

Cumulative Review 1

Section A

- ① C
- ② D and E
- ③ B
- ④ A
- ⑤ B
- ⑥ B
- ⑦ A, B, and C
- ⑧ A, D, and F
- ⑨ B
- ⑩ C

Section B

11 10

12 $1\frac{7}{12}$ feet

13 $-\frac{9}{46}$

14 $-\$310.15$

Score	Rubric
2	Student response includes each of the following 2 elements: • Correct additional amount of money that Maya needs • Correct steps used to compute the additional amount of money that Maya needs Example: Step 1: Find the cost of 8 grapefruits. $\\$5.20 \div 4 \times 8 = \\10.40 Step 2: Find the cost of 4 apples. $\\$2.50 \div 2 \times 4 = \\5 Step 3: Find the amount that Maya still needs. $\\$12 - \\$10.40 - \\$5 = -\\3.40 Maya needs \$3.40 more.
1	Student response includes 1 of the 2 elements.
0	Student response is incorrect or irrelevant.

16 $2x + y + 16$

17 0.1

18 $3(37b - 29d)$

19 Part A: $12.8x + 16$

Part B:

Score	Rubric
2	Student response includes each of the following 2 elements: • Correct values of m and n • Correct explanation of how the answers are found Example: The area of the parallelogram is $(12.8x + 16)$ square yards. The area of the parallelogram is also given as $(mx + n + 4x)$ square yards, or $[(m + 4)x + n]$ square yards. The two expressions are equivalent. So, $m = 12.8 - 4 = 8.8$ and $n = 16$.
1	Student response includes 1 of the 2 elements.
0	Student response is incorrect or irrelevant.

Section C

Score	Rubric
3	Student response includes each of the following 3 elements: • Correct identification of Kyle's mistakes • Correct simplification of $3(\frac{1}{3}x + 5) - (1.2x - 4)$ • Correct explanation of how the answer is found Example: Kyle did not multiply -1 with -4 when he expanded $-(1.2x - 4)$. $-(1.2x - 4) = (-1)(1.2x) + (-1)(-4)$ $= -1.2x + 4$ $\neq -1.2x - 4$ Kyle should not add $-0.2x$ and 11, as they are not like terms. The correct work with explanation is shown below. $3(\frac{1}{3}x + 5) - (1.2x - 4)$ $= 3(\frac{1}{3}x) + 3(5) - 1.2x + 4$ Apply the distributive property. $= x + 15 - 1.2x + 4$ $= x - 1.2x + 15 + 4$ Apply the commutative property. $= -0.2x + 19$ Add or subtract like terms.

2	Student response includes 2 of the 3 elements.
1	Student response includes 1 of the 3 elements.
0	Student response is incorrect or irrelevant.

21

Score	Rubric
3	Student response includes each of the following 3 elements: • Correct price of one blouse after discount • Correct number of shirts and blouses that Cole can buy at most • Correct work shown or explanation given to determine the number of shirts and blouses that Cole can buy at most Example: Price of one shirt after discount $= \\$8.60 \times 80\%$ $= \\$6.88$ Price of one blouse before discount $= \\$8.60 \times 125\%$ $= \\$10.75$ Price of one blouse after discount $= \\$10.75 \times 80\%$ $= \\$8.60$ Amount that Cole pays for two additional blouses $= \\$8.60 \times 2$ $= \\$17.20$ Amount left after paying for two additional blouses $= \\$100 - \\17.20 $= \\$82.80$ Price of a set of one shirt and one blouse $= \\$6.88 + \\8.60 $= \\$15.48$ Number of sets of one shirt and one blouse that Cole can buy with \$82.80 $= 82.80 \div 15.48$ ≈ 5 (after rounding down) Hence Cole can buy 7 blouses and 5 shirts at most.
2	Student response includes 2 of the 3 elements.
1	Student response includes 1 of the 3 elements.
0	Student response is incorrect or irrelevant.

22 Part A:

Score	Rubric
2	Student response includes each of the following 2 elements: • Correct amount left • Correct work shown or explanation given to determine the amount left Example: $50 \div 8 = 6.25$ Faith needs to buy 7 packs of apples. The cost of 7 packs of apples is $7p$ dollars. $50 \div 10 = 5$ Faith needs to buy 5 packs of oranges. $5\left(\frac{5}{4}p\right) = \frac{25}{4}p$ The cost of 5 packs of oranges is $\frac{25}{4}p$ dollars. $20p + 20 - 7p - \frac{25}{4}p = \frac{27}{4}p + 20$ The expression for the amount left after buying the fruit is $\frac{27}{4}p + 20$.
1	Student response includes 1 of the 2 elements.
0	Student response is incorrect or irrelevant.

