





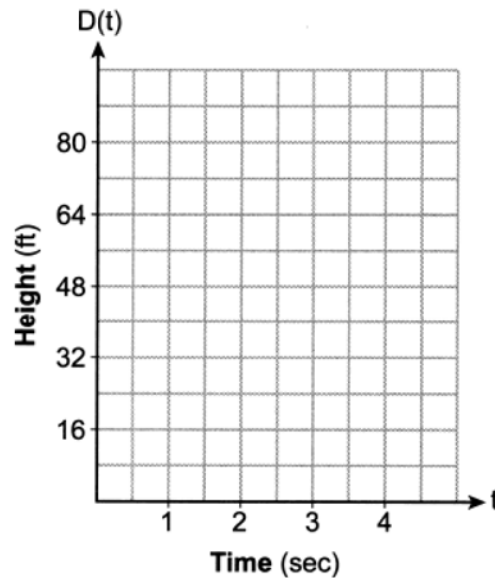


- 29 The table below shows the population of Manhattan for the years indicated, according to the U.S. Census Bureau.

Year	Population
1970	1,539,233
1980	1,428,285
1990	1,487,536
2000	1,537,195
2010	1,585,873
2020	1,643,734

Determine the average rate of change of the population per year between the years 1980 and 2020, rounded to the nearest integer.

- 30 Rewrite  $\frac{5}{\sqrt{3}}$  as a fraction with a rational denominator.
- 31 A ball is tossed up into the air from the deck of a building. The distance that the ball is above the ground  $t$  seconds after it is tossed can be modeled by the function  $D(t) = -16t^2 + 32t + 48$ , where the distance is measured in feet. On the set of axes below, graph  $D(t) = -16t^2 + 32t + 48$ .



State the maximum number of feet above the ground that the ball will reach. State the number of seconds after the toss it will take the ball to hit the ground.

- 32 Solve the following system of equations algebraically for all values of  $x$  and  $y$ :

$$y = -2x + 3$$

$$y = x^2 - 5x + 3$$

- 33 The table below shows the number of years of experience,  $x$ , working as a salesperson and their corresponding salaries,  $y$ , in thousands of dollars.

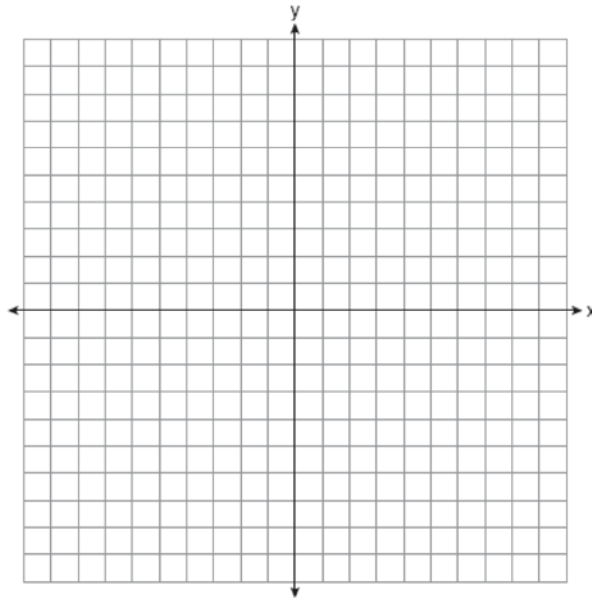
Number of Years of Experience ( $x$ )	Salary in Thousands of Dollars ( $y$ )
2	15
3	28
5	42
9	54
13	64
16	90

State the linear regression equation for these data. Round all values to the *nearest hundredth*. State the correlation coefficient for this data set, to the *nearest hundredth*. State what the correlation coefficient indicates about the linear fit of the data.

- 34 Graph the system of inequalities on the set of axes below.

