

## MME Review - Mathematics

### Answer Section

#### MULTIPLE CHOICE

- |            |                                                            |
|------------|------------------------------------------------------------|
| 1. ANS: B  | TOP: 1-1 Variables and Expressions                         |
| 2. ANS: J  | TOP: 1-1 Variables and Expressions                         |
| 3. ANS: B  | TOP: 1-2 Adding and Subtracting Real Numbers               |
| 4. ANS: G  | TOP: 1-4 Powers and Exponents                              |
| 5. ANS: B  | TOP: 1-7 Simplifying Expressions                           |
| 6. ANS: G  | TOP: 1-8 Introduction to Functions                         |
| 7. ANS: C  | TOP: 2-Ext Solving Absolute-Value Equations                |
| 8. ANS: J  | TOP: 3-3 Solving Inequalities by Multiplying and Dividing  |
| 9. ANS: D  | TOP: 4-2 Relations and Functions                           |
| 10. ANS: G | TOP: 4-3 Writing Function Rules                            |
| 11. ANS: B | TOP: 5-3 Rate of Change and Slope                          |
| 12. ANS: J | TOP: 5-8 Slopes of Parallel and Perpendicular Lines        |
| 13. ANS: C | TOP: 5-9 Transforming Linear Functions                     |
| 14. ANS: J | TOP: 6-2 Solving Systems by Substitution                   |
| 15. ANS: A | TOP: 8-2 Factoring by GCF                                  |
| 16. ANS: G | TOP: 8-6 Choosing a Factoring Method                       |
| 17. ANS: B | TOP: 9-2 Characteristics of Quadratic Functions            |
| 18. ANS: F | TOP: 9-9 The Quadratic Formula and the Discriminant        |
| 19. ANS: B | TOP: 10-7 Independent and Dependent Events                 |
| 20. ANS: F | TOP: 11-7 Adding and Subtracting Radical Expressions       |
| 21. ANS: B | TOP: 12-1 Inverse Variation                                |
| 22. ANS: F | TOP: 12-2 Rational Functions                               |
| 23. ANS: A | TOP: 1-1 Sets of Numbers                                   |
| 24. ANS: F | TOP: 1-4 Simplifying Algebraic Expressions                 |
| 25. ANS: C | TOP: 1-9 Introduction to Parent Functions                  |
| 26. ANS: H | TOP: 2-3 Graphing Linear Functions                         |
| 27. ANS: D | TOP: 2-8 Solving Absolute-Value Equations and Inequalities |
| 28. ANS: G | TOP: 5-7 Solving Quadratic Inequalities                    |
| 29. ANS: A | TOP: 5-7 Solving Quadratic Inequalities                    |
| 30. ANS: F | TOP: 6-2 Multiplying Polynomials                           |
| 31. ANS: D | TOP: 6-7 Investigating Graphs of Polynomial Functions      |
| 32. ANS: F | TOP: 10-2 Circles                                          |
| 33. ANS: D | TOP: 11-2 Theoretical and Experimental Probability         |
| 34. ANS: H | TOP: 11-5 Measures of Central Tendency and Variation       |
| 35. ANS: B | TOP: 12-2 Series and Summation Notation                    |
| 36. ANS: F | TOP: 14-1 Graphs of Sine and Cosine                        |
| 37. ANS: B | TOP: 14-1 Graphs of Sine and Cosine                        |
| 38. ANS: G | TOP: 14-5 Double-Angle and Half-Angle Identities           |
| 39. ANS: C | TOP: 14-6 Solving Trigonometric Equations                  |
| 40. ANS: F | TOP: 1-6 Midpoint and Distance in the Coordinate Plane     |
| 41. ANS: B | TOP: 2-4 Biconditional Statements and Definitions          |

