For the New SAT

DIGITAL SAT

SCHOLASTIC APTITUDE TEST

IDC

MATHEMATICS - PART 1

2026

Ismoilov Abduqodir

DIGITAL SAT MATHEMATICS Part I

First edition

Tashkent-2026

Contents

Scan this QR code to join our Telegram channel, **IDC Digital SAT Mathematics**, for step-by-step solutions and answer keys.

Scan the QR code below to join the **IDC** Telegram channel and stay informed about our latest publications and book updates.

To order our books, please contact the following:

(99) 968 44 00 @IDC_books

4. Linear Functions 1

1. The function h is defined by

$$h(x) = 5x - 9.$$

What is the value of $h(-5)$?

A) -18

B) -25

C) -34

D) -9

2. For the given equation, $8x-5y = -80$, which table gives three values of x and their corresponding values of y?

A)

x	0	5	10
y	16	24	32

B)

x	0	5	10
y	32	24	16

C)

x	24	16	8
y	0	5	10

D)

x	0	5	10
y	16	24	30

3. The number y is 24 less than the number x. Which equation represents the relationship between x and y?

A) $y = x - 24$

B) $y = 24 - x$

C) $x = y - 24$

D) $y = \dfrac{x}{24}$

4. A line has equation $y = -\dfrac{2}{3}x + 10$. Which of the following points lies on this line?

A) $(3, -8)$

B) $(6, 8)$

C) $(9, 5)$

D) $(12, 2)$

5. The graph of the polynomial function f in the xy-plane, where $y = f(x)$, passes through the point $(11, 8)$. What is the value of $f(11)$?

6. The function f is defined by $f(x) = 40x$. For what value of x is $f(x) = 320$?

7. The function m is defined by

$$m(x) = 18x + 120.$$

What is the slope of the graph of $y = m(x)$ in the xy-plane?

28. The function

$$h(t) = -3.2t + 96$$

models the height, in meters, of a hot-air balloon t minutes after it begins descending. According to the model, about how many meters does the balloon descend each minute?

A) 3.2 B) 96 C) 30 D) 99.2

29. The function $S(V) = 1.46V + 22$ estimates the speed of a vehicle in feet per second given its speed V in miles per hour. If the speed V increases by 15 miles per hour, by how much does the speed in feet per second increase?

A) 21.9

B) 22.0

C) 43.9

D) 44.9

30. The length of a metal rod in centimeters is given by $L(T) = 0.0012(T - 20) + 50$, where T is the temperature in degrees Celsius. If the temperature increases by 250 degrees Celsius, by how much does the length of the rod increase in centimeters?

A) 0.3

B) 1.2

C) 3.0

D) 50.3

4. Homework. Linear Functions 1

1. The function f is defined by

$$f(x) = \frac{1}{2}(x + 8).$$

What is the value of $f(12)$?

A) $20\frac{1}{2}$

B) 20

C) $10\frac{1}{2}$

D) 10

2. For the given equation, $6x + 4y = 48$, which table shows three values of x and their corresponding values of y?

A)

x	0	4	8
y	12	6	0

B)

x	0	2	4
y	6	8	10

C)

x	0	8	16
y	20	12	4

D)

x	4	8	12
y	0	6	12

3. The number y is 402 less than the number x. Which equation represents the relationship between x and y?

A) $y = 402 - x$

B) $y = x - 402$

C) $y = 598x$

D) $y = 402x$

4. A line has equation $y = 2x - 7$. Which of the following points lies on this line?

A) $(3, 1)$

B) $(2, 3)$

C) $(5, 5)$

D) $(4, 1)$

5. The graph of the polynomial function g in the xy-plane, where $y = g(x)$, passes through the point $(7, -12)$. What is the value of $g(7)$?

A) 12 B) 7 C) -5 D) -12

6. The function f is defined by $f(x) = 15x$. For what value of x is $f(x) = 675$?

A) 55 B) 45 C) 15 D) 6

7. The function m is defined by

$$m(x) = -9x - 144.$$

What is the slope of the graph of $y = m(x)$ in the xy-plane?

A) -9 B) 9 C) -144 D) 16

28. [2025] Scientists collected fallen acorns that each housed a colony of the ant species *P.ohioensis* and analyzed each colony's structure. For any of these colonies, if the colony has x worker ants, the equation

$$y = 0.67x + 2.6, \quad 20 \leq x \leq 110,$$

gives the predicted number of larvae, y, in the colony. If one of these colonies has 35 worker ants, which of the following is closest to the predicted number of larvae in the colony?

A) 114 B) 48 C) 38 D) 26

29. The function

$$h(t) = -4.5t + 120$$

models the height, in feet, of a drone t seconds after it begins its landing approach. According to the model, about how many feet does the drone descend each second?

A) 4.5

B) 26.7

C) 120

D) 124.5

30. The length of a copper cable in centimeters is given by $L(T) = 0.0024(T - 15) + 40$, where T is the temperature in degrees Celsius. If the temperature increases by 500 degrees Celsius, by how much does the length of the cable increase in centimeters?

