

CHAPTER 1:

1.1 Four ways to represent a function

1. Find the domain of:

- (a) polynomial
 - (b) $\sqrt[3]{f(x)}$
 - (c) $\sqrt{f(x)}$:
 - i. $\sqrt{x^2 - a}$
 - ii. $\sqrt{a - x^2}$
 - iii. $\sqrt{x^2 + a}$
 - iv. $\sqrt{x \pm a}$ or $\sqrt{a \pm x}$
 - (d) Fraction:
 - i. $D = \mathbb{R}$
 - ii. $D = \mathbb{R} - \{zeros\}$
 - (e) Fraction with radicals
 - (f) Absolute value
 - (g) Piecewise defined function
-

2. Find the range:

- (a) Absolute value
 - (b) polynomial [$x^2 \pm a$ or $a - x^2$]
 - (c) Radicals :
 - i. $\sqrt{a - x^2}$
 - ii. $\sqrt{x^2 - a}$
 - iii. $\sqrt{x^2 + a}$
 - iv. $\sqrt{x \pm a}$ or $\sqrt{a \pm x}$
-

3. Choose the correct graph ($f(x)$ is given) or the correct function (the graph is given) :

- (a) of standard functions
 - (b) of Piecewise defined function
-

4. Function or not (graph is given) using the vertical line test.

5. From the graph find :

- (a) Domain
- (b) Range

6. Increasing and decreasing functions:

- (a) from graphs
 - (b) statements (true or false)
 - (c) Intervals where the function inc. or dec.(standard functions)
-

7. Even and odd:

- (a) Classify (even or odd)
 - (b) Statements (true or false)
(example: definitions or $f(x) = \dots$ is odd (T or F))
 - (c) symmetry:
 - i. choose (ex: $f(x) = \dots$ is symmetric about (a-y-axis b-x-axis.....).)
 - ii. from the graph (even or odd)
 - iii. True or false(ex: $f(x) = \dots$ is symmetric about the origin. (T or F)
-

1.2 A catalog of essential functions.

- i. Classify
 - ii. True or false (example: $f(x) = \dots$ is a polynomial (T or F) question)
 - iii. Domain or Range for (power , exponential, logarithmic,)
-

1.3 New functions from old functions

1. Find the domain of:

- (a) $f(x) \circ g(x)$
 - (b) $f(x) \pm g(x)$ or $f(x)g(x)$
 - (c) $f(x)g(x)$
-

2. Find or evaluate or compute:

- (a) $f(x) \circ g(x)$
 - (b) $f(x) \pm g(x)$
 - (c) $f(x)g(x)$
 - (d) $f(x)g(x)$
 - (e) $f(x) \circ g(x) \circ h(x)$
 - (f) find $f(x), g(x)$ from $f(x) \circ g(x)$
 - (g) $(f \circ g)(a)$, where $a \in \mathbb{R}$.
-

3. Shifting:

- (a) find the domain of the new function
 - (b) find the range of the new function
 - (c) explain the transformation (the new $f(x)$ is given)
 - (d) choose the correct $f(x)$ after the shift
 - (e) Graphs:
 - i. choose the correct new $f(x)$ (the graph is given)
 - ii. choose the correct graph (the new $f(x)$ is given)
-

4. Reflecting (*or shift and reflect*)

- (a) find the domain of the new function
 - (b) find the range of the new function
 - (c) explain the transformation (the new $f(x)$ is given)
 - (d) choose the correct $f(x)$ after (the shift or reflect)
 - (e) Graphs:
 - i. choose the correct new $f(x)$ (the graph is given)
 - ii. choose the correct graph (the new $f(x)$ is given)
-

Appendix D

1. Convert:

- (a) radian \rightarrow degree
 - (b) degree \rightarrow radian
-

2. find the trigonometric functions using the triangle
ex:(If $\sin \theta = \frac{1}{2}$ then $\tan \theta = \dots$)
3. period
4. even or odd
5. table (choose the correct value)
6. Identities (T or F) or (applications)
7. Find the domain or the range.(Note: range $|\cos(x)| = [0, 1]$)

8. Graphs (with shift or reflect) P.38 example 3
 - (a) graph is given
 - (b) function is given

1.5 Exponential Functions

1. statements:
 - (a) laws
 - (b) increasing or decreasing

2. graphs of a^x

3. shift or reflect graphs
 - (a) graph is given
 - (b) function is given

4. Domain of $f(x)$ including e^x or a^x (or domain with shift or reflect)
5. Range of $f(x)$ including e^x or a^x (or range with shift or reflect)