42. ANS: J	TOP: 3-6 Lines in the Coordinate Plane
43. ANS: A	TOP: 3-6 Lines in the Coordinate Plane
44. ANS: J	TOP: 4-4 Triangle Congruence: SSS and SAS
45. ANS: D	TOP: 4-8 Isosceles and Equilateral Triangles
46. ANS: F	TOP: 5-1 Perpendicular and Angle Bisectors
47. ANS: A	TOP: 5-5 Indirect Proof and Inequalities in One Triangle
48. ANS: F	TOP: 6-1 Properties and Attributes of Polygons
49. ANS: A	TOP: 6-4 Properties of Special Parallelograms
50. ANS: F	TOP: 11-4 Inscribed Angles
51. ANS: A	TOP: 11-5 Angle Relationships in Circles
52. ANS: F	TOP: 12-1 Reflections
53. ANS: B	TOP: 12-2 Translations
54. ANS: J	TOP: 12-6 Tessellations
55. ANS: A	TOP: 12-6 Tessellations
56. ANS: G	TOP: 12-1 Example 2
57. ANS: A	TOP: 12-1 Example 2
58. ANS: J	TOP: 12-1 Example 2
59. ANS: B	TOP: 12-2 Example 1
60. ANS: F	TOP: 12-2 Example 4
61. ANS: B	TOP: 12-3 Example 1
62. ANS: J	TOP: 12-3 Example 2
63. ANS: A	TOP: 12-4 Example 1
64. ANS: G	TOP: 12-4 Example 2
65. ANS: D	TOP: 12-4 Example 2
66. ANS: F	TOP: 12-4 Example 2
67. ANS: C	TOP: 12-4 Example 4
68. ANS: F	TOP: 12-4 Example 4
69. ANS: C	TOP: 12-4 Example 4
70. ANS: G	TOP: 12-5 Example 1
71. ANS: B	TOP: 12-5 Example 1
72. ANS: H	TOP: 12-5 Example 2
73. ANS: C	TOP: 12-5 Example 3
74. ANS: J	TOP: 12-5 Example 3
75. ANS: A	TOP: 12-5 Example 3
76. ANS: G	TOP: 12-6 Example 1
77. ANS: B	TOP: 12-6 Example 1
78. ANS: H	TOP: 12-6 Example 3
79. ANS: B	TOP: 12-6 Example 4
80. ANS: H	TOP: 12-6 Example 5
81. ANS: D	TOP: 12-6 Example 5
82. ANS: F	TOP: 12-7 Example 1
83. ANS: B	TOP: 12-7 Example 1
84. ANS: H	TOP: 12-8 Example 1
85. ANS: A	TOP: 12-8 Example 1
86. ANS: G	TOP: 12-8 Example 1
87. ANS: B	TOP: 12-8 Example 2
88. ANS: G	TOP: 12-8 Example 2

89.	ANS: A	TOP: Skills Handbook: Simplifying Fractions
90.	ANS: F	TOP: Skills Handbook: Simplifying Fractions
91.	ANS: C	TOP: Skills Handbook: Spreadsheets
92.	ANS: G	TOP: Skills Handbook: Spreadsheets
93.	ANS: B	TOP: Skills Handbook: Adding and Subtracting Fractions
94.	ANS: G	TOP: Skills Handbook: Adding and Subtracting Fractions
95.	ANS: C	TOP: Skills Handbook: Adding and Subtracting Fractions
96.	ANS: F	TOP: Skills Handbook: Multiplying and Dividing Fractions
97.	ANS: B	TOP: Skills Handbook: Multiplying and Dividing Fractions
98.	ANS: H	TOP: Skills Handbook: Fractions and Decimals
99.	ANS: C	TOP: Skills Handbook: Fractions and Decimals
100.	ANS: G	TOP: Skills Handbook: Fractions and Decimals
101.	ANS: D	TOP: Skills Handbook: Fractions, Decimals, and Percents
102.	ANS: G	TOP: Skills Handbook: Fractions, Decimals, and Percents
103.	ANS: A	TOP: Skills Handbook: Prime Numbers and Composite Numbers
104.	ANS: H	TOP: Skills Handbook: Factors and Multiples
105.	ANS: A	TOP: Skills Handbook: Factors and Multiples
106.	ANS: G	TOP: Skills Handbook: Factors and Multiples
107.	ANS: C	TOP: Skills Handbook: Factors and Multiples
108.	ANS: F	TOP: Skills Handbook: Perimeter, Area, and Volume
109.	ANS: C	TOP: Skills Handbook: Perimeter, Area, and Volume
110.	ANS: F	TOP: Skills Handbook: Perimeter, Area, and Volume
111.	ANS: A	TOP: Skills Handbook: Perimeter, Area, and Volume
112.	ANS: H	TOP: Extension 2-6: Developing Geometric Formulas
113.	ANS: C	TOP: Extension 2-6: Developing Geometric Formulas
114.	ANS: H	TOP: Extension 2-6: Developing Geometric Formulas
115.	ANS: B	TOP: Extension 2-6: Developing Geometric Formulas
116.	ANS: J	
117.	ANS: C	TOP: Skills Handbook: Perimeter, Area, and Volume
118.	ANS: H	TOP: Skills Handbook: Perimeter, Area, and Volume
119.	ANS: D	
120.	ANS: H	
121.	ANS: A	TOP: Extension 2-6: Developing Geometric Formulas
122.	ANS: H	TOP: Skills Handbook: Perimeter, Area, and Volume
123.	ANS: B	TOP: Skills Handbook: Perimeter, Area, and Volume
124.	ANS: F	TOP: Skills Handbook: Translations
125.	ANS: C	TOP: Skills Handbook: Problem Solving Strategies: Draw a Diagram
126.	ANS: J	TOP: Skills Handbook: Problem Solving Strategies: Draw a Diagram
127.	ANS: A	TOP: Skills Handbook: Problem Solving Strategies: Try, Check, Revise
128.	ANS: H	TOP: Skills Handbook: Problem Solving Strategies: Try, Check, Revise
129.	ANS: C	TOP: Skills Handbook: Problem Solving Strategies: Solve a Simpler Problem
130.	ANS: H	TOP: Skills Handbook: Problem Solving Strategies: Logical Reasoning
131.	ANS: C	TOP: Skills Handbook: Problem Solving Strategies: Work Backward
132.	ANS: F	TOP: Skills Handbook: Problem Solving Strategies: Work Backward
133.	ANS: B	TOP: Technology 1-6: Matrices
134.	ANS: H	TOP: Technology 1-6: Matrices
135.	ANS: C	TOP: Extension 3-6: Algebraic Reasoning

