0115AI
Answer Section

1 ANS: 2   PTS: 2   REF: 011501ai   NAT: F.LE.B.5
   TOP: Modeling Linear Functions
2 ANS: 2   PTS: 2   REF: 011502ai   NAT: N.Q.A.1
   TOP: Conversions   KEY: dimensional analysis
3 ANS: 4   PTS: 2   REF: 011503ai   NAT: A.REI.B.4
   TOP: Solving Quadratics   KEY: factoring
4 ANS: 1   PTS: 2   REF: 011504ai   NAT: F.BF.A.1
   TOP: Modeling Exponential Functions
5 ANS: 3   PTS: 2   REF: 011505ai   NAT: F.LE.A.1
   TOP: Families of Functions
6 ANS: 2   PTS: 2   REF: 011506ai   NAT: F.IF.B.5
   TOP: Domain and Range
7 ANS: 1

$$7 - \frac{2}{3}x < x - 8$$

$$15 < \frac{5}{3}x$$

$$9 < x$$

   PTS: 2   REF: 011507ai   NAT: A.REI.B.3   TOP: Solving Linear Inequalities
8 ANS: 1
$$25,000(0.86)^2 - 25,000(0.86)^3 = 18490 - 15901.40 = 2588.60$$

   PTS: 2   REF: 011508ai   NAT: F.IF.A.2   TOP: Functional Notation
9 ANS: 4
$$y + 3 = 6(0)$$

$$y = -3$$

   PTS: 2   REF: 011509ai   NAT: F.IF.B.4   TOP: Graphing Linear Functions
10 ANS: 2   PTS: 2   REF: 011510ai   NAT: A.APR.A.1
   TOP: Operations with Polynomials   KEY: multiplication
11 ANS: 4

$$m = \frac{11-1}{3-(-2)} = \frac{10}{5} = 2 \quad y = mx + b \quad y = 2x + 5$$

$$11 = 2(3) + b \quad 9 = 2(2) + 5$$

$$5 = b$$

   PTS: 2   REF: 011511ai   NAT: A.REI.D.10   TOP: Writing Linear Equations
   KEY: other forms
12 ANS: 2   PTS: 2   REF: 011512ai   NAT: F.BF.B.3
   TOP: Graphing Polynomial Functions

13 ANS: 3 PTS: 2 REF: 011513ai NAT: A.CED.A.1
TOP: Modeling Linear Inequalities

14 ANS: 4 PTS: 2 REF: 011514ai NAT: S.ID.A.2
TOP: Central Tendency and Dispersion

15 ANS: 3 PTS: 2 REF: 011515ai NAT: F.LE.B.5
TOP: Modeling Exponential Functions

16 ANS: 1 PTS: 2 REF: 011516ai NAT: A.CED.A.4
TOP: Transforming Formulas

17 ANS: 4

$$x^2 + 6x = 7$$

$$x^2 + 6x + 9 = 7 + 9$$

$$(x + 3)^2 = 16$$

PTS: 2 REF: 011517ai NAT: A.REI.B.4 TOP: Solving Quadratics
KEY: completing the square

18 ANS: 3 PTS: 2 REF: 011518ai NAT: A.REI.D.11
TOP: Other Systems

19 ANS: 4

$$16^{2t} = n^{4t}$$

$$(16^2)^t = (n^4)^t$$

$$((4^2)^2)^t = ((n^2)^2)^t$$

PTS: 2 REF: 011519ai NAT: A.SSE.B.3 TOP: Modeling Exponential Functions

20 ANS: 3

$$f(0 + 1) = -2f(0) + 3 = -2(2) + 3 = -1$$

$$f(1 + 1) = -2f(1) + 3 = -2(-1) + 3 = 5$$

PTS: 2 REF: 011520ai NAT: F.IF.A.3 TOP: Sequences
KEY: recursive

21 ANS: 1

$$\frac{0.8(10^2) - 0.8(5^2)}{10 - 5} = \frac{80 - 20}{5} = 12$$

PTS: 2 REF: 011521ai NAT: F.IF.B.6 TOP: Rate of Change

22 ANS: 3 PTS: 2 REF: 011522ai NAT: A.SSE.A.2
TOP: Factoring the Difference of Perfect Squares KEY: higher power

23 ANS: 4 PTS: 2 REF: 011523ai NAT: F.BF.A.1
TOP: Modeling Linear Functions

24 ANS: 1 PTS: 2 REF: 011524ai NAT: A.APR.B.3
TOP: Graphing Polynomial Functions

25 ANS:

Correct. The sum of a rational and irrational is irrational.

