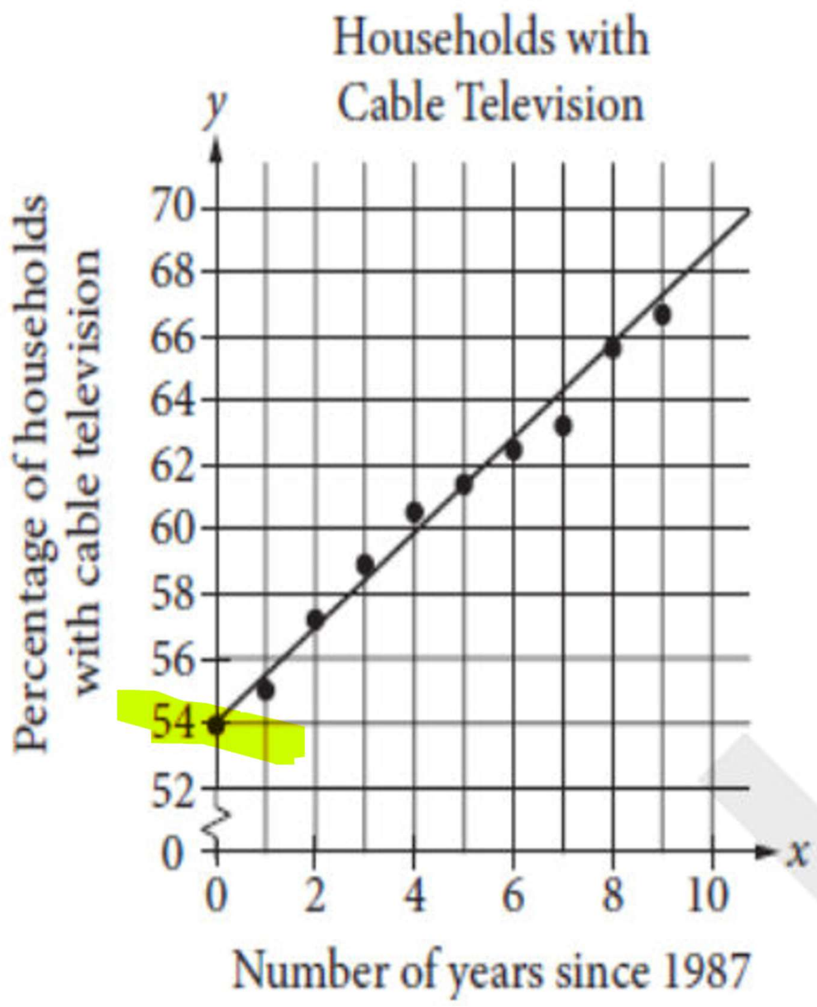
1

A cable company recorded the percentage of households in the United States that had cable television from 1987 to 1997. In the scatterplot below, x represents the number of years since 1987 and y represents the percentage of households with cable television. The line of best fit for the data is shown.



Which of the following is closest to the equation of the line of best fit shown?