136.	ANS: H	TOP: Extension 3-6: Algebraic Reasoning
137.	ANS: B	TOP: Extension 3-6: Algebraic Reasoning
138.	ANS: J	TOP: Extension 3-6: Algebraic Reasoning
139.	ANS: D	TOP: Extension 11-3: Special Right Triangles
140.	ANS: H	TOP: Extension 11-3: Special Right Triangles
141.	ANS: B	TOP: Extension 11-3: Special Right Triangles
142.	ANS: G	TOP: Extension 11-6: Rational Exponents
143.	ANS: D	TOP: Extension 11-6: Rational Exponents
144.	ANS: G	TOP: Extension 11-6: Rational Exponents
145.	ANS: C	TOP: Extension 11-6: Rational Exponents
146.	ANS: H	TOP: 5-3 Example 1
147.	ANS: B	TOP: 5-3 Example 2
148.	ANS: F	TOP: 5-3 Example 2
149.	ANS: A	TOP: 5-3 Example 3
150.	ANS: F	TOP: 5-3 Example 3
151.	ANS: D	TOP: 5-9 Example 1
152.	ANS: H	TOP: 6-1 Example 3
153.	ANS: A	TOP: 6-1 Example 3
154.	ANS: F	TOP: 6-2 Example 3
155.	ANS: D	TOP: 6-2 Example 3
156.	ANS: G	TOP: 6-2 Example 3
157.	ANS: B	TOP: 6-3 Example 1
158.	ANS: H	TOP: 6-3 Example 1
159.	ANS: D	TOP: 6-3 Example 2
160.	ANS: J	TOP: 6-3 Example 3
161.	ANS: B	TOP: 6-6 Example 2
162.	ANS: H	TOP: 6-6 Example 3
163.	ANS: D	TOP: 6-6 Example 3
164.	ANS: F	
165.	ANS: C	TOP: 6-5 Example 1
166.	ANS: H	TOP: 6-5 Example 2
167.	ANS: A	TOP: 6-7 Example 1
168.	ANS: H	TOP: 6-7 Example 1
169.	ANS: B	TOP: 6-7 Example 3
170.	ANS: J	TOP: 6-7 Example 4
171.	ANS: A	TOP: 6-8 Example 1
172.	ANS: J	TOP: 6-8 Example 3
173.	ANS: A	TOP: 6-8 Example 3
174.	ANS: G	TOP: 6-9 Example 1
175.	ANS: C	TOP: 6-9 Example 1
176.	ANS: G	TOP: 6-10 Example 1
177.	ANS: D	
178.	ANS: F	TOP: 5-1 Example 3
179.	ANS: A	TOP: 5-1 Example 3
180.	ANS: G	TOP: 5-1 Example 1
181.	ANS: C	TOP: 5-1 Example 6
182.	ANS: H	TOP: 5-2 Example 3