A) 0.12

B) 1.2

C) 12.0

D) 41.164

5. Linear Functions 2

1. The line $y = \frac{7}{5}x - 7$ has slope m. What is the slope of a line parallel to this line?

   A) $-\frac{5}{7}$ B) $\frac{7}{5}$

   C) $-\frac{7}{5}$ D) -7

2. The line m passes through $(4, 7)$ and $(1, 1)$. Which of the following is parallel to the line m?

   A) $y = -2x + 5$

   B) $y = 0.5x + 3$

   C) $y = 2x - 4$

   D) $y = x + 6$

3. The equation of line l is given. Which of the following is parallel to the line l?

   $$y = \frac{1}{3}x - 5$$

   A) $3x + 9y = 10$

   B) $3x - 9y = 10$

   C) $9x - 3y = 10$

   D) $9x + 3y = 10$

4. $$y = -\frac{13}{6}x + 24$$

   One of two equations in a system of linear equations is given. The system has infinitely many solutions. What is the slope of the graph of the second equation?

   A) $\frac{13}{6}$ B) $-\frac{6}{13}$ C) $-\frac{13}{6}$ D) 24

5. Line L is defined by the equation $3x - 5y = 15$. Line M is parallel to line L. An equation of line M is $39x = py + 104$, where p is a constant. What is the y-intercept of line M?

6. The slope of line l is $-\frac{3}{4}$. The line k is parallel to line l and contains the point $(8, 2)$. What is the y-coordinate of the y-intercept of line k?

   A) 2

   B) 6

   C) 8

   D) 14

29. [2025] A cooking school is offering a promotion where the first class is free, the second class is half off the regular price, and the remaining classes are regularly priced. If the regular price of a class is \$22.80, which function f gives the total cost, in dollars, of x classes taken using this promotion, where $x \geq 2$?

A) $f(x) = 22.80(x - 1) + 11.40$

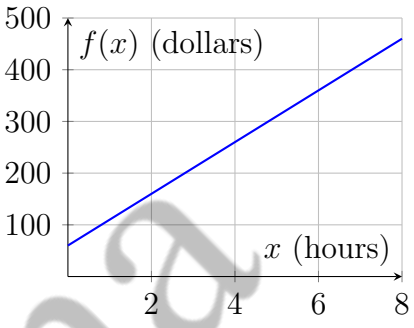
B) $f(x) = 22.80(x - 2) + 11.40$

C) $f(x) = 22.80(x-1)+11.40(x-2)$

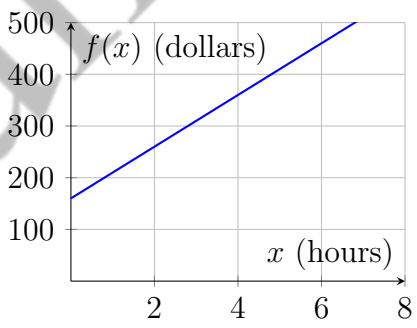
D) $f(x) = 22.80(x-2)+11.40(x-1)$

30. [2025] A computer repair specialist charges \$160 for the first two hours of repair plus an hourly fee for each additional hour. The total cost for 6 hours of repair is \$360. Which function f gives the total cost, in dollars, for x ($x \geq 2$) hours of repair?

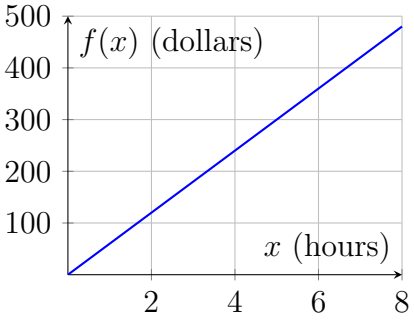
A) $f(x) = 50x + 60$



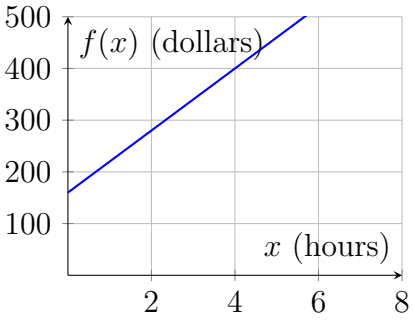
B) $f(x) = 50x + 160$



C) $f(x) = 60x$



D) $f(x) = 60x + 160$



5. Homework. Linear Functions 2

1. Line p is defined by the equation

$$6x + 5y = 10.$$

Line q is parallel to line p in the xy-plane. What is the slope of line q?

A) $-\frac{6}{5}$

B) $\frac{5}{6}$

C) $-\frac{5}{6}$

D) $\frac{6}{5}$

2. The line n passes through $(0, 5)$ and $(4, 2)$. Which of the following is parallel to the line n?

A) $y = -0.75x + 2$

B) $y = 0.75x - 4$

C) $y = -1.33x + 5$

D) $y = 4x - 3$

3. The equation of line l is given. Which of the following is parallel to the line l?

$$y = -4x + 20$$

A) $4x + y = 15$

B) $x - 4y = 15$

C) $4x - y = 15$

D) $x + 4y = 15$

4.

$$y = -\tfrac{11}{9}x + 11$$

One of two equations in a system of linear equations is given. The system has infinitely many solutions. What is the slope of the graph of the second equation?