PTS: 2   REF: 011525ai   NAT: N.RN.B.3   TOP: Operations with Radicals
KEY: classify

26 ANS:

$$\frac{33 + 12}{180} = 25\%$$

PTS: 2   REF: 011526ai   NAT: S.ID.B.5   TOP: Frequency Tables
KEY: two-way

27 ANS:

$(-4, 1)$, because then every element of the domain is not assigned one unique element in the range.

PTS: 2   REF: 011527ai   NAT: F.IF.A.1   TOP: Defining Functions
KEY: ordered pairs

28 ANS:

$-2x^2 + 6x + 4$

PTS: 2   REF: 011528ai   NAT: A.APR.A.1   TOP: Operations with Polynomials
KEY: subtraction

29 ANS:

$$4x^2 - 12x - 7 = 0$$

$$(4x^2 - 14x) + (2x - 7) = 0$$
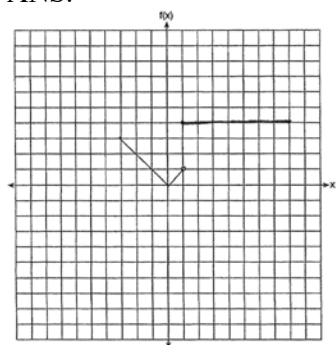
$$2x(2x - 7) + (2x - 7) = 0$$

$$(2x + 1)(2x - 7) = 0$$

$$x = -\frac{1}{2}, \frac{7}{2}$$

PTS: 2   REF: 011529ai   NAT: A.REI.B.4   TOP: Solving Quadratics
KEY: factoring

30 ANS:

PTS: 2   REF: 011530ai   NAT: F.IF.C.7   TOP: Graphing Piecewise-Defined Functions

31 ANS:

$$15x + 36 = 10x + 48$$
$$5x = 12$$
$$x = 2.4$$

PTS: 2   REF: 011531ai   NAT: A.CED.A.1   TOP: Modeling Linear Equations
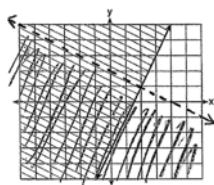
32 ANS:

$y = 0.25(2)^x$. I inputted the four integral values from the graph into my graphing calculator and determined the exponential regression equation.

PTS: 2   REF: 011532ai   NAT: F.LE.A.2   TOP: Modeling Exponential Functions

33 ANS:

$2p + 3d = 18.25$ $4p + 6d = 36.50$ $4p + 2(2.25) = 27.50$

$4p + 2d = 27.50$ $4p + 2d = 27.50$ $4p = 23$

            $4d = 9$ $p = 5.75$

            $d = 2.25$

PTS: 4   REF: 011533ai   NAT: A.CED.A.3   TOP: Modeling Linear Systems

34 ANS:

$y \geq 2x - 3$.   Oscar is wrong. $(2) + 2(1) < 4$ is not true.

PTS: 4   REF: 011534ai   NAT: A.REI.D.12   TOP: Graphing Systems of Linear Inequalities
KEY: graph

35 ANS:

$r \approx 0.94$. The correlation coefficient suggests that as calories increase, so does sodium.

PTS: 4   REF: 011535ai   NAT: S.ID.C.8   TOP: Correlation Coefficient

36 ANS:

The vertex represents a maximum since $a < 0$. $f(x) = -x^2 + 8x + 9$

$$= -(x^2 - 8x - 9)$$
$$= -(x^2 - 8x + 16) + 9 + 16$$
$$= -(x - 4)^2 + 25$$

PTS: 4   REF: 011536ai   NAT: F.IF.C.8   TOP: Vertex Form of a Quadratic

37 ANS:

$(x - 3)(2x) = 1.25x^2$ Because the original garden is a square, x^2 represents the original area, $x - 3$ represents the side decreased by 3 meters, $2x$ represents the doubled side, and $1.25x^2$ represents the new garden with an area 25% larger. $(x - 3)(2x) = 1.25x^2$ $1.25(8)^2 = 80$

$$2x^2 - 6x = 1.25x^2$$
$$.75x^2 - 6x = 0$$
$$x^2 - 8x = 0$$
$$x(x - 8) = 0$$
$$x = 8$$

PTS: 6   REF: 011537ai   NAT: A.CED.A.1   TOP: Geometric Applications of Quadratics