183. ANS: D TOP: 5-3 Example 1  
184. ANS: F TOP: 5-3 Example 1  
185. ANS: A TOP: 5-3 Example 1  
186. ANS: G TOP: 5-3 Example 3  
187. ANS: D TOP: 5-4 Example 3  
188. ANS: G TOP: 5-4 Example 3  
189. ANS: B TOP: 5-4 Example 5

**NUMERIC RESPONSE**

190. ANS: 12  
TOP: 1-2 Adding and Subtracting Real Numbers
191. ANS: 65  
TOP: 2-3 Solving Two-Step and Multi-Step Equations
192. ANS: 18  
TOP: 3-4 Solving Two-Step and Multi-Step Inequalities
193. ANS: 50.24  
TOP: 4-3 Writing Function Rules
194. ANS: 4  
TOP: 5-3 Rate of Change and Slope
195. ANS: 8  
TOP: 5-6 Slope-Intercept Form
196. ANS: 0.125  
TOP: 10-7 Independent and Dependent Events
197. ANS: 320  
TOP: 11-3 Exponential Growth and Decay
198. ANS: 2  
TOP: 12-1 Inverse Variation
199. ANS: 10.8  
TOP: 1-3 Square Roots
200. ANS: 25  
TOP: 3-3 Solving Systems of Linear Inequalities
201. ANS: 12  
TOP: 4-4 Determinants and Cramer's Rule
202. ANS: 31  
TOP: 4-4 Determinants and Cramer's Rule

203. ANS: 9

TOP: 5-1 Using Transformations to Graph Quadratic Functions

204. ANS: 5

TOP: 5-3 Solving Quadratic Equations by Graphing and Factoring

205. ANS: 16

TOP: 6-3 Dividing Polynomials

206. ANS: 45

TOP: 6-5 Finding Real Roots of Polynomial Equations

207. ANS: 6

TOP: 7-3 Logarithmic Functions

208. ANS: 18

TOP: 10-4 Hyperbolas

209. ANS: 0.3

TOP: 11-4 Compound Events

210. ANS: 50

TOP: 1-2 Measuring and Constructing Segments

211. ANS: 17

TOP: 3-3 Proving Lines Parallel

212. ANS: 5.5

TOP: 4-1 Classifying Triangles

213. ANS: 0.5

TOP: 6-4 Properties of Special Parallelograms

214. ANS: 35

TOP: 7-3 Triangle Similarity: AA SSS and SAS

215. ANS: 105

TOP: 7-6 Dilations and Similarity in the Coordinate Plane

216. ANS: 8.2

TOP: 8-6 Vectors

217. ANS: 483.6

TOP: 10-4 Surface Area of Prisms and Cylinders

218. ANS: 90

TOP: 11-2 Arcs and Chords

219. ANS: 57

TOP: 11-5 Angle Relationships in Circles

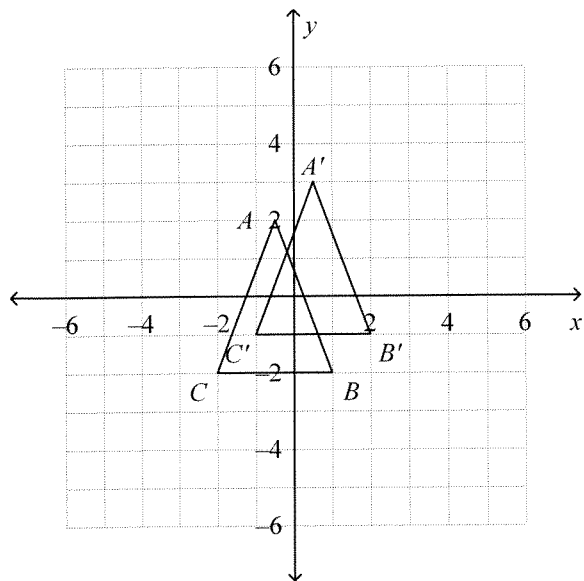
220. ANS:

Answers may vary. Sample:

- Town A
- Town D
- The break in the horizontal axis exaggerates the differences in population.

