

Principles of Calculus Modeling: An Interactive Approach by Donald Kreider, Dwight Lahr, and Susan Diesel
Exercises for Section 1.3

Homework problems copyright ©2000–2005 by Donald L. Kreider, C. Dwight Lahr, Susan J. Diesel.

1. (1 pt)

Find the domain and range of the function $f(x) = -6 + 4\sqrt{x}$. Type **-infinity** for $-\infty$ and **infinity** for ∞ , without quotes.

Domain: _____ to _____
Range: _____ to _____

2. (1 pt)

Consider the function $f(x) = \frac{7}{-6x+9}$. Are there any values for x which are **not** in the **domain** of f ? If your answer is yes, enter the value or the interval of values as appropriate. If your answer is no, leave answer boxes blank. Leave any unused answer boxes blank.

Single value not in the domain of f : _____
Interval not in the domain of f : (_____ , _____)

Are there any values which are **not** in the **range** of f ? If your answer is yes, enter the value or the interval of values as appropriate. If your answer is no, leave answer boxes blank. Leave any unused answer boxes blank.

Single value not in the range of f : _____
Interval not in the range of f : (_____ , _____)

3. (1 pt)

What is the domain of the function $g(x) = \frac{5}{4 - \sqrt{x-6}}$?

- _____
- A. All real numbers except $x = 6$ and $x = 22$.
 - B. All real numbers except $x = 22$.
 - C. All real numbers satisfying $x \geq 6$ and $x \neq 22$.
 - D. All real numbers satisfying $x \geq 6$.
 - E. None of these.

4. (1 pt)

Is the function $f(x) = 6x^4 - 6x^2$ **odd**, **even**, or **neither**? Type one of these three words in the answer box, without quotes.

5. (1 pt)

Is the function $f(x) = \frac{10}{x^2-5}$ **odd**, **even**, or **neither**? Type one of these three words in the answer box, without quotes.

Are there values of x which are not in the domain of f ? Enter answers in increasing order, using only as many answer boxes as you need, leaving the others blank. If there are no values which are excluded from the domain, leave all boxes blank.

6. (1 pt)

What type of symmetry does the function $f(x) = x^3 + 3x^2 + 3x + 10$ have? Leave any unused answer boxes blank.

Hint: Try rewriting the function.

Symmetry about the point (_____ , _____).

Symmetry about the vertical line $x =$ _____.

Symmetry about the horizontal line $y =$ _____.

7. (1 pt)

You may use an applet, Maple, or another computer program for this problem.

Graph the function $f(x) = \frac{x^2 - 4x + 3}{x^2 - 4x + 5}$ and determine the symmetries of the graph by examining the plot, entering your answers below. Leave blank the spaces that do not apply.

Symmetry about the point (_____ , _____)

Symmetry about the vertical line $x =$ _____

Symmetry about the horizontal line $y =$ _____

8. (1 pt)

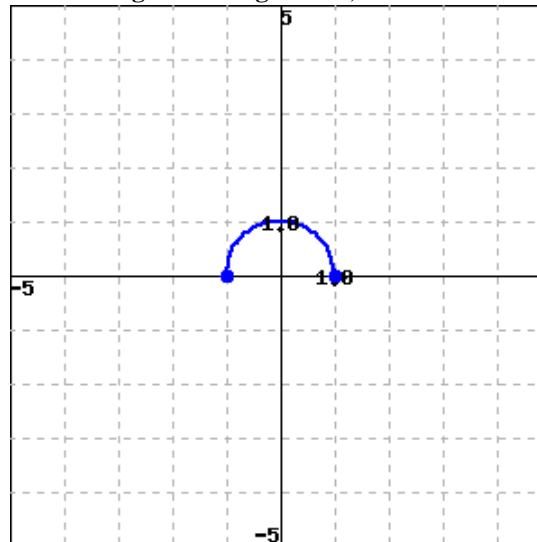
Find the domain and range of the function $f(x) = \frac{9}{4+x^2}$.

Enter your answers in the spaces below. Type **-infinity** for $-\infty$ and **infinity** for ∞ , without quotes.

Domain: _____ to _____
Range: _____ to _____

9. (1 pt)

Find the domain and range of the function graphed below. (Click on image for a larger view)



Enter your answers in the spaces below. Type **-infinity** for $-\infty$ and **infinity** for ∞ , without quotes.

Domain: _____ to _____
Range: _____ to _____

10. (1 pt)

Is the function $f(x) = -7x^4 - 4x^2$ **odd**, **even**, or **neither**? Type one of these three words in the answer box, without quotes.

11. (1 pt)

Consider the function $f(x) = \frac{\sqrt{x^2 - 36}}{(x+15)(x-16)}$. Are there any values for x which are **not** in the **domain** of f ?

If your answer is yes, enter the single values (in increasing order) or the interval of values as appropriate. If your answer is no, leave answer boxes blank. Leave any unused answer boxes blank.

Single values not in the domain of f :

Interval not in the domain of f :

(_____ , _____)

12. (1 pt)

Consider the function $f(x) = \frac{x^2 - 12x + 35}{x^2 + 11x + 30}$. Are there any values for x which are **not** in the **domain** of f ?

If your answer is yes, enter the single values (in increasing order) or the interval of values as appropriate. If your answer is no, leave answer boxes blank. Leave any unused answer boxes blank.

Single values not in the domain of f :

Interval not in the domain of f :

(_____ , _____)

13. (1 pt)

Consider the function $f(x) = \frac{\sqrt{x-8}}{\sqrt{x+6} - \sqrt{x-6}}$. Which choice below best describes the domain of f ?

- A. $x \leq -6$
- B. $x \geq 6$
- C. $x \geq 8$
- D. $x \geq 12$
- E. $x \geq 6$ and $x \neq 12$

14. (1 pt)

Consider the function $f(x) = \frac{\sqrt{x^2 - 64}}{\sqrt{x^2 + 36} - \sqrt{x^2 - 36}}$. The domain of f consists of all real values of x **except**:

- A. $x = -6, x = 6$
- B. $x < 6$
- C. $-6 < x < 6$
- D. $-6 < x < 6, x = -8, x = 8$
- E. $-8 < x < 8$

15. (1 pt)

Is the function $f(x) = x^3 - 7 + \sqrt{x^2 + 14x + 49}$ **odd**, **even**, or **neither**?

Type one of these three words in the answer box, without quotes.

16. (1 pt)

Let the function $f(x)$ be given by $f(x) = \frac{x^3 + 9x^2 - 9x - 81}{\sqrt{x^2 + 18x + 81}}$

when $x \neq -9$ and $f(x) = 0$ when $x = -9$.

Is f **odd**, **even**, or **neither**?

Type one of these three words in the answer box, without quotes.