

## Midterm 1: REVIEW

For #1-4, state if the sequence is arithmetic, geometric or neither.

- 1) 3, 30, 300, 3000,...
- 2) 1, 4, 9, 16,...
- 3) 27, 21, 15, 9,...
- 4) 40, 10, 10/4, 10/16,...

For # 5-17, find the indicated sum:

- 5) If  $a_n = 3n^2 - 1$ , find  $a_8$
- 6) If  $a_n = 3 - n^2$ , find  $a_{10}$
- 7) What is the 27<sup>th</sup> term in the sequence -10, -7, -4, -1...?
- 8) What is the 23<sup>rd</sup> term in the sequence 48, 24, 12, 6,...

$$9) \sum_{i=1}^{12} 4 =$$

$$10) \sum_{i=1}^{15} -2i + 1 =$$

$$11) \sum_{i=1}^{\infty} 4 \left( \frac{2}{3} \right)^{i-1} =$$

$$12) \sum_{i=1}^{\infty} \left( \frac{3}{4} \right) (4)^{i-1} =$$

13)  $\sum_{i=1}^{\infty} \frac{4}{3^{i-1}}$

14) What is the sum of the first 83 terms for  $91+86+81+76+\dots$ ?

15) Find the sum of the following infinite series:  $81+27+9+3+\dots$ ?

16) Find the sum of the following infinite series:  $25+15+9+27/5+\dots$

17) Find the sum of the following infinite series:  $\frac{1}{2}+1+2+4+\dots$

Answer each of the following:

18) You're on vacation and have brought with you 3 pair of shorts, 4 shirts and 2 pair of shoes. How many different outfits can you make?

19) There are 18 jelly-bellies in a jar, each are different flavors. How many different ways can you select 4 jelly-bellies?

20) There are 100 sales people at a large corporation. The president of the corporation has decided she will select a head of sales, assistant to the head of sales, and secretary from the pool of 100. How many different options does the president have?

21) If you have four different gifts and you want to give each one of your four best friends one of them, how many different ways can you give your gifts?

22) You work for a large corporation that likes to give gifts to politicians. There is a pool of 12 different gifts that you can give and you have to select a specific gift for three different people, how many ways could you give the gifts?

23) You just got your first credit card and need to choose a four-digit pin number.

a) Assuming you must use 0-9 for each digit but there are no other restrictions, how many possible pin numbers are there?

b) You've decided that you want a pin number where the four digits are unique (no repeated digits). How many possible pin numbers are there if you make this restriction?

24) There are 10 people interested in learning how to use a new interactive technology, but the instructor can only train 3 people. How many ways might she choose the three people?

25) You're at the gym and need to work out your arms, abs and legs. There are 3 machines for arms, two for abs and 6 for legs. You only have time to use one machine for each area (arms, abs and legs). How many different ways could you select the machines you will use?

26) What is  $\binom{12}{5}$ ?

27) Write  $(x - 3)^4$  in expanded notation using the binomial theorem

28) If  $f(x) = 2x - 3$  and  $g(x) = x^2 - 3$ , then what is

a)  $f \circ g(x)$

b)  $g \circ f(x)$

For 29 – 32, state the implied domain

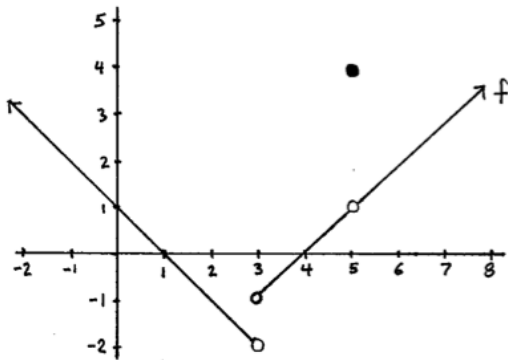
29)  $f(x) = x^2 - 3x - 10$

30)  $g(x) = \sqrt{5 - 2x}$

31)  $h(x) = \frac{x^2 + 5x - 14}{x + 3}$

32)  $q(x) = \sqrt[3]{4 - 3x}$

Below is the graph of a function  $f(x)$ . Use the graph to answer questions 26-30



33) What is  $f(0)$ ?

33) \_\_\_\_\_

34) Find all  $x$  for  $f(x)=0$ .

34) \_\_\_\_\_

35) What is  $f(5)$ ?

35) \_\_\_\_\_

36) What is the domain of  $f(x)$ ? 3

36) \_\_\_\_\_

37) State the range of  $f(x)$

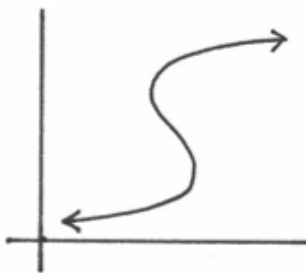
37) \_\_\_\_\_

38) State all  $x$  and  $y$  intercepts

38)  $x$  intercept(s) \_\_\_\_\_

39)  $y$  intercept(s) \_\_\_\_\_

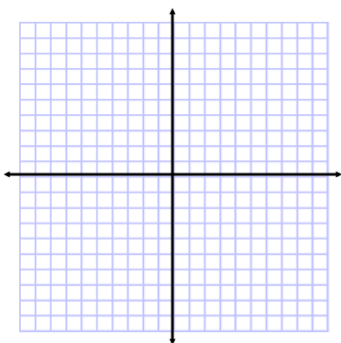
40) Is the picture below the graph of a function?