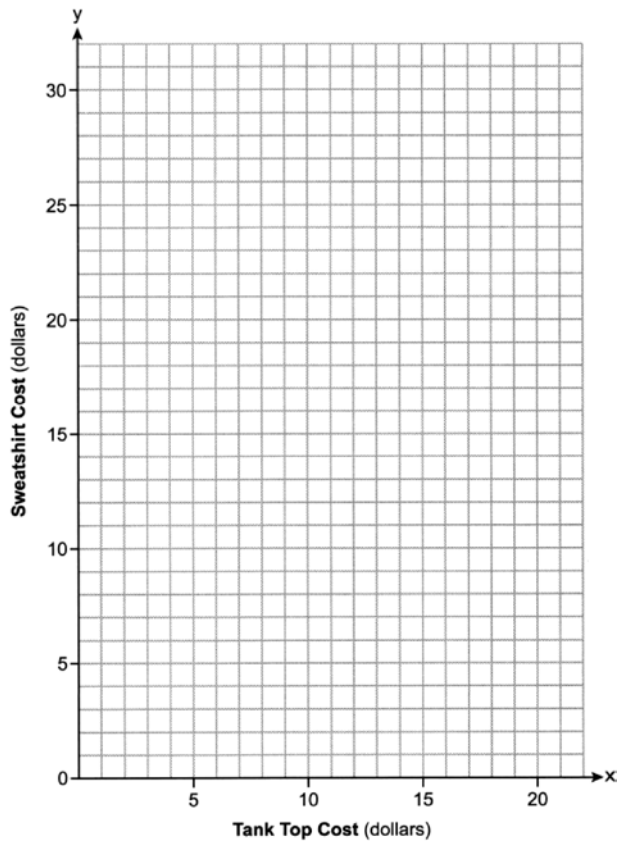
$$2y < x - 8$$

$$3x + y \geq 6$$



State the coordinates of a point that satisfies both inequalities. Justify your answer.

- 35 At a department store in a tax-free state, Jane can either buy three tank tops and two sweatshirts for \$52 or two tank tops and one sweatshirt for \$30. If  $x$  represents the price of one tank top and  $y$  represents the cost of one sweatshirt, write a system of equations that could be used to model this situation. On the set of axes below, graph the system of equations.



State the coordinates of the point of intersection of your lines. Explain what each coordinate of the point of intersection means in the context of the problem.