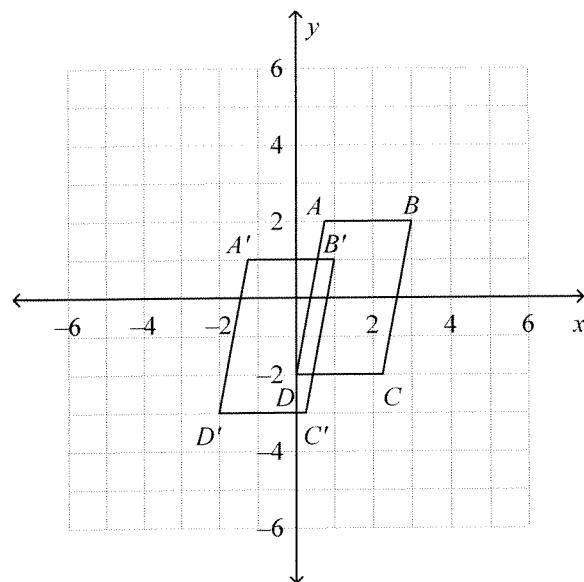
TOP: 12-3 Example 1

221. ANS:



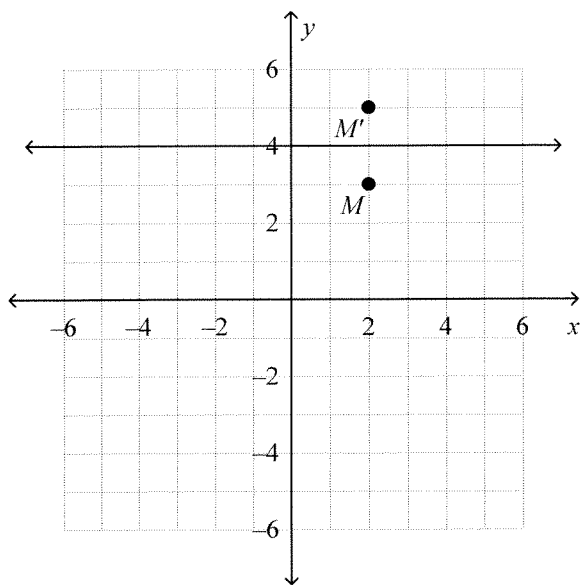
TOP: Skills Handbook: Translations

222. ANS:



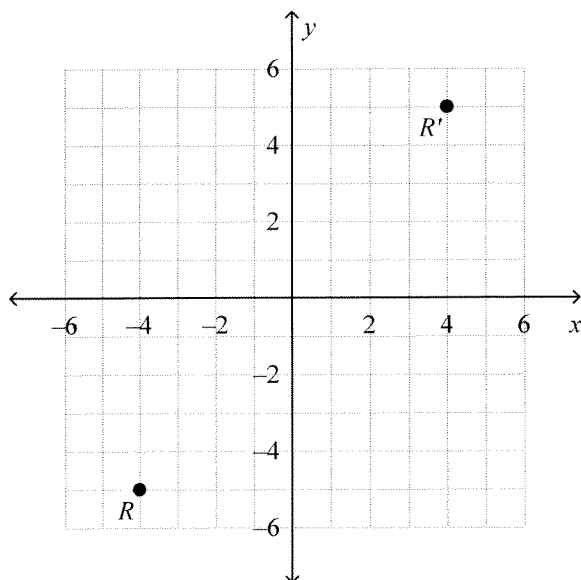
TOP: Skills Handbook: Translations

223. ANS:



TOP: Skills Handbook: Reflections

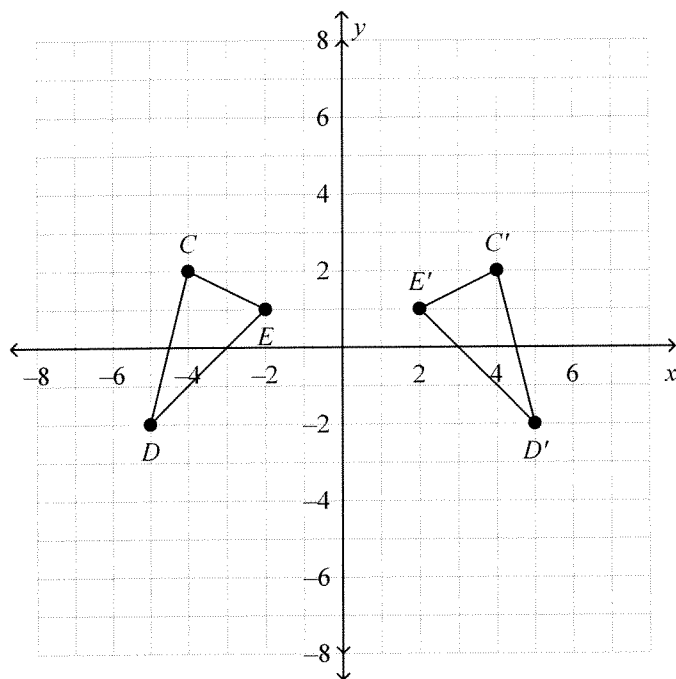
224. ANS:



TOP: Skills Handbook: Rotations

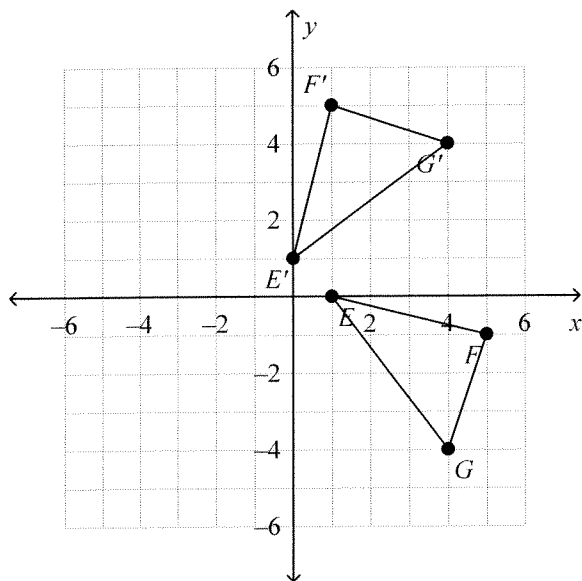


225. ANS:



