ALGEBRA II SOL PRACTICE TEST
STRAND 3: Functions and Statistics

1. The distance (in feet) that a free falling body falls in each second, starting with the first second is given by the arithmetic progression 22, 66, 110, 154, …….

Find the distance that the body falls in the 7th second.

Distance =

2. Find the sum of the first 7 terms of the series: $\frac{27}{16}+\frac{9}{4}+3+...$

A) $29\frac{373}{432}\approx 29.863$ **B)** $36\frac{373}{432}\approx 36.863$ **C)** $35\frac{373}{432}\approx 35.863$ **D)** $32\frac{373}{432}\approx 32.863$

3. Raul earned $12 on Monday and doubled his pay each day thereafter. How much was his pay check for the 5 day work week?

Pay check amount =

4. A 30 row-theater has 20 seats in the first row. The second row has 21 seats. If each row has one more than the row in front of it, how many seats are there in the theater?

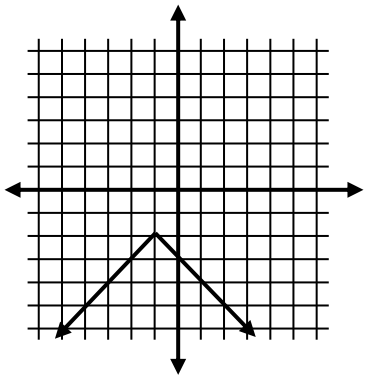
A) 2100 **B)** 1050 **C)** 2070 **D)** 1035

5. Identify *all* functions that have an asymptote of x = 5.

$g(x)=3\log(x-5)$	$f(x)=\sqrt{x-5}+2$	$h(x)=e^{x-5}$
$g(x)=\log_{10}(-x+5)-4$	$h(x)=-\sqrt[3]{x-5}+1$	$f(x)=\frac{3x+20}{x-5}$

Directions: Circle the box of each expression you want to select. You must select all correct expressions.

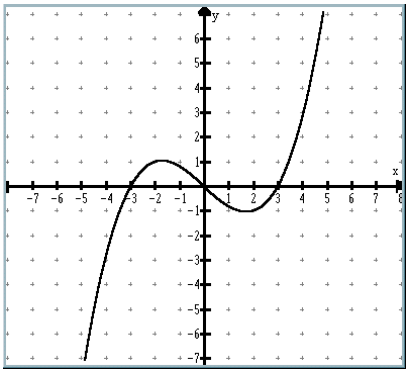
6. What would be the equation of the following graph?



A) $y=-|x+1|-2$ **B)** $y=|x-1|+2$

C) $y=-|x-2|+1$ **D)** $y=-|x+2|-1$

7. Given the following graph of a polynomial, over which intervals is the function increasing? Decreasing?
There may be from zero up to three intervals for each.

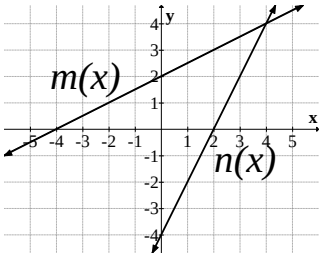


Increasing	*Decreasing*

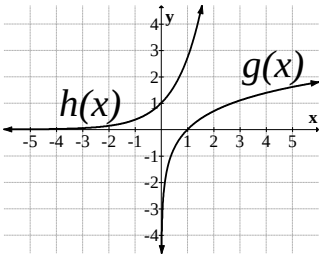
(-2, 2)	(-∞, 2)
(0. 2)	(2, ∞)
(-∞, -2)	(-∞, -3)
(0, 3)	(3, ∞)

8. Which pair of functions are *not* inverses?

A)



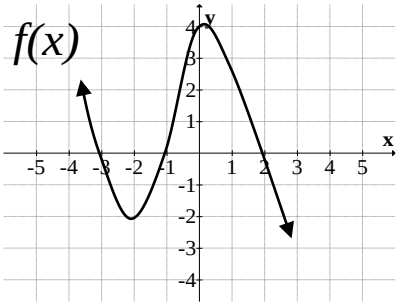
B)