## 0626AI

## Answer Section

1 ANS: 1

$$a_{20} = 4 + (20 - 1)(3) = 61$$

PTS: 2

REF: 062601ai

NAT: F.BF.A.1

TOP: Sequences

2 ANS: 2

$$0.5x - 4 = 8 - x$$

$$x - 8 = 16 - 2x$$

$$3x = 24$$

$$x = 8$$

PTS: 2

REF: 062602ai

NAT: A.REI.B.3

TOP: Solving Linear Equations

3 ANS: 3

PTS: 2

REF: 062603ai

NAT: A.SSE.A.2

TOP: Factoring the Difference of Perfect Squares

4 ANS: 2

PTS: 2

REF: 062604ai

NAT: F.IF.A.1

TOP: Defining Functions

5 ANS: 3

PTS: 2

REF: 062605ai

NAT: A.APR.A.1

TOP: Powers of Powers

6 ANS: 3

PTS: 2

REF: 062606ai

NAT: A.SSE.A.1

TOP: Modeling Polynomials

7 ANS: 2

PTS: 2

REF: 062607ai

NAT: F.BF.A.1

TOP: Sequences

8 ANS: 1

PTS: 2

REF: 062608ai

NAT: S.ID.C.9

TOP: Analysis of Data

9 ANS: 2

PTS: 2

REF: 062609ai

NAT: A.CED.A.1

TOP: Modeling Linear Equations

10 ANS: 4

$$h(-1) = (-1)^2 - 3(-1) + 1 = 5$$

PTS: 2

REF: 062610ai

NAT: F.IF.A.2

TOP: Function Notation

11 ANS: 3

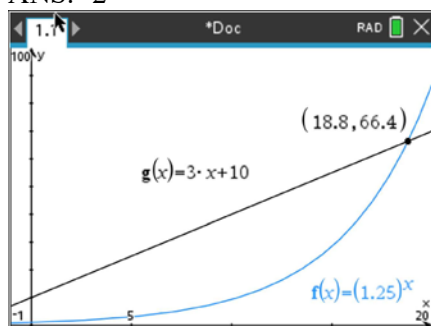
PTS: 2

REF: 062611ai

NAT: A.APR.B.3

TOP: Zeros of Polynomials

12 ANS: 2



PTS: 2

REF: 062612ai

NAT: F.LE.A.3

TOP: Families of Functions

13 ANS: 2

$$m = \frac{5 - -1}{2 - -2} = \frac{6}{4} = \frac{3}{2}$$

PTS: 2

REF: 062613ai

NAT: A.REI.D.10

TOP: Writing Linear Equations

KEY: other forms

14 ANS: 4

$$\frac{40}{20 + 40 + 10} \approx 57\%$$

PTS: 2

REF: 062614ai

NAT: S.ID.B.5

TOP: Frequency Tables

KEY: two-way

15 ANS: 4

$$x^2 - 10x = 24$$

$$x^2 - 10x + 25 = 24 + 25$$

$$(x - 5)^2 = 49$$

PTS: 2

REF: 062615ai

NAT: A.REI.B.4

TOP: Solving Quadratics

KEY: completing the square

16 ANS: 1

PTS: 2

REF: 062616ai

NAT: F.BF.B.3

TOP: Transformations with Functions

17 ANS: 4

PTS: 2

REF: 062617ai

NAT: A.REI.A.1

TOP: Identifying Properties

18 ANS: 3

$$25\% \times 40 = 10$$

PTS: 2

REF: 062618ai

NAT: S.ID.A.1

TOP: Quartiles and Percentiles

19 ANS: 2

PTS: 2

REF: 062619ai

NAT: A.APR.A.1

TOP: Operations with Polynomials

KEY: subtraction

20 ANS: 4

PTS: 2

REF: 062620ai

NAT: F.LE.B.5

TOP: Modeling Exponential Functions

21 ANS: 4

$$2.5 \text{ rods} \times \frac{5.5 \text{ yds}}{1 \text{ rod}} \times \frac{3 \text{ ft}}{1 \text{ yd}} \times \frac{12 \text{ in}}{1 \text{ ft}} = 495 \text{ in}$$

PTS: 2 REF: 062621ai NAT: N.Q.A.1 TOP: Conversions

22 ANS: 1

$$\frac{3 \pm \sqrt{(-3)^2 - 4(2)(-6)}}{2(2)} = \frac{3 \pm \sqrt{57}}{4}$$

PTS: 2 REF: 062622ai NAT: A.REI.B.4 TOP: Solving Quadratics  
KEY: quadratic formula

23 ANS: 3

$$x = \frac{-8}{2(1)} = -4$$

PTS: 2 REF: 062623ai NAT: F.IF.C.7 TOP: Graphing Quadratic Functions

24 ANS: 3

$$2\sqrt{6} \cdot 5\sqrt{3} = 10\sqrt{18} = 10\sqrt{9} \cdot \sqrt{2} = 30\sqrt{2}$$

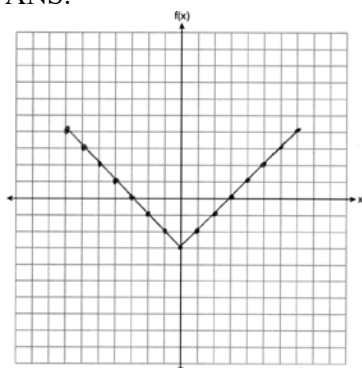
PTS: 2 REF: 062624ai NAT: N.RN.B.3 TOP: Operations with Radicals  
KEY: multiplication