A) $-\frac{9}{11}$

B) $\frac{11}{9}$

C) 11

D) $-\frac{11}{9}$

5. The slope of line l is $\frac{2}{5}$. The line k is parallel to line l and contains the point $(15, -4)$. What is the y-coordinate of the y-intercept of line k?

A) -10

B) -6

C) 4

D) 10

6. In the xy-plane, line s passes through the point $(0, 0)$ and is parallel to the line represented by the equation $y = 12x + 7$. If line s also passes through the point $(3, d)$, what is the value of d?

A) 12

B) 19

C) 36

D) 43

28. A tutor charges \$60 for the first lesson and \$40 for each additional lesson. Which of the following functions gives the total cost $T(n)$, in dollars, for n lessons, where n is a positive integer?

A) $T(n) = 40n + 60$

B) $T(n) = 40n + 20$

C) $T(n) = 20n + 40$

D) $T(n) = 60n$

29. A computer repair specialist charges \$160 for the first two hours of repair plus an hourly fee for each additional hour. The total cost for 6 hours of repair is \$360. Which function f gives the total cost, in dollars, for x hours of repair, where $x \geq 2$?

A) $f(x) = 50x + 60$

B) $f(x) = 50x + 160$

C) $f(x) = 60x$

D) $f(x) = 60x + 160$

30. For events with 30 or more guests, a banquet hall charges \$45 per person for the first 30 guests and \$30 for each additional guest. Which function f gives the total charge, in dollars, for an event with n guests, where $n \geq 30$?

A) $f(n) = 30n + 450$

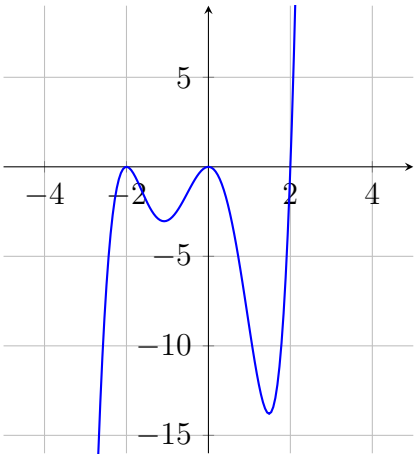
B) $f(n) = 30n + 1,350$

C) $f(n) = 75n - 900$

D) $f(n) = 30n + 15$

9. Functions 2

1. The graph of function is shown in the xy-plane, where $y = f(x)$. Which of the following functions could define f?



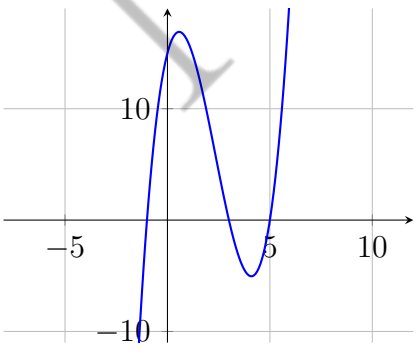
A) $f(x) = (x-2)^2x^2(x+2)$

B) $f(x) = (x+2)^2x^2(x-2)$

C) $f(x) = (x-2)^2x(x+2)^2$

D) $f(x) = (x+2)^2x(x-2)$

2. The graph of $y = f(x) - k$ is shown in the xy-plane. If a, b, k are positive constants, which equation could define f?



A) $f(x) = (x-a)^2(x+b)$

B) $f(x) = (x+a)^2(x+b)$

C) $f(x) = (x-a)^2(x-b)^2$

D) $f(x) = (x+a)^2(x-b)^2$

3. The function f is defined by

$$f(x) = ax\sqrt{x+b},$$

where a and b are constants. In the xy-plane, the graph of $y = f(x)$ passes through the point $(-17, 0)$, and $f(-8) < 0$. Which of the following must be true?

A) $a > 0$

B) $b < 0$

C) $f(0) = -17$

D) $f(0) = 17$

4.

$$x - 28 = (x-a)(x-28)$$

Which of the following are solutions to the given equation, where a is a constant and $a > 30$?
I. a
II. $a + 1$
III. 28

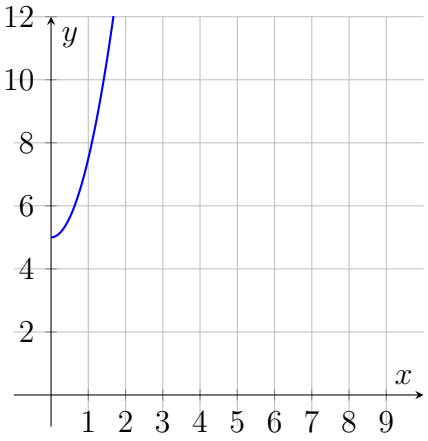
A) III only

B) I and III only

C) II and III only

D) I, II, and III

27.



The graph gives the estimated population y, in thousands, of a town x years since 2007, where $0 \leq x \leq 5$. Which of the following best describes the increase in the estimated population from $x = 0$ to $x = 1$?

