

Exercises

No calculator is allowed for these questions.

1. The following functions have been shifted as described. Circle the equation that matches each description, then sketch its graph.

- (a) $y = \ln x$ shifted right 2 units.

$$y = \ln(x + 2) \qquad y = \ln(x - 2)$$

$$y = \ln x + 2 \qquad y = \ln x - 2$$

- (b) $y = 2^x$ shifted down 1 unit.

$$y = 2^x - 1 \qquad y = 2^{x-1}$$

$$y = 2^{x+1} \qquad y = 2^x + 1$$

- (c) $y = |x|$ shifted left 3 units.

$$y = |x + 3| \qquad y = |x - 3|$$

$$y = |x| + 3 \qquad y = |x| - 3$$

- (d) $y = x^2$ shifted up 2 units and right 4 units.

$$y = (x - 2)^2 - 4 \qquad y = (x - 2)^2 + 4$$

$$y = (x^2 + 4) + 2 \qquad y = (x - 4)^2 + 2$$

- (e) $y = \sin x$ reflected across the x -axis.

$$y = \sin(-x) \qquad y = \sin(x - 1)$$

$$y = -\sin x \qquad y = -\sin(-x)$$

2. Write the domain for each of the following functions. Then sketch the graph.

(a) $y = \ln x^2$

(b) $y = |x + 2|$

(c) $y = -\ln(x - 1)$

Multiple Choice Questions

A graphing calculator is required for some of these questions.

1. The graph of $y = x^2$ first reflected across the x -axis and then shifted down one unit is

(A) $y = 1 - x^2$

(B) $y = 1 + x^2$

(C) $y = 1 - x^{-2}$

(D) $y = -1 - x^2$

2. The graph of $y = x^2$ first shifted down one unit and then reflected in the x -axis is

(A) $y = x^2 - 1$.

(B) $y = 1 - x^2$.

(C) $y = 1 + x^2$.

(D) $y = 1 - x^{-2}$.

3. The inverse of the function $y = x^2$ with domain $= \{x \leq 0\}$ has equation.

(A) $y = x^2$.

(B) $y = \sqrt{x}$.

(C) $y = \pm\sqrt{x}$.

(D) $y = -\sqrt{x}$.

Free-Response Questions

A graphing calculator is required for some questions.

1. Sketch the graph of $y = \frac{1}{x}$, and then use it to sketch the graphs of the following functions without a calculator. Check your results by graphing each equation in the calculator.

(a) $y = \frac{1}{x - 1}$

(b) $y = \frac{1}{x} - 1$

(c) $y = \frac{1}{x + 2} + 2$

(d) the inverse of $y = \frac{1}{x}$

2. Describe the translations and/or reflections that transform $y = x^{2/3}$ into the following:

(a) $y = x^{2/3} + 2$

(b) $y = -x^{2/3} - 3$

(c) $y = (-x)^{2/3}$

(d) $y = (x - 1)^{2/3} + 1$