A) $y = 54x + \frac{7}{5}$

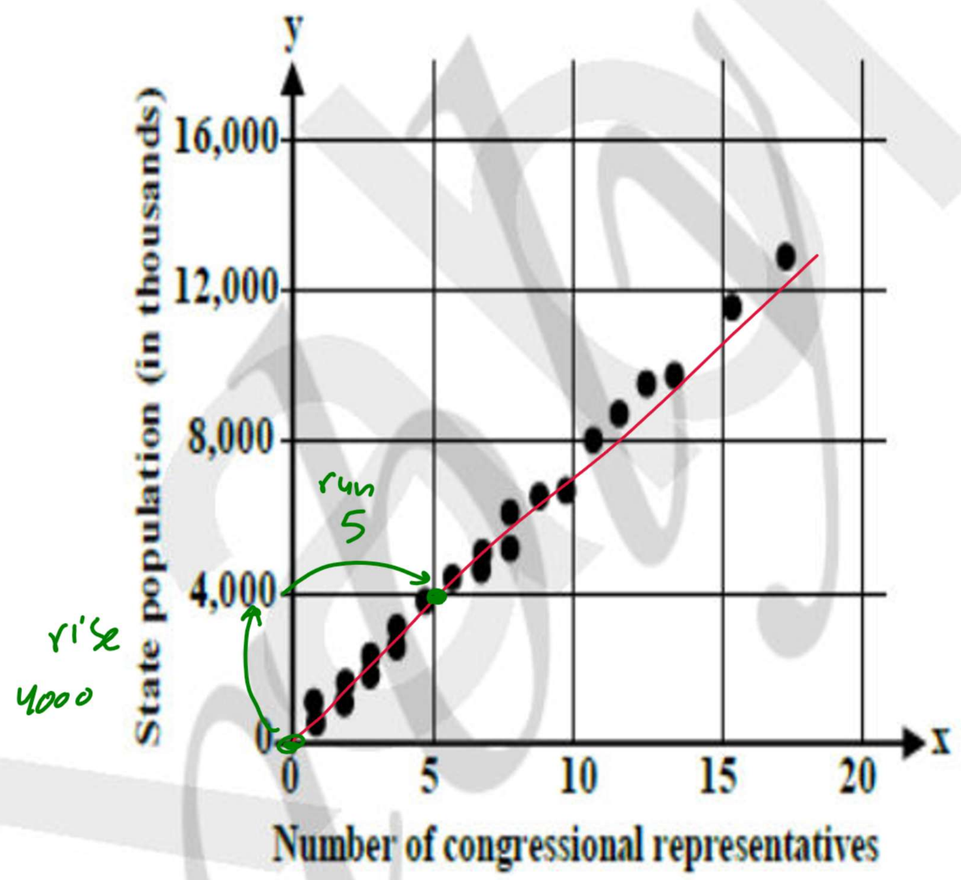
B) $y = \frac{7}{5}x - 54$

C) $y = \frac{7}{5}x + 54$

D) $y = \frac{7}{5}x$

2

The scatterplot below shows the number of congressional representatives, x, and the population y, in thousands, for 25 of the 50 states in the United Sates.



Which of the following could be an equation of a line of best fit for these data?

A) $y = -31 + 716x$

B) $y = -31 - 716x$

C) $y = -31 + 7x$

D) $y = -31 - 7x$

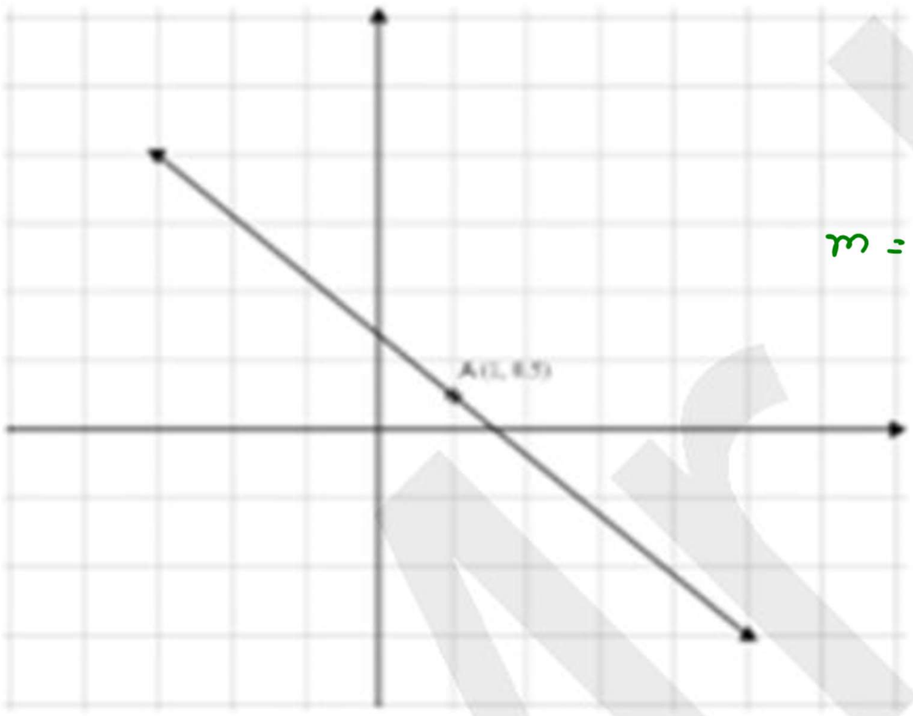
3

rise/run = -7/8

What is the slope of the line shown in the graph?