TOP: Skills Handbook: Reflections

226. ANS:

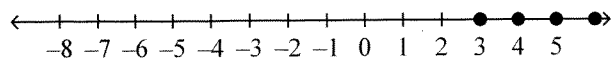


TOP: Skills Handbook: Rotations

227. ANS: 
$$\begin{bmatrix} -6 & -4 & 10 \\ -1 & -3 & 8 \\ -2 & -1 & 1 \end{bmatrix}$$

TOP: Technology 1-6: Matrices

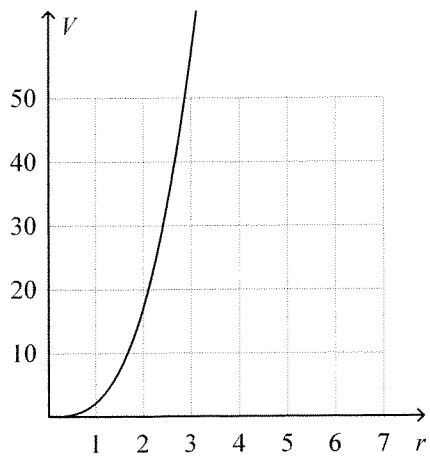
228. ANS:  
 $y \geq 3$



TOP: Extension 3-4: Interpreting Solutions

229. ANS:

a.



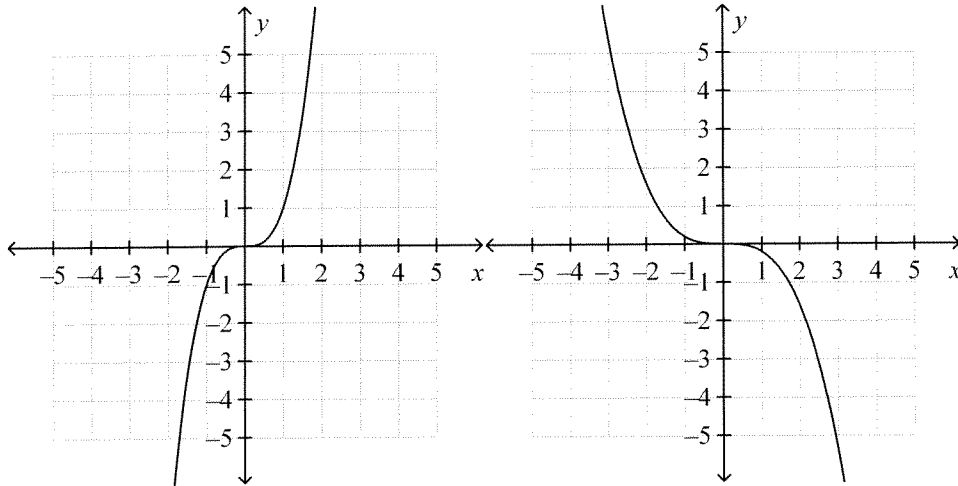
b. 1.7 in.