C) $f(x) = 2x - 4$, $g(x) = \frac{x}{2} + 2$

D) $q(x) = 5x - 4$, $p(x) = 4x - 5$

9. Given the graph of $f(x)$, identify *all* of the true statements.



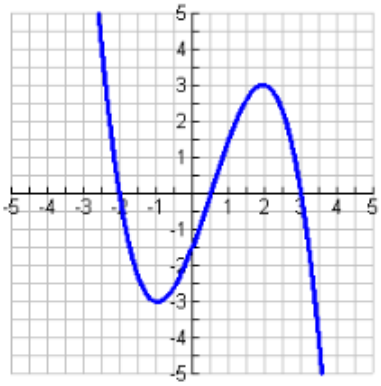
Directions: Circle the box of each statement you want to select. You must select all correct statements.

as $x \to \infty, f(x) \to -\infty$	as $x \to -\infty, f(x) \to -\infty$	as $x \to \infty, f(x) \to \infty$
$f(x)$ is decreasing over the interval $-3 < x < -1$	$f(x)$ is increasing over the interval $-2 < x < 0$	$f(x)$is decreasing over the interval $0 < x < \infty$

10. Given $f(x) = \frac{1}{x}$ and $g(x) = 2x - 6$, what is the domain and range of $f(g(x))$?

A domain: all real numbers, range: all real numbers
B domain: all real numbers except 3, range: all real numbers except 0
C domain: all real numbers except 0, range: all real numbers except 0
D domain: all real numbers except 3, range: all real numbers

11. Find all rational roots of the function graphed.



A) $-2, 2, \frac{1}{2}$ **B)** $-2, 2, \frac{2}{3}$

C) $-4, 4, 1$ **D)** $-2, 2, 3$

12. The following table shows the change in value of a house over the years. What is the projected value of the house in 2005?

Year	1950	1960	1970	1980	1990
Value	$20,000	$35,000	$55,000	$90,000	$145,000

A) $180,000 **B)** $245,000 **C)** $306,000 **D)** $280,000

13. In Karate, it is known that the force, *f*, needed to break a board, varies inversely with the length, *l*, of the board. If it takes 10 pounds of pressure to break a board 4 feet long. How many pounds of pressure would it take to break a board 6 feet long?

A) 15 pounds **B)** $6\frac{2}{3}$ pounds **C)** $2\frac{2}{5}$ pounds **D)** 12 pounds

14. The area of a parallelogram varies jointly as its base and its height. Parallelogram DUCK has a base of 15 meters, a height of 12 meters , and an area of 180 square meters. Find the height of parallelogram DOVE if its area is 1615 meters and its base is 42.5 meters.

Height =

15. Which represents the composition $(fog)(x)$ for the following functions?

$$f(x) = x^3 - 1$$
$$g(x) = x - 2$$

A) $x^3 - 3$ **B)** $x^3 - 9$

C) $x^3 - 6x^2 + 12x - 8$ **D)** $x^3 - 6x^2 + 12x - 9$

16. From a group of 30 boys and 32 girls, two girls and two boys are to be chosen to represent their school. How many possible selections are there?

A) 931 **B)** 215,760 **C)** 557,845 **D)** 863,040 **E)** 13,388,280

17. An election is being held for president, vice president, and secretary. If 7 people are running for office, how many outcomes are possible?

A) 35 **B)** 210 **C)** 5040 **D)** 720

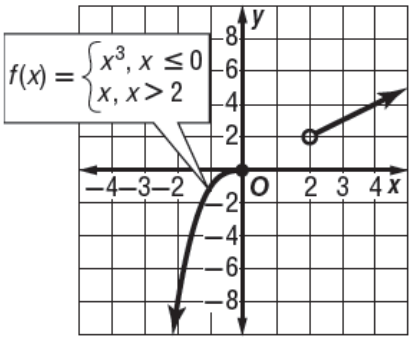
18. Which of the following functions is increasing only on the interval $0 < x < \infty$?

