1. The one-to-one function $f$ is defined below.

$$f(x) = (x - 4)^3$$

Find $f^{-1}$, the inverse of $f$. Then give the domain of $f^{-1}$ using interval notation.

2. The one-to-one function $f$ is defined by

$$f(x) = \frac{-8x + 5}{7x + 2}.$$ 

Find $f^{-1}$, the inverse of $f$. Then, give the domain and range of $f^{-1}$ using interval notation.
3. For each function graphed below, state whether it is one-to-one.

One-to-one?:
Yes   No

One-to-one?:
Yes   No

One-to-one?:
Yes   No
One-to-one?:
Yes  No

One-to-one?:
Yes  No

One-to-one?:
Yes  No

One-to-one?:
Yes  No
4. Suppose \( H(x) = \sqrt[3]{3x + 6} \).

Find two functions \( f \) and \( g \) such that \( (f \circ g)(x) = H(x) \).

Neither function can be the identity function.
(There may be more than one correct answer.)

5. For the real-valued functions \( g(x) = \sqrt{2x + 12} \) and \( h(x) = x - 2 \), find the composition \( g \circ h \) and specify its domain using interval notation.

\[
(g \circ h)(x) = \]

Domain of \( g \circ h : \)

6. Suppose that the functions \( f \) and \( g \) are defined as follows.

\[
f(x) = 4x - 3
\]
\[
g(x) = \frac{1}{\sqrt{x - 2}}
\]

Find \( f - g \) and \( f \circ g \). Then, give their domains using interval notation.

\[
(f - g)(x) = [ ]
\]

Domain of \( f - g : [ ] \)

\[
(f \circ g)(x) = [ ]
\]

Domain of \( f \circ g : [ ] \)
7. The graph of \( y = f(x) \) is shown below.
Graph \( y = -f(x - 2) \).

8. Below is the graph of \( y = |x| \).
Translate it to make it the graph of \( y = |x + 3| - 1 \).
9. The graph of $f$ (in blue) is translated a whole number of units horizontally and vertically to obtain the graph of $k$ (in red).

The function $f$ is defined by $f(x) = |x|$. Write down the expression for $k(x)$. 

10. Four functions are given below. Either the function is defined explicitly, or the entire graph of the function is shown.

For each, decide whether it is an even function, an odd function, or neither.

The function \( f \)

- Even - Odd - Neither

The function \( g \)

\[ g(x) = -2x^5 + 7x^2 \]

- Even - Odd - Neither

The function \( h \)

\[ h(x) = -2x^5 + 3x^3 \]

- Even - Odd - Neither
11. Find the difference quotient \( \frac{f(x+h) - f(x)}{h} \), where \( h \neq 0 \), for the function below.

\[ f(x) = 3x^2 - 6 \]

Simplify your answer as much as possible.

12. Find the domain of the function.

\[ f(x) = \frac{\sqrt{x+4}}{-2x+7} \]

Write your answer as an interval or union of intervals.

13. Simplify. Write your answers without exponents.

\[ \left( \frac{1}{8} \right)^{\frac{4}{3}} = \]

\[ 125^{-\frac{2}{3}} = \]
14. Determine the interval(s) on which the function is (strictly) decreasing.

Write your answer as an interval or union of intervals.

15. Sam can choose Plan A or Plan B for his long distance charges. For each plan, cost (in dollars) depends on minutes used (per month) as shown below.

a. If Sam makes 160 minutes of long distance calls for the month, which plan costs less? How much less does it cost than the other plan?

b. For what number of long distance minutes do the two plans cost the same? If the time spent on long distance calls is less than this amount, which plan costs less?
1. \( f^{-1}(x) = \sqrt[3]{x} + 4 \)
   Domain of \( f^{-1} \): \((-\infty, \infty)\)

2. \( f^{-1}(x) = \frac{2x-5}{-7x-8} \)
   Domain \( f^{-1} \): \((-\infty, -\frac{8}{7}) \cup (-\frac{8}{7}, \infty)\)
   Range \( f^{-1} \): \((-\infty, -\frac{2}{7}) \cup (-\frac{2}{7}, \infty)\)

3. 
   ![Graphs](image)

4. \( f(x) = \sqrt[3]{x} \)
   \( g(x) = 3x + 6 \)

5. \((g \circ h)(x) = \sqrt{2x+8}\)
   Domain of \( g \circ h \): \([-4, \infty)\)
6. \[(f - g)(x) = 4x - 3 - \frac{1}{\sqrt{x - 2}}\]

Domain of \(f - g\): \((2, \infty)\)

\[(f \cdot g)(x) = \frac{4x - 3}{\sqrt{x - 2}}\]

Domain of \(f \cdot g\): \((2, \infty)\)

7. [Graph of \(f(x)\) showing a series of lines and points.]

8. [Graph of \(g(x)\) showing a line passing through the origin and another line with a y-intercept.]

9. \(k(x) = |x - 3| + 2\)
10. The function $y$

$-\text{ Odd}$

The function $s$

$-\text{ Neither}$

$g(x) = -2x^5 + 7x^2$

$-\text{ Neither}$

$h(x) = -2x^5 + 3x^3$

$-\text{ Odd}$

11. $\mathbb{G} x + 3 \ h$

12. $\left[ -4, \frac{7}{2} \right) \cup \left( \frac{7}{2}, \infty \right)$
13. \[
\left( \frac{1}{8} \right)^\frac{4}{3} = \frac{1}{16}
\]
\[
125 \cdot \frac{2}{3} = \frac{1}{25}
\]

14. \((-6, -4) \cup (-1, 1)\)

15. (a) If Sam makes 160 minutes of long distance calls for the month, which plan costs less?

Plan B

How much less does it cost than the other plan?

$2

(b) For what number of long distance minutes do the two plans cost the same?

120

If the time spent on long distance calls is less than this amount, which plan costs less?

Plan A