A) The estimated population at $x = 1$ is 3.5 times the estimated population at $x = 0$.

B) The estimated population at $x = 1$ is 2.5 times the estimated population at $x = 0$.

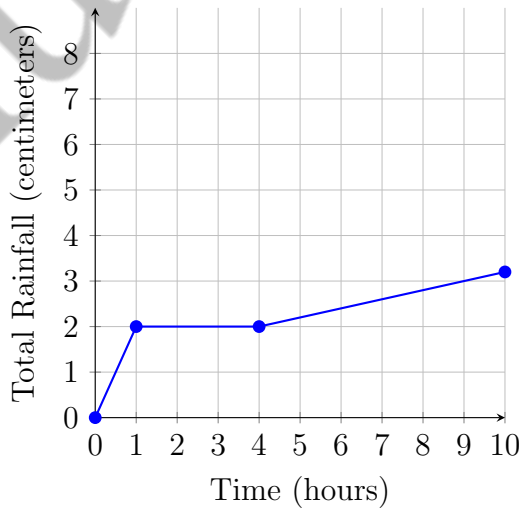
C) The estimated population at $x = 1$ is 1.5 times the estimated population at $x = 0$.

D) The estimated population at $x = 1$ is 0.5 times the estimated population at $x = 0$.

28. A proposal for a construction project was included on a city election ballot. A TV news report stated that 4 times the number of people voted in favor of the proposal than voted against it. An internet article reported that 10,500 more people voted in favor of the proposal than voted against it. Based on these data, how many people voted against the proposal?

29. A community voted on a new park renovation plan. A local newspaper reported that 3 times as many people voted in favor of the plan as those who voted against it. An online post stated that 8,400 more people voted in favor of the plan than voted against it. Based on these data, how many people voted against the plan?

30. [2025] The graph shows the total amount of rainfall y, in centimeters, from the start of a 10-hour period, where x is the number of hours after the start of the period. Which of the following statements about the rainfall during this time period is true?



A) The rate of rainfall was 2 centimeters per hour between $x = 2$ and $x = 4$.

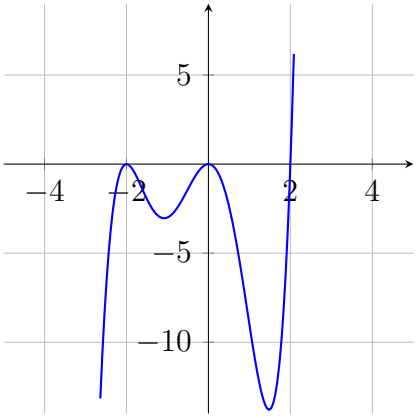
B) The greatest rainfall rate was between $x = 4$ and $x = 10$.

C) The rate of rainfall increased between $x = 0$ and $x = 2$.

D) The rate of rainfall was 0 centimeters per hour between $x = 2$ and $x = 4$.

9. Homework. Functions 2

1. The graph of a function is shown in the xy-plane, where $y = f(x)$. Which of the following functions could define f?



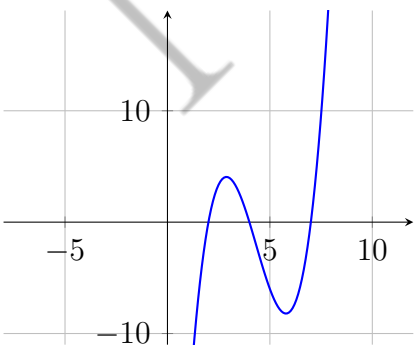
A) $f(x) = (x-2)^2x(x+2)$

B) $f(x) = (x+2)^2x^2(x-2)^2$

C) $f(x) = (x-2)^2x^2(x+2)$

D) $f(x) = (x-2)x^2(x+2)^2$

2. The graph of $y = f(x) + k$ is shown in the xy-plane. If a, b, k are positive constants, which equation could define f?



A) $f(x) = (x-a)(x-b)^2$

B) $f(x) = (x+a)(x-b)^2$

C) $f(x) = (x-a)^2(x+b)$

D) $f(x) = (x-a)^2(x-b)^2$

3. The function f is defined by

$$f(x) = ax\sqrt{x+b},$$

where a and b are constants. In the xy-plane, the graph of $y = f(x)$ passes through the point $(-18, 0)$, and $f(-7) < 0$. Which of the following must be true?

A) $f(0) = 18$

B) $f(0) > -18$

C) $b < 0$

D) $a > 0$

4.

$$x + 12 = (x+a)(x+12)$$

Which of the following are solutions to the given equation, where a is a constant?
I. $-a$
II. $-a+1$
III. -12

A) III only

B) I and III only

C) II and III only

D) I, II, and III

27. Lena starts training for a marathon on March 1. The distance, D, in kilometers, that she can swim without stopping is estimated by

$$D = 2.5w + 4,$$

where w is the number of weeks since March 1. Which of the following is the best explanation of the number 2.5 in this context?

A) The total distance Lena runs on her first day of training.