A. $-\frac{1}{2}$
B. $-\frac{7}{8}$
C. $-\frac{8}{7}$
D. -2

4



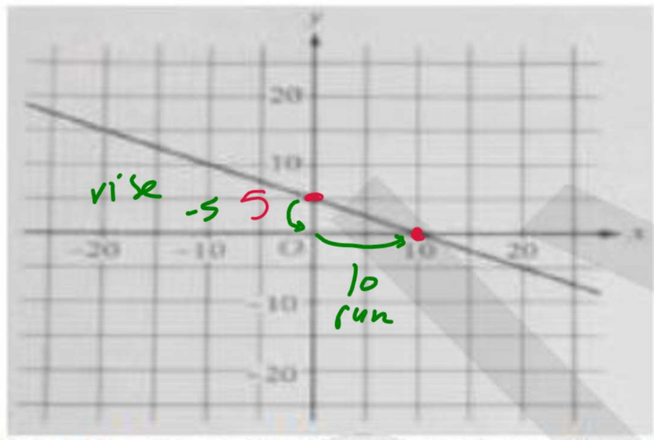
m = -7/8

What is the equation of the line passing through $A\,(1, 0.5)$ and perpendicular to the graphed line?

A. $y = \frac{1}{2}x$
B. $y = 2x - \frac{3}{2}$
C. $y = \frac{7}{8}x - \frac{3}{8}$
D. $y = \frac{8}{7}x - \frac{9}{14}$

8/7

5



Which of the following is an equation of the line graphed in the xy-plane above?

rise/run = -5/10 = -1/2

A) $y = -\frac{1}{2}x + 10$

B) $y = -\frac{1}{2}x + 5$

C) $y = -2x + 10$

D) $y = -2x + 5$

$y = mx + b$

slope

Average

rate

Y per x

y-int

Initial

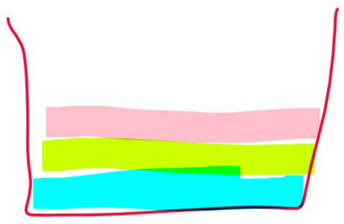
starting

at $x=0$

$y = 500 + 50x$

1

The weight of an empty fish tank is 4 pounds. A gallon of water weighs approximately 8 pounds. Which of the following best approximates the total weight w, in pounds, of the fish tank and g gallons of water?



A) $w=8g$

B) $w=8g+4$

C) $w=4g+8$

D) $w=4g$

2

A pool initially contains 1,385 cubic feet of water. A pump begins emptying the water at a constant rate of 20 cubic feet per minute. Which of the following functions best approximates the volume $v(t)$, in cubic feet, of water in the pool t minutes after pumping begins, for $0 \leq t \leq 69$?

A) $v(t) = 1{,}385 - 20t$

B) $v(t) = 1{,}385 - 69t$

C) $v(t) = 1{,}385 + 20t$

D) $v(t) = 1{,}385 + 69t$

3

A full of box of cereal initially contains 28 ounces. If 2.4 ounces of cereal are eaten each day, which of the following represents the number of ounces of cereal, C remaining in the box after d days?

A) $C=-2.4d+28$

B) $C=-2.4d-28$

C) $C=2.4d+28$

D) $C=2.4d-28$

1

A gaming website charges its client by number of games downloaded **g**. If the total fees **f** of a gamer are given by the equation **f = 7g+88**, what is the best interpretation of the term **88?**

A. The price of one downloaded game.
B. The subscription fees of the website
C. The average number of games downloaded per player
D. The fees of downloading 7 games

2

Sarah ordered a set of golf clubs and a golf bag online, which were shipped to her house. The weight w, in pounds, of the bag and the clubs is estimated by the equation $w=1.2c+13$, where c is the number of clubs in the bag. What is the best interpretation of the number 1.2 in the equation?

A) The estimated weight, in pounds, of 1 club
B) The estimated weight, in pounds, of 13club
C) The estimated weight, in pounds, of the bag with no clubs
D) The estimated weight, in pounds, of the bag with 13 clubs

3

$$s = 9.8t$$

The equation above can be used to approximate the speed s, in meters per second (m/s), of an object t seconds after being dropped into a free fall. Which of the following is the best interpretation of the number 9.8 in this context?

