Practice test 1

The actual test will consist of 6 multiple choice questions and 6 regular problems. You will have 50 minutes to complete the exam.

Multiple choice questions: circle the correct answer

1. The function $f(x) = \sin(x) + x^2$ is

    A. even   **B.** odd   **C.** both even and odd   **D.** neither even nor odd

2. 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. $y = \sin(x/2)$

3. The domain of the function $f(x) = \dfrac{1}{\sqrt{x - 1}}$ 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.** $x \neq 1$

4. Simplify $\dfrac{1 + x}{x} - \dfrac{\frac{1}{x} + 1}{x + 1}$.

    A. 1   **B.** x **C.** $x + 1$ **D.** $\dfrac{1}{x}$ **E.** $\dfrac{x - 1}{x + 1}$

5. 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

6. 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) $-\sin\left(x - \dfrac{\pi}{2}\right)$

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

   (a) $f + g$

   (b) $f - g$

   (c) fg

   (d) $\dfrac{f}{g}$

   (e) $g \circ f$

   (f) $f \circ h$

   (g) $g \circ h$

   (h) $f \circ g \circ h$

10. Find the inverse function of:

    (a) $f(x) = 5x - 4$

    (b) $f(x) = (x+1)^3$

    (c) $f(x) = e^x + 5$

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

12. 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 $(1, 4)$

13. Write an equation of the line that

    (a) has slope 2 and passes through the point $(-1, 3)$

    (b) passes throught 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 $(0, -6)$

14. Evaluate the following expressions:

    (a) $\dfrac{2^5 \sqrt{2^{20}}}{2^{18}}$

    (b) $\log_2 32$

    (c) $\log_4 \left(\dfrac{1}{2} \right)$

    (d) $3^{\log_3 7}$

    (e) $\sin \left(\dfrac{\pi}{6} \right)$

    (f) $\cos \left(\dfrac{\pi}{4} \right)$

    (g) $\arcsin(1)$

    (h) $\arccos \left(\dfrac{1}{2} \right)$