B) The total distance Lena runs during her first week.

C) The increase in the estimated distance Lena can run each day.

D) The increase in the estimated distance Lena can run each week of training.

28. A school fundraiser offered two types of tickets: standard and VIP. The number of VIP tickets sold was 3 times the number of standard tickets sold. The total number of tickets sold was 480. Based on these data, how many VIP tickets were sold?

A) 120

B) 160

C) 240

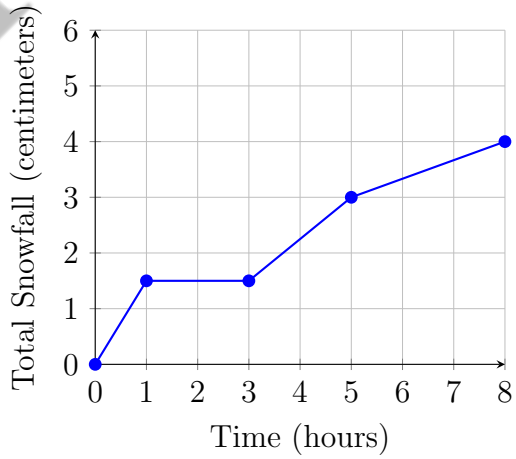
D) 360

29. A city council proposed a new library expansion. A local survey reported that 5 times as many residents supported the expansion as opposed it. A community newsletter stated that 12,000 more residents supported the expansion than opposed it. Based on these data, how many residents opposed the expansion?

A) 2,000 C) 3,000

B) 12,000 D) 15,000

30. The graph shows the total amount of snowfall y, in centimeters, from the start of an 8-hour period, where x is the number of hours after the start of the period. Which of the following statements about the snowfall during this time period is true?



A) The snowfall rate was 0 centimeters per hour between $x = 1$ and $x = 3$.

B) The greatest snowfall rate was between $x = 3$ and $x = 5$.

C) The snowfall rate increased between $x = 5$ and $x = 8$.

D) The snowfall rate was constant between $x = 0$ and $x = 2$.

15. Quadratic Functions 4. Advanced Exercises

1. The product of a positive number x and the number that is 12 less than 5 times of x is equal to 161. What is the value of x?

2. Let the function p be defined as

$$p(x) = \frac{(x-c)^2 - 150}{2c},$$

where c is a constant. If $p(c) = 30$, what is the value of $p(3c)$?

3.

$$(5x+k)(9x^2-40)(2x^2-32x+3p) = 0,$$

where k is a positive constant. If the sum of the solutions to the equation is $\frac{69}{5}$, what is the value of k?

4. The roots of the equation

$$x^2 - 8x + 15 = 0$$

are p and q. Which of the following equations has $p-1$ and $q-1$ as roots?

A) $x^2 - 6x + 8 = 0$

B) $x^2 - 6x + 15 = 0$

C) $x^2 - 6x + 6 = 0$

D) $x^2 - 8x + 11 = 0$

5.

$$x^2 - (4v - 6)x + 1 = 0.$$

It is given that one of the solutions to the equation is a, and $a + \frac{1}{a} = 2v - 3$. What is the value of v?

A) 1

B) 1.5

C) 2

D) 2.5

6. If $d = a - c$, which of the following is equivalent to the expression $x^4 - a^2 + 2ac - c^2$?

A) $(x^2 + d)^2$

B) $(x - d)^2$

C) $(x^2 + d)(x^2 - d)$

D) $x^4 - dx^2 - d^2$

28. [2025] A club plans to sell tote bags. The club members estimate they will sell 80 tote bags when the bags are priced at \$9 each. For every price increase of \$1, they estimate they will sell 8 fewer bags. What is the estimated revenue, in dollars, when the bags are priced at \$12 each? (Revenue = Price × Number of bags sold)

29. A concert venue plans to sell tickets for a charity concert. The organizers estimate they will sell 500 tickets when the price is \$20 each. For every price increase of \$5, they estimate they will sell 50 fewer tickets. What is the maximum revenue the venue can earn? (Revenue = Price × Number of tickets sold)

30. The total distance s, in meters, traveled by a car moving along a straight road can be modeled by a quadratic function of time t, where t is measured in seconds. At a time of 5.0 seconds, the car has traveled 20.0 meters, and at a time of 15.0 seconds, it has traveled 180.0 meters. If the car was at a distance of 0 meters when $t = 0$, what is the total distance traveled, in meters, by the car after 25.0 seconds?

15. Homework. Quadratic Functions 4. Advanced

1. The product of a positive number x and the number that is 7 less than 4 times x is equal to 102. What is the value of x?

   A) 4

   B) 5

   C) 6

   D) 10

2. Let the function q be defined as

$$q(x) = \frac{(x-k)^3 - 200}{4k},$$

   where k is a constant. If $q(k) = 25$, what is the value of $q(2k)$?

   A) 25

   B) 26

   C) 104

   D) -52

3.

$$(4x-m)(7x^2-30)(3x^2-24x+2n) = 0,$$

   where m is a positive constant. If the sum of the solutions to the equation is $\frac{41}{4}$, what is the value of m?