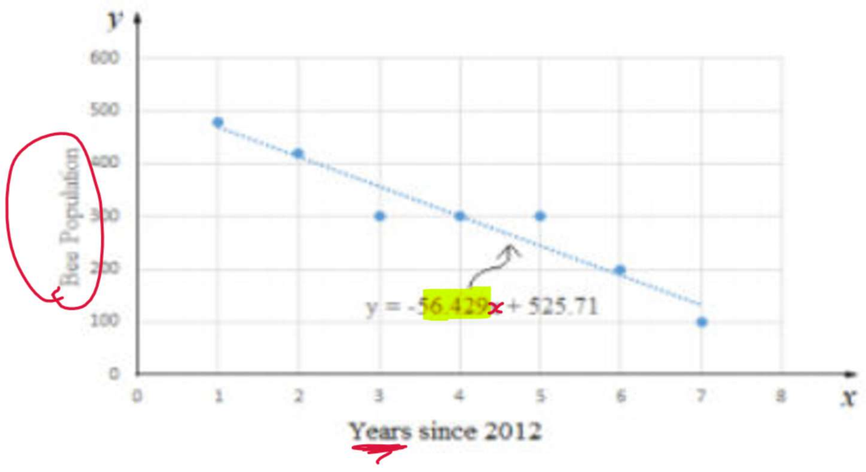
A. The speed, in m/s, of the object when it hits the ground
B. The increase in speed, in m/s, of the object for each second after it is dropped
C. The speed, in m/s, of the object t seconds after it is dropped
D. The initial speed, in m/s, of the object when it is dropped

4

The distance d, in feet, from the ground to a flag on a flagpole t seconds after a person begins lowering it is modeled by the function $d(t) = 20 - 2t$. In this function, what does 20 represent?

A) The distance, in feet, of the flag from the ground before it is lowered.
B) The distance, in feet, of the flag from the ground after 2 seconds.
C) The number of seconds it takes for the flag to reach the ground.
D) The rate, in feet per second, at which the flag moves as it is lowered.

5



The scatterplot above shows the Bee population in a certain farm for every year since 2012. A line of best fit and its equation are also shown.

Which of the following is the best interpretation of the value -56.429 in the equation of the line of best fit?

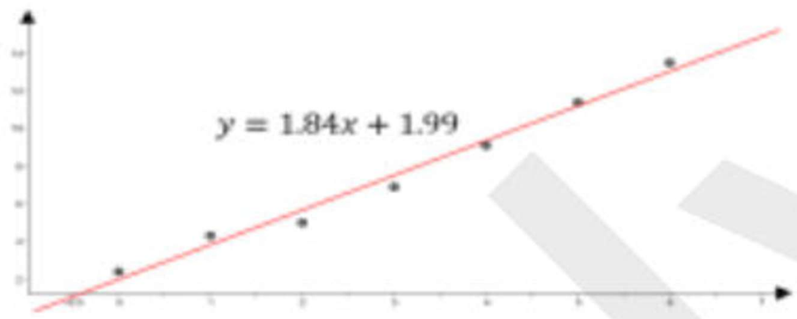
A. The average increase in the number of bees each year.

B. The average decrease in the number of bees every 525.71 years.

C. The average decrease in the number of bees each year.

D. The number of bees present in the beginning.

6



At 8:00 a.m., a patient is given a drip feed containing a particular chemical and its concentration in his blood is measured, in suitable units, at one interval as shown above in the scatterplot. A line of best fit and its equation $y = 1.84x + 1.99$ are also given.

14. Which of the following is the best interpretation of the y-intercept in the equation of the line?

A. If x increases by 1 unit, then y increases by 1.84 units.

B. If x increases by 1 unit, then the concentration of the chemical in his blood is expected to increase by 1.84 units.

C. Before drip feeding the patient, the concentration of this particular chemical in his blood is expected to be 1.99 units.

