

## Practice test 1

The actual test will consist of 6 multiple choice questions and 6 regular problems.  
You will have 1 hour to complete the exam.

## Multiple choice questions: circle the correct answer

- The function  $f(x) = \sin(x) + x^2$  is  
A. even      B. odd      C. both even and odd      D. neither even nor odd
- If we shift the graph of  $y = \sin(x)$  2 units to the left, then the equation of the new graph is  
A.  $y = \sin(x) + 2$       B.  $y = \sin(x) - 2$       C.  $y = \sin(x + 2)$       D.  $y = \sin(x - 2)$   
E.  $y = \sin(x/2)$
- The domain of the function  $f(x) = \frac{1}{\sqrt{x-1}}$  is the set of all real numbers  $x$  for which  
A.  $x > 0$       B.  $x \neq 0$       C.  $x \geq 1$       D.  $x > 1$       E.  $x \neq 1$
- Simplify  $\frac{1+x}{x} - \frac{\frac{1}{x} + 1}{x+1}$ .  
A. 1      B.  $x$       C.  $x + 1$       D.  $\frac{1}{x}$       E.  $\frac{x-1}{x+1}$
- Let  $f(x) = \begin{cases} -x - 2 & \text{if } x < -1 \\ x - 3 & \text{if } -1 \leq x \leq 1 \\ 2 - x^2 & \text{if } x > 1 \end{cases}$ . Find  $f(1)$ .  
A. -3      B. -2      C. -1      D. 0      E. 1
- If  $f(x) = 1 + x$  and  $g(x) = x^2 - 6$ , find  $(f \circ g)(-2)$ .  
A. -9      B. -7      C. -5      D. -1      E. Undefined

**Regular problems: show all your work**

7. Use transformations of functions to sketch the graphs of:

- (a)  $(x - 3)^2$
- (b)  $3 \cos x + 2$
- (c)  $-\sin\left(x - \frac{\pi}{2}\right)$
- (d)  $e^{-x-1}$

8. Find a formula for the function whose graph is obtained from the graph of  $f(x) = e^x - 1$  by

- (a) Reflecting about the  $y$ -axis and then compressing horizontally by a factor of 2.
- (b) Vertically compressing by a factor of 5 and then shifting 3 units to the left.
- (c) Reflecting about the  $x$ -axis and then shifting 2 units down.

9. Let  $f(x) = 2 - x$ ,  $g(x) = \frac{1}{x}$ ,  $h(x) = \sqrt{x+1}$ . Find the following functions and their domains:

- (a)  $f + g$
- (b)  $f - g$
- (c)  $fg$
- (d)  $\frac{f}{g}$
- (e)  $g \circ f$
- (f)  $f \circ h$
- (g)  $g \circ h$
- (h)  $f \circ g \circ h$

10. Find the distance between  $(-4, 3)$  and  $(2, 11)$ .

11. Write an equation of the circle

- (a) whose radius is 3 and center is at  $(3, -4)$
- (b) whose center is at  $(-2, 0)$  and that passes through the point  $(1, 4)$

12. Write an equation of the line that

- (a) has slope 2 and passes through the point  $(-1, 3)$
- (b) passes through the points  $(-1, 3)$  and  $(0, -6)$
- (c) is parallel to the line  $y = 7x - 1$  and passes through  $(0, -6)$

(d) is perpendicular to the line  $y = 7x - 1$  and passes through  $(0, -6)$

13. Evaluate the following expressions:

(a)  $\sin\left(\frac{\pi}{6}\right)$

(b)  $\cos\left(\frac{\pi}{4}\right)$

(c)  $\tan\left(-\frac{\pi}{3}\right)$

(d)  $\sec\left(\frac{2\pi}{3}\right)$