TOP: Extension 10-9: Cubic Functions

230. ANS:

$$y = x^3$$

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



Descriptions may vary. Sample: Both graphs pass through the origin, but the graph of  $y = x^3$  lies in Quadrants I and III, and the graph of  $y = -\frac{1}{5}x^3$  lies in Quadrants II and IV. The graph of  $y = -\frac{1}{5}x^3$  is wider than the graph of  $y = x^3$ .

TOP: Extension 10-9: Cubic Functions

231. ANS:

a.  $n = 0.10 \cdot 900$

$$n = 90$$

Moss roses will cover 90 square feet.

b.  $900 = 0.25 \cdot n$

$$n = 3,600$$

Amy's yard is 3,600 square feet.

TOP: 6-7 Example 1

232. ANS:

a. 79.6%

b. 105.4%

TOP: 6-8 Example 2

233. ANS:

a. \$144.50

b. 50%

TOP: 6-9 Example 2

234. ANS:  $(0.7c)(1.065)$ , or  $0.7455c$

235. ANS:

- a. To find the dimensions for the model, write and solve a proportion using the scale for each dimension.

$$\frac{\text{model (in.)} \rightarrow 1}{\text{actual (ft)} \rightarrow 5} = \frac{h \leftarrow \text{model (in.)}}{82 \leftarrow \text{actual (ft)}}$$

$$1 \cdot 82 = 5 \cdot h$$

$$\frac{82}{5} = \frac{5h}{5}$$

$$16.4 = h$$

$$\frac{\text{model (in.)} \rightarrow 1}{\text{actual (ft)} \rightarrow 5} = \frac{d \leftarrow \text{model (in.)}}{26 \leftarrow \text{actual (ft)}}$$

$$1 \cdot 26 = 5 \cdot d$$

$$\frac{26}{5} = \frac{5d}{5}$$

$$5.2 = d$$

The model is 16.4 inches tall and 5.2 inches in diameter.

- b. You need to find the scale of the model as a ratio of 1 inch to some number of feet. Write and solve a proportion using the height of the new model and the height of the actual tower.

$$\frac{\text{model (in.)} \rightarrow 1}{\text{actual (ft)} \rightarrow f} = \frac{20 \leftarrow \text{model (in.)}}{82 \leftarrow \text{actual (ft)}}$$

Write a proportion.

$$1 \cdot 82 = 20 \cdot f$$

$$\frac{82}{20} = \frac{20f}{20}$$

$$4.1 = f$$

The scale is 1 inch : 4.1 feet.

236. ANS:

- [4] a. To find the perimeter of the smaller garden, you must add the lengths of the sides. The trapezoids are similar, so write and solve proportions to find the lengths of the missing sides.

$$\begin{array}{ccc} \frac{6}{10} = \frac{3}{a} & \frac{6}{4} = \frac{3}{b} & \frac{6}{4} = \frac{3}{c} \\ 6a = 30 & 6b = 12 & 6c = 12 \\ a = 5 & b = 2 & c = 2 \end{array}$$

The perimeter of the smaller garden is 3 m + 5 m + 2 m + 2 m, or 12 meters.

- [3] correct procedure with one mathematical error  
 [2] correct procedure with two mathematical errors  
 [1] correct answer with no explanation

TOP: 6-3 Example 1

237. ANS:

$$[4] \quad \text{a. } \frac{646 \text{ miles}}{16 \text{ hours}} = 40.4 \text{ mi/h}$$

Her average speed was about 40.4 miles per hour.

b. Methods may vary. Sample: Write and solve a proportion to find the speed needed to shorten the trip from 16 hours to 15.5 hours:

$$\frac{40.4}{16} = \frac{r}{15.5}$$

$$16r = 40.4 \cdot 15.5$$

$$r = \frac{40.4 \cdot 15.5}{16}$$

$$r = 41.6774$$

Susan should drive at an average speed of approximately 41.7 mi/h to reduce her trip time by one half hour.