For numbers 31 – 50 graph and state the domain and range of each.

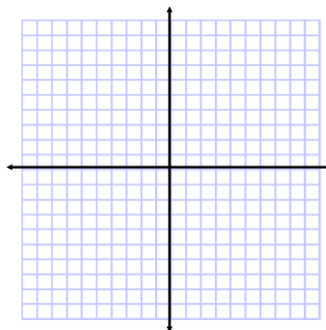
41)  $f(x) = x$       D=

R=



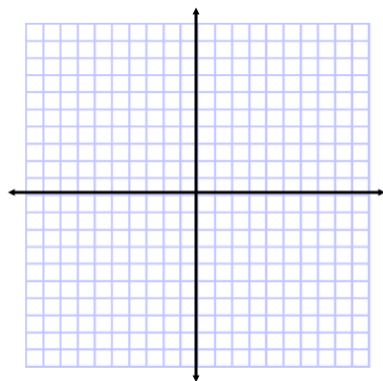
42)  $f(x) = 2$       D=

R=



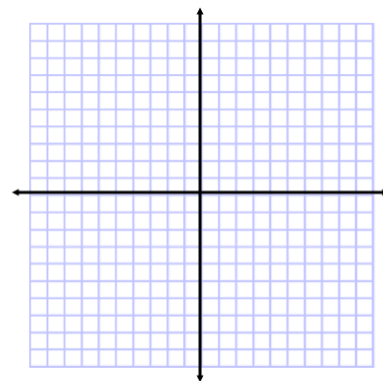
43)  $f(x) = x^2$       D=

R=



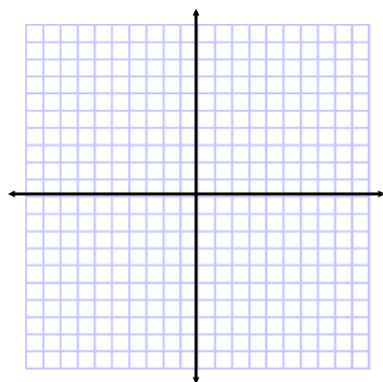
44)  $f(x) = x^3$       D=

R=



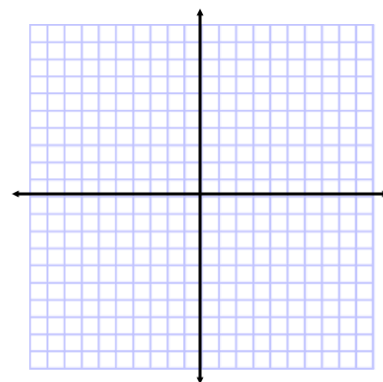
45)  $f(x) = 1/x$       D=

R=



46)  $f(x) = 1/x^2$       D=

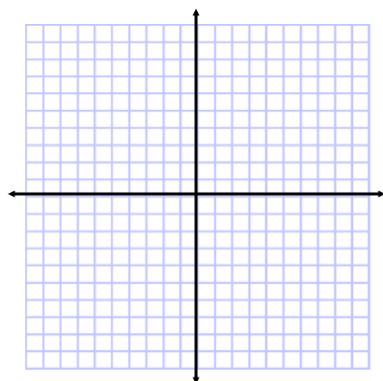
R=



47)  $g : [-1,2) \rightarrow \mathfrak{R}$  where  $g(x) = x^2$

D=

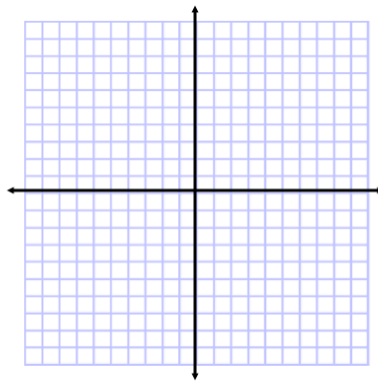
R=



48)  $h : \{1,2,3,4\} \rightarrow \mathfrak{R}$  where  $h(x) = x^2 - 2x$

D=

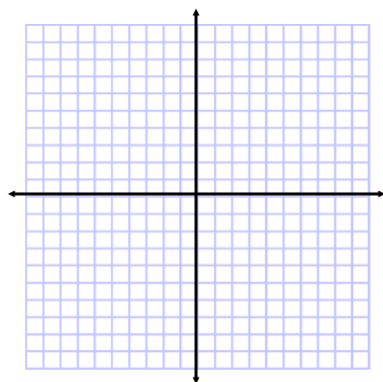
R=



49)  $f(x) = (x - 2)^2 + 3$

D=

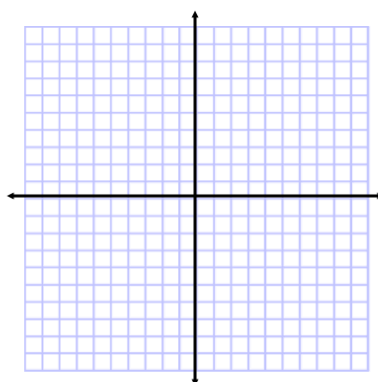
R=



50)  $f(x) = \sqrt{3-x} + 1$

D=

R=



48) If  $g(x)$  is an invertible function, and  $g(2)=7$ , then what is  $g^{-1}(7)$ ?

49) Find the inverse of  $f(x)=\sqrt[3]{2x+4}$ .

50) Find the inverse of  $g(x)=\frac{x}{x+1}$

51) Find the inverse of  $h(x) = 5 - 2x$