   A) 9

   B) 12

   C) 15

   D) 18

4. The roots of the equation

$$x^2 - 10x + 21 = 0$$

   are r and s. Which of the following equations has $r+2$ and $s+2$ as roots?

   A) $x^2 - 6x + 5 = 0$

   B) $x^2 - 14x + 45 = 0$

   C) $x^2 - 14x - 45 = 0$

   D) $x^2 - 12x + 32 = 0$

5.

$$x^2 - (6w-5)x + 2 = 0.$$

   It is given that one of the solutions to the equation is b, and $b + \frac{2}{b} = 3w - 3$. What is the value of w?

   A) 1

   B) $\frac{1}{3}$

   C) $\frac{2}{3}$

   D) 2

6. If $m = b + c^2$, which of the following is equivalent to the expression

$$x^4 - b^2 - 2bc^2 - c^4?$$

   A) $(x^2 + m)^2$

   B) $(x^2 - m)^2$

   C) $(x^2 + m)(x^2 - m)$

   D) $x^4 + mx^2 + m^2$

27.

$g(x) = -0.004500x^2 + 18.120x - 17{,}500$

gives the predicted average Antarctic sea ice area $g(x)$, in millions of square kilometers, for September of each year x, where $1991 \leq x \leq 2026$. Based on the model, what is the positive difference, in millions of square kilometers, between the predicted average Antarctic sea ice area for September of the year 1991 and the predicted average Antarctic sea ice area for September of the year 2026? (Round your answer to the nearest thousandth.)

A) 13.122

B) 4.873

C) 1.522

D) 1.523

28. A school fundraiser plans to sell water bottles. The organizers estimate they will sell 120 water bottles when the bottles are priced at \$2 each. For every price increase of \$1, they estimate they will sell 10 fewer bottles. What is the estimated revenue, in dollars, when the bottles are priced at \$6 each? (Revenue = Price × Number of bottles sold)

A) 240

B) 330

C) 480

D) 600

29. A theater plans to sell tickets for a special performance. The organizers estimate they will sell 450 tickets when the price is \$15 each. For every price increase of \$3, they estimate they will sell 30 fewer tickets. What is the maximum revenue the theater can earn? (Revenue = Price × Number of tickets sold)

A) \$9,000

B) \$10,800

C) \$12,150

D) \$13,500

30. The total distance s, in meters, traveled by a motorcycle moving along a straight track can be modeled by a quadratic function of time t, where t is measured in seconds. At a time of 4.0 seconds, the motorcycle has traveled 12.0 meters, and at a time of 10.0 seconds, it has traveled 120.0 meters. If the motorcycle was at a distance of 0 meters when $t = 0$, what is the total distance traveled, in meters, by the motorcycle after 14.0 seconds?

A) 180

B) 192

C) 210

D) 252

17. Percentage 2

1. If 40% of x is equal to 25% of y, and $x + y = 130$, then what is the value of x?

   A) 35

   B) 40

   C) 50

   D) 60

2. For the positive quantities h, j, and k, 54% of h is equivalent to 48% of j, and j is equivalent to 36% of k. What percentage of k is h?
   (Disregard the % sign when entering your answer. For example, if your answer is 39%, enter 39.)

3. The positive number m is 3,500% of the number n, and n is 25% of the number p. What is the value of $m - p$ in terms of n?

   A) $34n$

   B) $34.75n$

   C) $31n$

   D) $30n$

4. [2025] A number f is 120% greater than a positive number g. A number h is 90% less than the number f. The number h is how many times the number g?

   A) 0.12

   B) 0.22

   C) 1.08

   D) 1.98

5. The speeds of particles A, B, and C are a meters per second, b meters per second, and c meters per second, respectively. If the speed of particle A is 4,500% of the speed of particle C and the speed of particle C is 0.008% of the speed of particle B, which expression represents the value of $a + b$ in terms of c?

   A) 450c

   B) 12,545c

   C) 1,295c

   D) 170c

6. If b is 200% greater than a, where $a > 0$, then $a + b$ is what percent greater than b?

   A) 33.3%

   B) 50.0%

   C) 66.7%

   D) 200%

29. [2025] A researcher surveyed undergraduate students, graduate students, and postdoctoral students. The number of undergraduate students surveyed was 5,000% of the number of postdoctoral students surveyed. The number of graduate students surveyed was 30% of the number of undergraduate students surveyed. If there were 4,500 graduate students surveyed, what was the sum of the number of undergraduate students and postdoctoral students surveyed?

30. The sum of three integers, each less than 12, is 23. If the product of the two smallest integers is 40% less than the product of the two largest integers, what is the value of the middle integer?

A) 5

B) 6

C) 7

D) 8

17. Homework. Percentage 2

1. If 30% of x is equal to 20% of y, and $x + y = 150$, what is the value of x?

   A) 45

   B) 60

   C) 75

   D) 90

2. For the positive quantities h, j, and k, 60% of h is equivalent to 50% of j, and j is equivalent to 12% of k. What percentage of k is h?

