  $-10a$       (d)  $5a$       (e)  $10a$

6.  $(xy^3)^2 =$

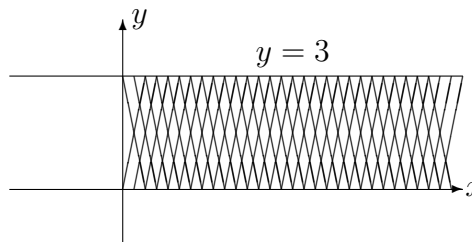
(a)  $x^2y^3$       (b)  $x^2y^6$       (c)  $(xy)^6$       (d)  $x^2y^5$       (e)  $(xy)^5$

7.  $\sqrt{3}(\sqrt{3} + 2) =$

(a)  $9 + 2\sqrt{3}$       (b) 5      (c)  $3 + 2\sqrt{3}$       (d)  $\sqrt{3} + 2\sqrt{3}$       (e) 11

8. The shaded area (including the boundary) represents the graph of which of the following sets of inequalities?

(a)  $x \leq 3$  and  $y \leq 3$   
 (b)  $x \leq 3$  and  $y \geq 0$   
 (c)  $0 \leq x \leq 3$  and  $y \geq 0$   
 (d)  $y \leq 3$  and  $x \geq 0$   
 (e)  $0 \leq y \leq 3$  and  $x \geq 0$



9.  $\frac{x-3}{8} - \frac{7}{4} = \frac{5}{8}$  has a solution of  
(a)  $-12$  (b)  $-6$  (c)  $15$  (d)  $16$  (e)  $22$
- 

10.  $\frac{x}{5y} \div \frac{2x}{3y} =$   
(a)  $\frac{3}{10}$  (b)  $\frac{2x^2}{15y^2}$  (c)  $\frac{x}{15y}$  (d)  $\frac{10}{3}$  (e)  $\frac{x+3y}{2x+5y}$
- 

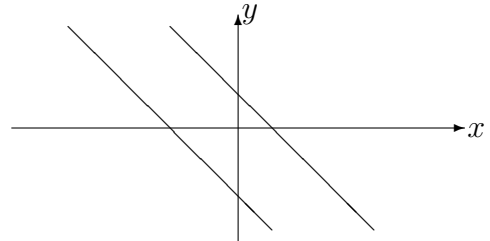
11. If  $f(x) = \frac{x+3}{5-x}$ , then  $f(a+4) =$   
(a)  $\frac{a+7}{1-a}$  (b)  $\frac{a+7}{9-a}$  (c)  $\frac{38-6a}{5-a}$  (d)  $\frac{23-3a}{5-a}$  (e)  $\frac{a+7}{5-a}$
- 

12. If  $x^2 + 2x = 3$ , then  $x$  could equal  
(a)  $-3$  (b)  $-2$  (c)  $-1$  (d)  $0$  (e)  $3$
- 

13.  $\sqrt[6]{a^2b^3} =$   
(a)  $a^{12}b^{18}$  (b)  $a^{-4}b^{-3}$  (c)  $a^{1/3}b^{1/2}$  (d)  $a^4b^3$  (e) None of above
- 

14. The two parallel lines represent the graphs of which of the following pair of equations?

- (a)  $x - 2y = 3$  and  $x - 2y = 7$   
(b)  $x + y = 1$  and  $x + y = -2$   
(c)  $x + y = 3$  and  $2x + 2y = 6$   
(d)  $x + y = 3$  and  $x - y = 5$   
(e)  $x - y = 7$  and  $x - y = 14$



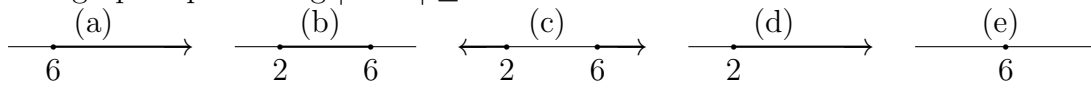
15. For any  $x$ ,  $|x - 7| =$   
(a)  $x - 7$  (b)  $|7 - x|$  (c)  $|x + 7|$  (d)  $-x - 7$  (e)  $|-(x + 7)|$
- 

