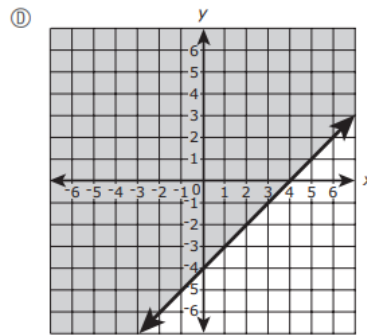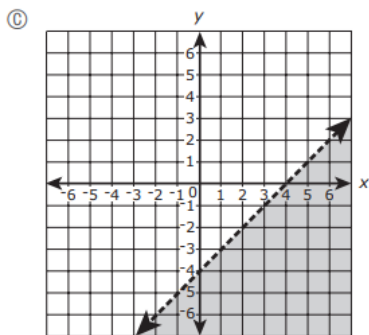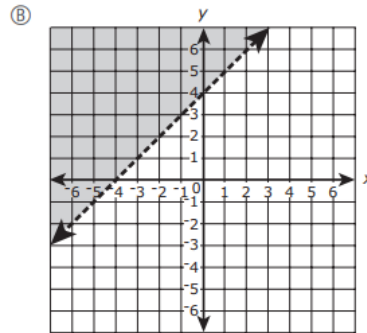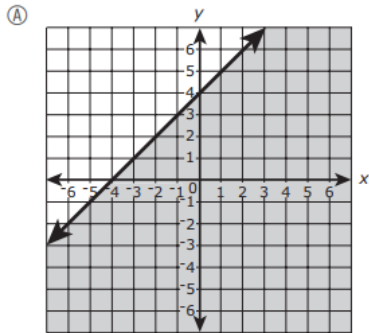# Algebra Test 02082022

Question 1.

Consider this inequality.

$$y \geq x - 4$$

Which of the following graphs represents the solution set of the inequality?

Ⓐ

Ⓑ

Ⓒ

Ⓓ

Question 2

A dolphin jumps out of the water and then back into the water. His jump could be graphed on a set of axes where x represents time and y represents distance above or below sea level. The domain for this graph is best represented using a set of

(1) integers

(3) real numbers

(2) positive integers

(4) positive real numbers

Question 3.

Which of the following is the solution set of this inequality?

$$2 - 4y > 14$$

Ⓐ $y > -3$

Ⓑ $y < -3$

Ⓒ $y > 3$

Ⓓ $y < 3$

Question 4.

Which of the following statements are **true** about the graph of $y = -2x^2 + 3x - 1$?

I. The parabola opens upward.

II. The parabola opens downward.

III. The graph of $y = \left(\dfrac{1}{2}\right)x^2$ is wider.

IV. The graph of $y = \left(\dfrac{1}{2}\right)x^2$ is narrower.

A II and III   B I and IV
C I and III   D II and IV
E None of the statements are true.

Question 5.

The graph of which function is **not** a line?

A $2x + 4y = 5$ B $y = 0.6x$
C $y = 2x^3$ D $y = 4$
E $y = 4x - (2x + 1) + 4$

Question 6.

Which function has the *smallest* y-intercept?

$g(x) = 2x - 6$
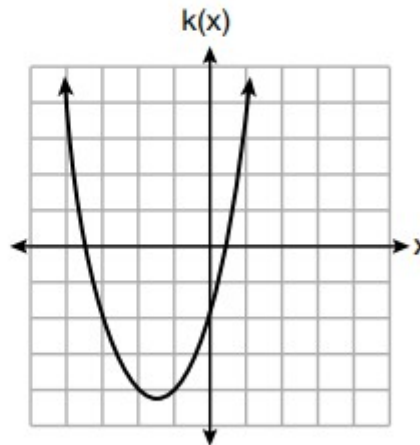
(1)

$f(x) = \sqrt{x} - 2$

(3)

k(x)

x	h(x)
−2	$\frac{1}{4}$
−1	$\frac{1}{2}$
0	1
1	2
2	4

(2)

(4)

Question 7.

If $f(x) = 2x$ and $g(x) = x + 2$, what is
$f(x) + g(x)$?