25 ANS:

$$(1 - 2x)(3 - 5x) = 3 - 5x - 6x + 10x^2 = 10x^2 - 11x + 3$$

PTS: 2 REF: 062625ai NAT: A.APR.A.1 TOP: Operations with Polynomials  
KEY: multiplication

26 ANS:



PTS: 2 REF: 062626ai NAT: F.IF.C.7 TOP: Graphing Absolute Value Functions

27 ANS:

$$-4x + 1 > 9 + 3(2x + 1) + x$$

$$-4x > 8 + 6x + 3 + x$$

$$-4x > 11 + 7x$$

$$-11 > 11x$$

$$-1 > x$$

PTS: 2

REF: 062627ai

NAT: A.REI.B.3

TOP: Solving Linear Inequalities

28 ANS:

$$2A = bh$$

$$\frac{2A}{b} = h$$

PTS: 2

REF: 062628ai

NAT: A.CED.A.4

TOP: Transforming Formulas

KEY: basic

29 ANS:

$$\frac{1643734 - 1428285}{40} = 5386$$

PTS: 2

REF: 062629ai

NAT: F.IF.B.6

TOP: Rate of Change

30 ANS:

$$\frac{5}{\sqrt{3}} \cdot \frac{\sqrt{3}}{\sqrt{3}} = \frac{5\sqrt{3}}{3}$$

PTS: 2

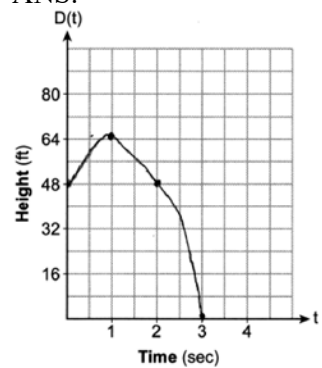
REF: 062630ai

NAT: N.RN.B.3

TOP: Operations with Radicals

KEY: division

31 ANS:



64, 3

PTS: 4

REF: 062631ai

NAT: F.IF.B.4

TOP: Graphing Quadratic Functions

32 ANS:

$$x^2 - 5x + 3 = -2x + 3 \quad y = -2(0) + 3 = 3 \quad (0,3), (3,-3)$$

$$x^2 - 3x = 0 \quad y = -2(3) + 3 = -3$$

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

$$x = 0, 3$$

PTS: 4 REF: 062632ai NAT: A.REI.C.7 TOP: Quadratic-Linear Systems

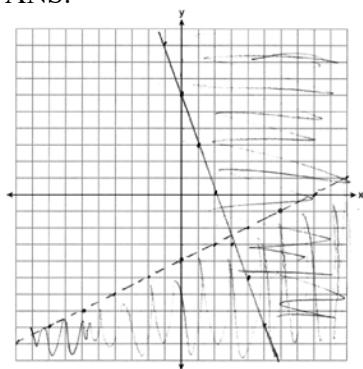
33 ANS:

$$y = 4.61x + 11.93, 0.98, \text{strong}$$

PTS: 4 REF: 062633ai NAT: S.ID.B.6 TOP: Regression

KEY: linear with correlation coefficient

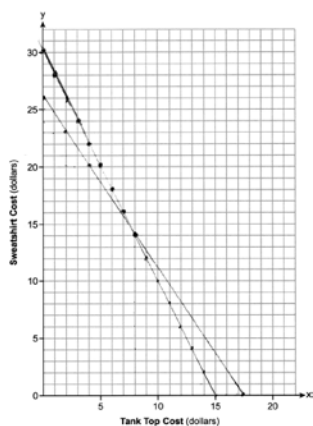
34 ANS:



(10,-10) lies in the solution of both inequalities.

PTS: 4 REF: 062634ai NAT: A.REI.D.12 TOP: Graphing Systems of Linear Inequalities

35 ANS:



$$3x + 2y = 52$$

$$2x + y = 30$$

sweatshirt.

(8,14). 8 represents the cost of a tank top and 14 represents the cost of a

PTS: 6 REF: 062635ai NAT: A.REI.C.6 TOP: Graphing Linear Systems