16.  $\log_6 4 + \log_6 9 =$   
(a)  $2$  (b)  $\log_6 13$  (c)  $\frac{13}{6}$  (d)  $78$  (e)  $\log_6(\frac{4}{9})$
- 

17. Given a rectangle with sides of length  $x$  and width  $y$ . Suppose the length  $x$  is doubled and the width  $y$  is halved. The new perimeter is  
(a)  $4x + y$  (b)  $(2x)(\frac{y}{2})$  (c)  $2x + \frac{y}{2}$  (d)  $x^2 + y$  (e)  $x^2 + \frac{y}{2}$
- 

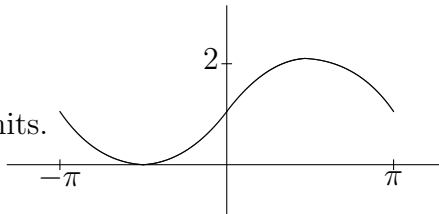
18. If  $\log_2 16 = 8 \cdot 2^{-x}$ , then  $x =$   
(a)  $-7$  (b)  $-\frac{4}{3}$  (c)  $-1$  (d)  $-\frac{2}{3}$  (e)  $1$
-

19. The graph representing  $|x - 4| \geq 2$  is



20. Which of these choices best describes the alteration made to the graph of the sine curve,  $y = \sin x$ , for  $-\pi \leq x \leq \pi$ ?

- (a) The amplitude of the graph was doubled.  
 (b) The graph was shifted to the left  $\pi$  units.  
 (c) The period of the graph was decreased to  $\pi$  units.  
 (d) The graph was reflected about the  $x$ -axis.  
 (e) The graph was shifted up 1 unit.

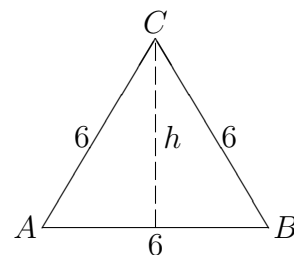


21.  $\sin\left(\frac{3\pi}{4}\right) =$

- (a)  $-\frac{1}{\sqrt{2}}$       (b)  $-\frac{1}{2}$       (c)  $\frac{1}{2}$       (d)  $\frac{1}{\sqrt{2}}$       (e)  $\frac{\sqrt{3}}{2}$

22. Triangle  $ABC$  at the right is an equilateral triangle. The height  $h$  of the triangle is

- (a) 3      (b)  $3\sqrt{3}$       (c)  $6\sqrt{3}$       (d)  $3\sqrt{2}$       (e)  $6\sqrt{2}$



23. When  $\frac{\pi}{2} < \theta < \frac{3\pi}{4}$ , which of the following could possibly be  $\tan \theta$ ?

- (a)  $-8$       (b)  $-\frac{1}{8}$       (c) 0      (d)  $\frac{1}{8}$       (e) 8

24. For all real numbers  $x$ ,  $\cos^2 x - \sin^2 x =$

- (a) 0      (b) 1      (c)  $\sin(2x)$       (d)  $\cos(2x)$       (e)  $\cos\left(\frac{x}{2}\right)$

25. If  $f(x) = 10^{\left(\frac{1+x}{1-x}\right)}$ , then  $f(3) =$

- (a)  $-100$       (b)  $-\frac{1}{100}$       (c)  $\frac{1}{100}$       (d) 100      (e) 1000

## Answers

- |      |       |       |       |       |
|------|-------|-------|-------|-------|
| 1. d | 6. b  | 11. a | 16. a | 21. d |
| 2. d | 7. c  | 12. a | 17. a | 22. b |
| 3. e | 8. e  | 13. c | 18. e | 23. a |
| 4. a | 9. e  | 14. b | 19. c | 24. d |
| 5. b | 10. a | 15. b | 20. e | 25. c |

If you are taking the Math Placement Exam online, log into Sakai at <http://sakai.ithaca.edu>  
 Make sure you have scrap paper and a calculator available. Good luck!