[3] one computational error

[2] two computational errors OR one error in method

[1] correct answers with no work shown

238. ANS:

$$[4] \quad \text{a. } c = 17,000 \cdot 0.034$$

$$c = 578$$

Allen earned a \$578 on the sale of the car.

b. Write and solve a percent equation to find the total sales.

$$9,860 = 0.034s$$

$$\frac{9,860}{0.034} = \frac{0.034s}{0.034}$$

$$290,000 = s$$

Allen sold \$290,000 worth of vehicles, which is greater than \$200,000. Allen received a bonus.

[3] correct methods with one mathematical error

[2] correct methods with two mathematical errors

[1] correct answers with no work shown

TOP: 6-7 Example 3

## OTHER

239. ANS:

Answers may vary. Sample: Since the range of the data set is  $52 - 18$ , or 34, choose a number that is either 6 smaller than 18 or 6 larger than 52. You can choose either 12 or 58. When either one is added to the existing data set, the range will be 40.

TOP: 12-1 Example 2

240. ANS:

Answer may vary. Sample: The median of the mid-term exam was 72%, and the grades ranged from 58% to 84%. The median of the final exam was 69%, and the grades ranged from 57% to 83%. Students did slightly better on the mid-term exam.

TOP: 12-2 Example 3

241. ANS:

Answers may vary. Sample: The cost of a pizza at Big Al's appears to be about half the cost of a pizza at Mama Mia's and about two-thirds the cost of a pizza at Luigi's Cafe. Actually, the cost of a pizza is about \$7.50 at Big Al's and \$10.00 at Mama Mia's. The difference in cost is only about \$2.50. The break in the scale exaggerates the differences.

TOP: 12-3 Example 1

242. ANS:

Answers may vary. Sample: The graph gives the impression that home sales in Johnston greatly increased. In fact, from the vertical axis, you can see that the number of home sales increased by about 40%. But since the bar on the right has not only increased in height but has also increased in width, the area of the second bar is more than twice the area of the first bar.

TOP: 12-3 Example 3

243. ANS:

Answers may vary. Sample: It is not possible. There is only one combination of all four pictures. There are, however, 4!, or 24, different permutations or arrangements of the four pictures.

TOP: 12-6 Example 3

244. ANS:

Answers may vary. Sample: Take a random sample of the student population by picking every tenth student from the school directory. This way each student has an equal chance of being chosen.

TOP: 12-8 Example 1

245. ANS:

Answers may vary. Sample:

- There is a break in the vertical scale, which makes the differences in the market shares appear much larger than they are.
- Redraw the graph without the break in the vertical axis.

TOP: Skills Handbook: Misleading Graphs

246. ANS:

Quarters	Dimes	Nickels
1	1	8
1	2	6
1	3	4
1	4	2
2	1	3

5 combinations

TOP: Skills Handbook: Problem Solving Strategies: Look for a Pattern and Make a Table

247. ANS:  
25 black squares

TOP: Skills Handbook: Problem Solving Strategies: Look for a Pattern and Make a Table

248. ANS:  
No, the ratios are not the same. Solution methods may vary. Sample: To determine whether the ratios are the same, test them by writing a proportion. If the cross products of the proportion are equal, then the ratios are equal. If the cross products of the proportion are not equal, then the ratios are not equal.

$$\frac{11}{29} \stackrel{?}{=} \frac{23}{33}$$

$$11 \cdot 33 \stackrel{?}{=} 29 \cdot 23$$

$$363 \neq 667$$

Since the cross products are not equal, the ratios are not the same for both classes.

TOP: 6-2 Example 2

249. ANS:  
Answers may vary. Sample: No; the bolt has a diameter of  $\frac{5}{16}$ , which is equal to 0.3125. Since 0.3125 is greater than 0.3, the bolt will not fit in the hole.

TOP: 5-1 Example 1

250. ANS:  
Answers may vary. Sample: A quarter pound is  $\frac{1}{4}$  of 16 oz, or 4 oz. Four ounces is less than 5 ounces, so a quarter-pound hamburger is not heavier.

TOP: 5-5 Example 3