D. At 9:00 a.m., the concentration of this particular chemical in his blood is expected to be 1.99 units.

Linear

+ , −

initial

$y = mx + b$

Exponential

× , ÷

% ↑ / ↓

$y = a\,b^{x}$

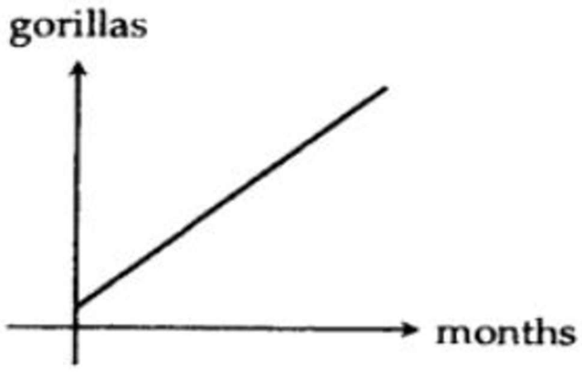
$A = P(1 \pm r)^{t}$ ←

1

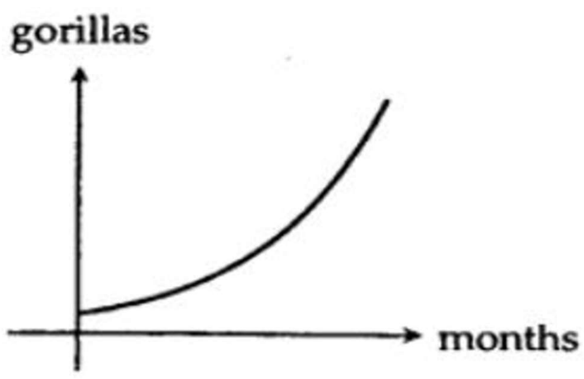
+100

The population of gorillas increases by 100 every month. Which of the following graphs could model the gorilla population as a function of time?

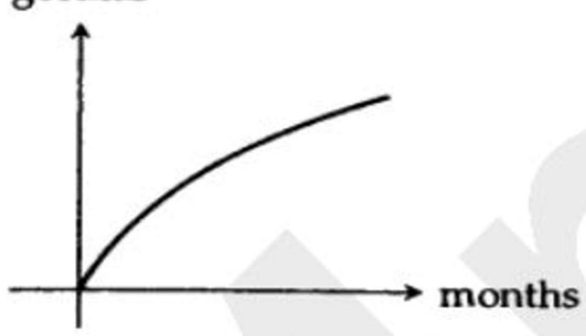
A)



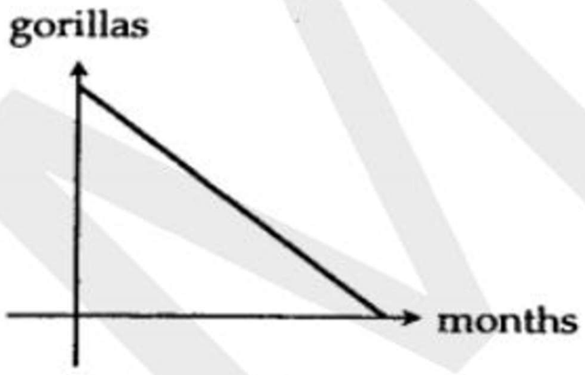
B)



C)



D)