A $x + 2$

B $x + 4$

C $2x + 2$

D $3x + 2$

E $2x^2 + 2$

Question 8.

This parabola shows the relationship between the amount of money a baker earns from bread sales each day and the price the baker charges for each loaf of bread.

Based on the parabola, what price should the baker charge for each loaf of bread to earn the greatest amount of money from bread sales each day?
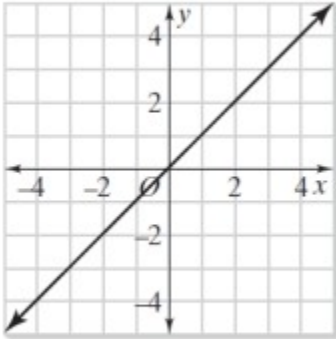
Question 9.

What are the solutions of the equation below?

$$(x - 2)(x + 9) = 0$$

A. $x = -2; \quad x = -9$

B. $x = -2; \quad x = 9$

C. $x = 2; \quad x = -9$

D. $x = 2; \quad x = 9$

Question 10.

Which equation represents the function
graphed below?

A $y = x$ **C** $y = 2x$

B $y = -x$ **D** $y = 1 - x$

Question 11

A company that manufactures radios first pays a start-up cost, and
then spends a certain amount of money to manufacture each radio.
If the cost of manufacturing r radios is given by the function
$c(r) = 5.25r + 125$, then the value 5.25 best represents

(1) the start-up cost

(2) the profit earned from the sale of one radio

(3) the amount spent to manufacture each radio

(4) the average number of radios manufactured

Question 12

A ball is thrown into the air from the edge of a 48-foot-high cliff so that it eventually lands on the ground. The graph below shows the height, y, of the ball from the ground after x seconds.
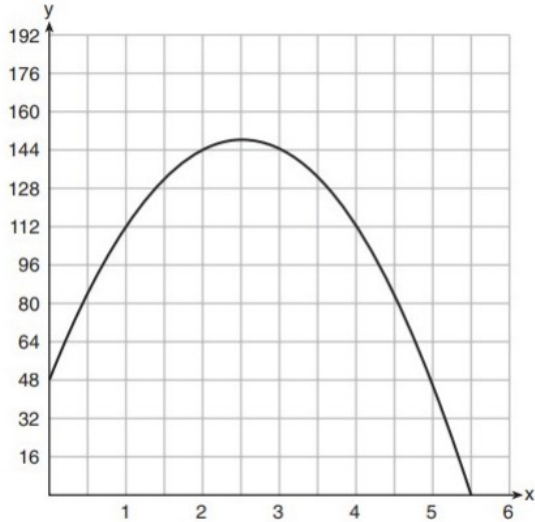
For which interval is the ball's height always *decreasing*?

(1) $0 \leq x \leq 2.5$ (3) $2.5 < x < 5.5$

(2) $0 < x < 5.5$ (4) $x \geq 2$

Question 13

A function is defined as $K(x) = 2x^2 - 5x + 3$. The value of $K(-3)$ is

(1) 54   (3) 0

(2) 36   (4) -18

Question 14

If $f(x) = 2(3^x) + 1$, what is the value of $f(2)$?

(1) 13   (3) 37

(2) 19   (4) 54

Question 15

The formula for finding the perimeter, P, of a rectangle with length l and width w is given.

$$P = 2l + 2w$$

Which formula shows how the length of a rectangle can be determined from the perimeter and the width?

A. $l = \frac{P}{2} - 2w$

B. $l = \frac{P-2w}{2}$

C. $l = \frac{P}{2} + w$

D. $l = \frac{P-2}{2w}$

Question 16

A population of paramecia, P, can be modeled using the exponential function $P(t) = 3(2)^t$, where t is the number of days since the population was first observed. Which domain is most appropriate to use to determine the population over the course of the first two weeks?

(1) $t \geq 0$ (3) $0 \leq t \leq 2$

(2) $t \leq 2$ (4) $0 \leq t \leq 14$

Question 17

Eli, a mechanic, earns $20 for every oil change he performs and $120 for every tune-up. He needs to earn over $2,100 today to be able to pay the rent for his business and still have some money left over.