   A) 10

   B) 33

   C) 40

   D) 48

3. The positive number a is 2,400% of the number b, and b is 20% of the number c. What is the value of $a - c$ in terms of b?

   A) $22b$

   B) $21b$

   C) $19b$

   D) $17b$

4. The positive number m is 1,664% of the sum of the positive numbers n and p, and n is 80% of p. What percent of n is m?

   A) 2,340%

   B) 2,604%

   C) 3,044%

   D) 3,744%

5. A number x is 150% greater than a positive number y. A number z is 80% less than the number x. The number z is how many times the number y?

   A) 0.3

   B) 0.5

   C) 1.2

   D) 2.8

6. The speeds of particles A, B, and C are a meters per second, b meters per second, and c meters per second, respectively. If the speed of particle A is 4,500% of the speed of particle C, and the speed of particle C is 0.008% of the speed of particle B, which expression represents the value of $a + b$ in terms of c?

   A) $450c$

   B) $12{,}545c$

   C) $1{,}295c$

   D) $170c$

27. A satellite weighs 200.00 pounds on Earth and 230.00 pounds on Saturn. The satellite's weight on Mars is 150% of its weight on Earth. If the satellite's weight on Saturn is x% of its weight on Mars, which of the following is closest to the value of x?

A) 33.33

B) 42.75

C) 76.67

D) 172.50

28. The composition of an animal is defined as its muscle, bone, and fat. A biologist studied the composition of a young deer and found that it had 180 kilograms of muscle, which made up approximately 60% of its total composition. Of the remaining composition, approximately 45% was bone, and the rest was fat. Based on these approximations, to the nearest tenth, how many kilograms of this deer's composition was bone?

A) 36.0

B) 36.9

C) 40.5

D) 54.0

29. A researcher surveyed undergraduate students, graduate students, and postdoctoral students. The number of undergraduate students surveyed was 4,800% of the number of postdoctoral students surveyed. The number of graduate students surveyed was 25% of the number of undergraduate students surveyed. If there were 3,000 graduate students surveyed, what was the sum of the number of undergraduate students and postdoctoral students surveyed?

A) 7,850

B) 9,000

C) 10,500

D) 12,250

30. The sum of three integers, each less than 11, is 24. If the product of the two smallest integers is 50% less than the product of the two largest integers, what is the value of the middle integer?

A) 5

B) 6

C) 9

D) 10

19. Proportion and Rates 2

1. If a cyclist rides at a constant speed of 18 miles per hour, how many minutes will it take to travel 12 miles?

   A) 30

   B) 40

   C) 50

   D) 60

2. A sea turtle swam from Perhentian, Malaysia, to the coast of Australia, covering a total of 1,800 miles. The journey took the turtle 90 days to complete. On average, how many miles did the turtle swim per day?

3. A satellite orbits Earth and travels 259,200 kilometers in 5 days. To the nearest kilometer per hour, what was the satellite's average speed during this period?

   A) 2,160

   B) 2,200

   C) 51,840

   D) 54,000

4. Traveling at 36 miles per hour, Carlos completes his daily commute in 50 minutes. How many minutes would he save if he traveled at 45 miles per hour?

   A) 10

   B) 18

   C) 25

   D) 40

5. Lola drove 360 miles and arrived at her destination in 8 hours. If she had driven 35 miles per hour faster, how many hours would she have saved on the trip?

   A) 3.5

   B) 4.5

   C) 5.5

   D) 6

6. A car travels d miles in t hours and arrives at its destination 2 hours late. At what average speed, in miles per hour, should the car have traveled to arrive on time?

   A) $\frac{d}{t-2}$

   B) $\frac{d}{t+2}$

   C) $\frac{d}{t}-2$

   D) $\frac{d}{t}+2$

24. A person is born every 7 seconds and a person dies every 12 seconds. How many seconds does it take for the population to grow by one person?

A) $\frac{5}{84}$ sec

B) 5 sec

C) $8\frac{4}{5}$ sec

D) $16\frac{4}{5}$ sec

25. If 15 grams of tea costs t dollars and each gram makes c cups of tea, what is the cost of one cup of tea in terms of t and c?

A) $\frac{t}{15c}$

B) $\frac{15t}{c}$

C) $\frac{c}{15t}$

D) $\frac{15c}{t}$

26. A tank that holds 15,000 liters is $\frac{1}{3}$ full. A pump can deliver g liters of water every m minutes. If the pumping company charges d dollars per minute, how much will it cost, in dollars, to fill the tank completely?

A) $\frac{10{,}000 \cdot m \cdot d}{g}$

B) $\frac{10{,}000 \cdot g \cdot d}{m}$

C) $\frac{5{,}000 \cdot m \cdot d}{g}$

D) $\frac{5{,}000 \cdot g \cdot d}{m}$

27. [2025] A square map has a side length of 55 inches, and 1 inch on the map represents an actual distance of 13 miles. A smaller version of the same map is printed as a square with the side length 70% shorter than the side length of the previous map. On the smaller map, which of the following is closest to the actual distance, in miles, represented by 1 inch?