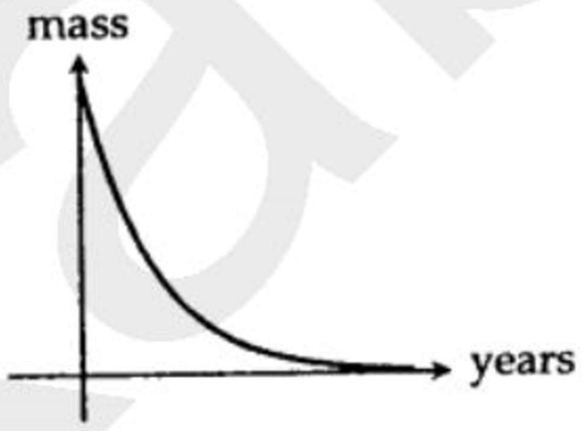


2

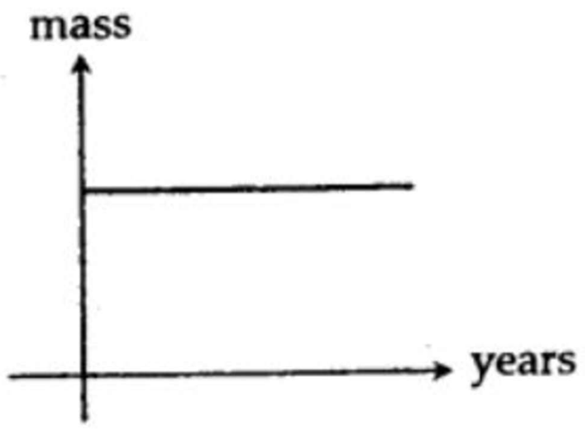
A radioactive element loses half its mass each year. Which of the following graphs could model the mass of the element as a function of time?

A)

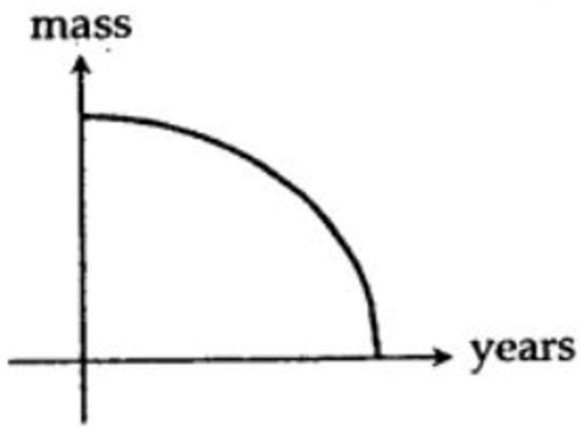
B)



C)



D)



3

The number of dandelions in a large park is recorded over the course of five months, as shown in the table below.

Month	Dandelions
1	12,500
2	2,500
3	500
4	100
5	20

÷ 5

Which of the following best describes the relationship between time and the number of dandelions during the five months?

A) Increasing linear
B) Decreasing linear
C) Exponential growth
D) Exponential decay

4

The value of a stock is going up by 200% every hour. Which of the following best describes the relationship between time (in hours) and the value of the stock?

A) Increasing linear
B) Decreasing linear
C) Exponential growth
D) Exponential decay

5

The number of criminal cases in a state district is recorded over the course of five years, as shown in the table below.

Year	Cases
1	450
2	400
3	350
4	300
5	250

Which of the following best describes the relationship between time and the number of cases during the five years?

A) Increasing linear
B) Decreasing linear
C) Exponential growth
D) Exponential decay

6

A house is losing a fourth of its value every year. Which of the following best describes the relationship between time (in years) and the value of the house?

A) Increasing linear
B) Decreasing linear
C) Exponential growth
D) Exponential decay

$$ax^2+bx+c=0$$

$$x=\frac{-b\pm\sqrt{b^2-4ac}}{2a}$$

ex: $2x^2-5x+1$

$a=2$

$b=-5$

$C=1$

$$\frac{-b\pm\sqrt{b^2-4ac}}{2a}$$

$$\frac{+5\pm\sqrt{(-5)^2-4(2)(1)}}{2(2)}$$

1

Find the value of x in the equation

$$2x^2 - 3x - 5 = 0$$

A) 1
B) 0
C) -1
D) No solution

2

Find the value of x in the equation

$$x(x-3) = -7 - 10x$$

A) $\frac{7+\sqrt{77}}{2}$
B) $\frac{-7+\sqrt{77}}{2}$
C) $\frac{7+\sqrt{21}}{2}$
D) $\frac{-7+\sqrt{21}}{2}$

3

. Which of the following is a solution for the equation $2x^2 - 7|x| + 5 = 0$?