A) $y = \frac{1}{x}$ **B)** $y = 2^{-x}$ **C)** $y = \ln(x)$ **D)** $y = |x - 2|$

19. Over which interval is the domain of the graphed function discontinuous?

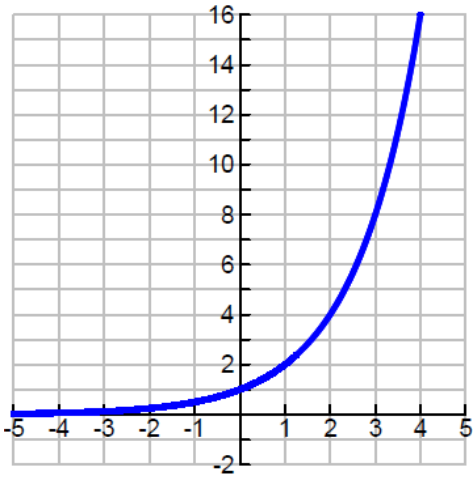
A) (0, 2) **B) (0, 2]**

C) [0, 2) **D) [0, 2]**



20. The graph of the parent function is shown. Identify each function which belongs to this same family. ***Select all that apply.***

$f(x) = 3(2^x)$	$f(x) = log_2 x$
$f(x) = 2^{x-3}$	$f(x) = -3(2^x)$
$f(x) = 2(3^x)$	$f(x) = 2^{-x}$
$f(x) = 3^x - 2$	$f(x) = 3x^2$



21. The SAT is designed so that the scores are normally distributed with a mean of 500 and a standard deviation of 100. Approximately what percent of the scores are below 600?

A) 16% **B)** 50% **C)** 84% **D)** 98%

22. Which variables in the table below are related by inverse variation?

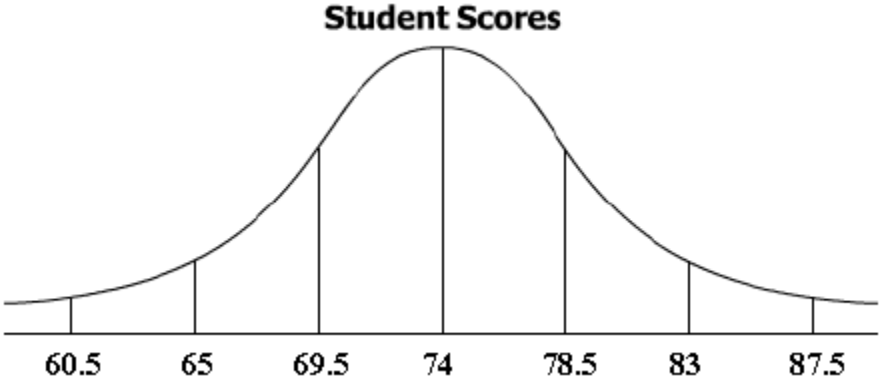
A) x and y **B)** x and z

C) w and y **D)** w and z

w	2	4	6	8
x	1	4	8	16
y	1	2	3	4
z	8	2	1	0.5

23. This graph summarizes the test scores of 2,000 students. The data is normally distributed with a mean of 74 and a standard deviation of 4.5.

Directions: Shade in each region you want to select. You may select more than one region.



Identify the regions under the curve where only the data for approximately 1630 students are located.

24. If $f(g(x)) = \frac{1}{\sqrt{2x-3}}$, which of the following could be true?

A) $f(x) = \frac{1}{x}$ and $g(x) = \frac{1}{\sqrt{2x-3}}$

B) $f(x) = \frac{1}{x}$ and $g(x) = \sqrt{2x-3}$

C) $f(x) = \frac{1}{\sqrt{2x}}$ and $g(x) = \sqrt{x-3}$

D) $f(x) = \sqrt{2x-3}$ and $g(x) = \frac{1}{x}$