A) 3.90

B) 7.65

C) 38.50

D) 43.33

28. [2025] A square map has a side length of 30 inches, and 1 inch on the map represents an actual distance of 17 miles. A smaller version of the same map is printed as a square with the side length 65% shorter than the side length of the previous map. On the smaller map, which of the following is closest to the actual distance, in miles, represented by 1 inch?

A) 5.95

B) 10.30

C) 19.50

D) 48.57

19. Homework. Proportion and Rates 2

1. If a runner maintains a constant speed of 9 miles per hour, how many minutes will it take to travel 6 miles?

   A) 30

   B) 35

   C) 40

   D) 45

2. A dolphin swam from Bali, Indonesia, to the coast of Australia, covering a total of 1,200 miles. The journey took the dolphin 60 days to complete. On average, how many miles did the dolphin swim per day?

   A) 15

   B) 18

   C) 20

   D) 25

3. A space probe travels 432,000 kilometers around a planet in 8 days. To the nearest kilometer per hour, what was the probe's average speed during this period?

   A) 2,200

   B) 2,250

   C) 2,500

   D) 2,700

4. Traveling at 24 miles per hour, Maria completes her daily commute in 90 minutes. How many minutes would she save if she traveled at 30 miles per hour?

   A) 12

   B) 18

   C) 24

   D) 30

5. Sara drove 240 miles and arrived at her destination in 4 hours. If she had driven 20 miles per hour faster, how many hours would she have saved on the trip?

   A) 0.5

   B) 1.0

   C) 1.5

   D) 2.0

6. A bus travels a distance of D miles in T hours but arrives 1.5 hours late. At what average speed, in miles per hour, should the bus have traveled to arrive on time?

   A) $\dfrac{D}{T-1.5}$

   B) $\dfrac{D}{T+1.5}$

   C) $\dfrac{D}{T}-1.5$

   D) $\dfrac{D}{T}+1.5$

24. In a small town, a baby is born every 10 seconds and a person passes away every 15 seconds. How many seconds does it take for the population to increase by one person?

A) $\frac{1}{30}$ sec

B) 5 sec

C) 30 sec

D) 6 sec

25. A package contains 20 grams of coffee and costs p dollars. If each gram can brew k cups of coffee, what is the cost of one cup of coffee in terms of p and k?

A) $\frac{p}{20k}$

B) $\frac{20p}{k}$

C) $\frac{k}{20p}$

D) $\frac{20k}{p}$

26. A water reservoir has a capacity of 18,000 liters and is currently $\frac{1}{4}$ full. A pump supplies p liters of water every n minutes. If the service fee is c dollars per minute, how much will it cost, in dollars, to completely fill the reservoir?

A) $\frac{13{,}500 \cdot p \cdot c}{n}$

B) $\frac{4{,}500 \cdot n \cdot c}{p}$

C) $\frac{4{,}500 \cdot p \cdot c}{n}$

D) $\frac{13{,}500 \cdot n \cdot c}{p}$

27. A square blueprint has a side length of 60 inches, where 1 inch represents an actual distance of 12 miles. A reduced version of the same blueprint is printed as a square whose side length is 40% shorter than the original. On the smaller blueprint, which of the following is closest to the actual distance, in miles, represented by 1 inch?

A) 7.2

B) 8.0

C) 12.0

D) 20.0

28. A square map has a side length of 58 inches, and 1 inch on the map represents an actual distance of 14.5 miles. A reduced version of the same map is printed as a square whose side length is 37% shorter than the original map. On the smaller map, which of the following is closest to the actual distance, in miles, represented by 1 inch?

A) 9.1

B) 14.5

C) 23.0

D) 31.7

21. Answers

1. Linear Equations

1 B
2 A
3 D
4 A
5 C
6 B
7 B
8 -72
9 D
10 C
11 B
12 C
13 C
14 D
15 D
16 C
17 B
18 $\frac{3}{8}$
19 $-\frac{13}{14}$
20 D
21 D
22 B
23 A
24 C
25 B
26 D
27 C
28 A
29 A
30 A

1. Homework. Linear Equations

1 A
2 C
3 B
4 D
5 A
6 D
7 D
8 C
9 C
10 B
11 B
12 C
13 B
14 B
15 B
16 D
17 C
18 D
19 B
20 B
21 C
22 A
23 C
24 D
25 A
26 C
27 D
28 B
29 B
30 A

15. Quadratic Functions 4

1. 7
2. 25
3. 11
4. A
5. B
6. C
7. -16
8. 23
9. $-\frac{57}{77}$
10. 600
11. 294
12. 179
13. -9
14. 39
15. D
16. A
17. 39
18. -6
19. -10
20. 11
21. C
22. D
23. C
24. -94.2
25. 15
26. B
27. 0.059
28. 672
29. 12,250
30. 500

15. Homework. Quadratic Functions 4

1. C
2. B
3. A
4. B
5. C
6. C
7. D
8. C
9. C
10. A
11. C
12. B
13. B
14. D
15. B
16. B
17. C
18. B
19. C
20. D
21. C
22. D
23. C
24. A
25. A
26. B
27. D
28. C
29. A
30. D