A. 0
B. -1
C. 2
D. -3

4

Find the value of x in the equation

$$2n^2 + 5n - 9 = 0$$

A) $\frac{5+\sqrt{97}}{4}$
B) $\frac{-5+\sqrt{97}}{4}$
C) $\frac{5+\sqrt{47}}{4}$
D) $\frac{-5+\sqrt{47}}{4}$

5

Find the value of x in the equation

$$6v^2 + 3 = -2v$$

A) $\frac{4+\sqrt{76}}{12}$
B) $\frac{-4+\sqrt{76}}{12}$
C) $\frac{2+2\sqrt{19}}{6}$
D) No solution

$x^2 - \text{Sum}\,x + \text{Prod} = 0$

ex: $x^2 - 5x + 6 = 0$

Sum = $+5$

Prod = 6

ex: $x^2 + 6x + 9 = 0$

sum = -6

Prod = 9

ex: $x^2 - 5x + 6 = 0$

then $x = \ldots 2, 3 \ldots$

Sum = 5

Prod = 6

ex: $x^2 - 7x + 10 = 0$

then $x = \ldots 5, 2 \ldots$

sum = $+7$

Prod = 10

1

The sum of the zeros of $y = x^2 + 6x - 4$ is:

E) -6
F) 6
G) -2
H) 2

2

The sum of the zeros of $y = \frac{3x^2}{3} - \frac{6x}{3} - \frac{4}{3}$ is:

$x^2 - 2x - \frac{4}{3}$

A) -6
~~B)~~ 6
C) -2
D) 2

3

The Product of the zeros of $y = \frac{4x^2}{4} + \frac{8x}{4} - \frac{12}{4}$ is:

$x^2 + 2x - 3$

A) -3
B) 3
C) 7
D) -7

4

The Product of the zeros of $y = 2x^2 + 6x - 10$ is:

A) -5
B) 5
C) -10
D) 10

5

The sum of the zeros of $y = 5x^2 + 6x - 7$ is:

A) 6/5
B) -6/5
C) 7/5
D) -7/5

6

The sum of the zeros of $y = x^2 - 7x + 5$ is:

A) -7
B) 7
C) -5
D) 5

$(x-a)(x+a)$ → x-int, roots, Sols

$(x-a)^2+b$ → vertex, Max, Min

b^2-4ac
- +ve → 2 Sols
- Zero → 1 Sol.
- -ve → no Sols.

1

$$y = x^2 - 6x - 16$$

The graph of the equation above in the xy-plane is a parabola. Which of the following equivalent forms of the equation includes the x- and y-coordinates of the vertex as constants?

A. $y = (x-3)^2 - 25$

B. $y = x(x-6) - 16$

C. $y = x^2 \quad 2(3x+8)$

D. $y + 16 = x(x-6)$

2

$$y = 7x^2 - 28x + 21$$

The graph of the equation above is a parabola in the xy-plane. In which of the following equivalent forms of the equation do the x-intercepts of the parabola appear as constants or coefficients?

A) $y = 7(x^2 - 4x) + 21$

B) $y = 7x(x-4) + 21$

C) $y = 7(x-2)^2 - 7$

D) $y = 7(x-1)(x-3)$

1

$$x^2 - 2mx = -9$$

$x^2 - 2mx + 9 = 0$

What is the minimum positive integer value of **m** that allows the above equation to have **two real solutions?**

$a = 1$, $b = -2m$, $c = 9$

+ve

$b^2 - 4ac > 0$

$(-2m)^2 - 4(1)(9) > 0$

$4m^2 - 36 > 0$

$m^2 > \frac{36}{4}$

$m^2 > \sqrt{9}$

$m > 3$

2

$$2x^2 - 4x = t$$

$2x^2 - 4x - t = 0$

$a = 2$, $b = -4$, $c = -t$

In the equation above, t is a constant. If the equation has no real solutions, which of the following could be the value of t ?

A) −3

B) −1

C) 1

D) 3

$b^2 - 4ac < 0$

$(-4)^2 - 4(2)(-t) < 0$

$16 + 8t < 0$ -16

$8t < -16$

$t < -2$

3

$m\,x^2 + 4x + 2 = 0$

In the equation above, What is the positive value of m if the equation has one real solution?

$a = m$, $b = 4$, $c = 2$

$= 0$

$b^2 - 4ac = 0$

$(4)^2 - 4(m)(2) = 0$

shift + solve

$m = 2$

4

$$2x^2 + bx + 8 = 0$$

In the equation above, b is a constant. For what positive value of b does the equation have exactly one real solution?

5

$x^2 - ax + 6 = 0$

In the equation above, What is the minimum positive value of a if the equation has two real solutions?

6

$x^2 - ax + 6 = 0$

In the equation above, What is the minimum positive value of a if the equation has two real solutions?