Select the inequality in standard form that describes this situation. Use the given numbers and the following variables.

x = the number of oil changes Eli will do today

y = the number of tune-ups Eli will do today

$120x + 20y \geq 2,100$

$120x + 20y > 2,100$

$20x + 120y \geq 2,100$

$20x + 120y > 2,100$

Question 18

The equation $V(t) = 12,000(0.75)^t$ represents the value of a motorcycle t years after it was purchased. Which statement is true?

(1) The motorcycle cost $9000 when purchased.

(2) The motorcycle cost $12,000 when purchased.

(3) The motorcycle's value is decreasing at a rate of 75% each year.

(4) The motorcycle's value is decreasing at a rate of 0.25% each year.

Question 19

Which of the following is **not** a solution of the equation below?

$$3x(x-1)(x-2) = 0$$

A. $x = 0$

B. $x = 1$

C. $x = 2$

D. $x = 3$

Question 20

The formula $a = \dfrac{v_f - v_i}{t}$ is used to calculate acceleration as the change in velocity over the period of time.

Solve the formula for the final velocity, v_f, in terms of initial velocity, v_i, acceleration, a, and time, t.

Bonus section. You can get a maximum of 100. If you get any of the above wrong, you can make it up with the questions below. I strongly suggest you do ALL questions to give yourself the best chance of getting 100.
Good luck!

Question 21

The figure shows a graph of the function of $f(x)$ in the xy-coordinate plane, with the vertex at $(1, 9)$ and the zeros at -2 and 4.
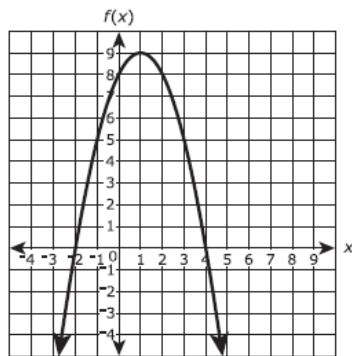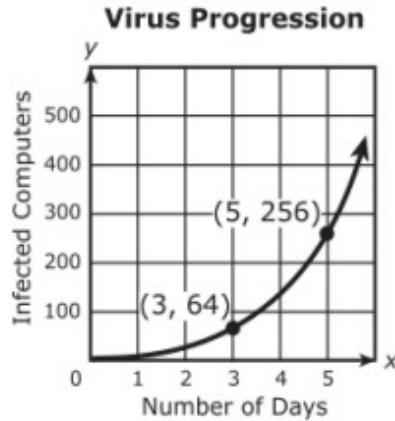

The function g is defined by $g(x) = -3x + 2$.

Which statements are true? Select **all** that apply.

A. $f(-2)$ is greater than $g(-2)$.

B. $f(-1)$ is less than $g(-1)$.

C. $f(0)$ is greater than $g(0)$.

D. $f(1)$ is less than $g(1)$.

E. $f(2)$ is greater than $g(2)$.

Question 22

The graph shows the number of computers that have been infected with a virus in the days since the computer virus was first reported.

Virus Progression

Let d represent the number of days since the computer virus was first reported, and let $c(d)$ represent the number of computers infected. Which equations model this situation?

Select **each** correct equation.

☐ A. $c(d) = 2d + 246$

☐ B. $c(d) = 96d - 224$

☐ C. $c(d) = 2^{d+3}$

☐ D. $c(d) = (8)2^d$

☐ E. $c(d) = 4^d$

☐ F. $c(d) = 4^{d-1}$

Question 23

The table below represents the function F.

x	3	4	6	7	8
F(x)	9	17	65	129	257

The equation that represents this function is

(1) $F(x) = 3^x$

(2) $F(x) = 3x$

(3) $F(x) = 2^x + 1$

(4) $F(x) = 2x + 3$

Question 24

A car was purchased for $25,000. Research shows that the car has an average yearly depreciation rate of 18.5%.

Create a function that will determine the value, $V(t)$, of the car t years after purchase.

Determine, to the *nearest cent*, how much the car will depreciate from year 3 to year 4.