Part B:

Score	Rubric
2	Student response includes each of the following 2 elements: • Correct value • Correct work shown or explanation given to determine the value Example: When $p = 5$, $\frac{27}{4}p + 20 = \frac{27}{4}(5) + 20$ $= 53.75$ \$53.75 will be left after buying the fruit.
1	Student response includes 1 of the 2 elements.
0	Student response is incorrect or irrelevant.

Cumulative Review 2

Section A

- ① B
- ② A
- ③ C, D, and E
- ④ C
- ⑤ C
- ⑥ B
- ⑦ A
- ⑧ C
- ⑨ B
- ⑩ D

Section B

11 $x = \frac{5}{4}$

12 $a = 1$

13 \$3.30

14 $x \geq 3$



Score	Rubric
2	Student response includes each of the following 2 elements: • Correct minimum average score • Correct work shown or explanation given to determine the minimum average score Example: Let x be the average score of Lola's last 2 tests. Total of the scores for Lola's last 2 tests = $x + x$ $= 2x$ Total of the scores for Lola's first 3 tests = $57 + 66 + 70$ $= 193$ Total of the scores for Lola's 5 tests = $193 + 2x$ Since the average score for Lola's 5 tests is at least 70, $\frac{193 + 2x}{5} \geq 70$ $193 + 2x \geq 350$ $2x \geq 350 - 193$ $2x \geq 157$ $x \geq 78.5$ The minimum average score of Lola's last 2 tests is 78.5.
1	Student response includes 1 of the 2 elements.
0	Student response is incorrect or irrelevant.

16 $bh = 26$

17 6 workers

18 1.5

Score	Rubric
2	Response includes each of the following 2 elements: • Correct increase in price of the watch • Correct explanation given to determine the increase in price Example: When the price of the watch was decreased by 25%, the new price would be 75% of \$1,200, or \$900. When the price of the watch further increased by 50%, the new price would be 150% of \$900, or \$1,350. $\\$1,350 - \\$1,200 = \\$150$ So, there was \$150 increase in price of the watch.
1	Student response includes 1 of the 2 elements.
0	Student response is incorrect or irrelevant.

20 25%

Section C

21 Part A:

Score	Rubric
1	Student response includes each of the following 2 elements: • Correct answer • Correct explanation given to support the answer Example: I do not agree with Carla. When $x = 1$, $3(5x + 4) = 3(5 + 4)$ $= 27$ $15x + 12 = 15 + 12$ $= 27$ So, the equation $3(5x + 4) = 15x + 12$ is true for $x = 1$. Thus, it is not correct that the equation $3(5x + 4) = 15x + 12$ has no solution.
0	Student response includes 1 of the 2 elements above, or student response is incorrect or irrelevant.

Part B:

Score	Rubric
2	Student response includes each of the following 2 elements: • Correct identification of Carson's mistake • Correct work shown to determine the value of x Example: Carson did not change the sign of 12 from + to – when he shifted 12 to the other side of the equation. The correct work is shown below. $3(5x + 4) = 57$ $15x + 12 = 57$ $15x = -12 + 57$ $15x = 45$ $x = 3$ The solution of the equation $3(5x + 4) = 57$ is $x = 3$.
1	Student response includes 1 of the 2 elements.
0	Student response is incorrect or irrelevant.

22

Score	Rubric
3	Student response includes each of the following 3 elements: • Correct inequality • Correct possible values of d • Correct work shown or explanation given to determine the possible values of d Example: Avery collected d pebbles. Brooke collected $(d + 10)$ pebbles. Caden collected $4(d + 10)$ pebbles. Dominic collected $(d + 3)$ pebbles. Total number of pebbles collected by the four children $d + (d + 10) + 4(d + 10) + (d + 3)$ $= d + d + 10 + 4d + 40 + d + 3$ $= 7d + 53$ Since the total number of collected pebbles does not exceed 88, $7d + 53 \leq 88$ $7d \leq 88 - 53$ $7d \leq 35$ $d \leq 35 \div 7$ $d \leq 5$ Since d represents the number of pebbles, d must be an integer. So, the possible values of d are 0, 1, 2, 3, 4, and 5.
2	Student response includes 2 of the 3 elements.
1	Student response includes 1 of the 3 elements.
0	Student response is incorrect or irrelevant.

23 Part A:

Score	Rubric
2	Student response includes each of the following 2 elements: • Correct answer • Correct explanation given to support the answer Example: Price of grapes per ounce at Happy Fruit Shop $= \\$2.80 \div 16$ $= 17.5\text{¢}$ Price of grapes per ounce at Vitamin C Home $= \\$2 \div 8$ $= 25\text{¢}$ Price of grapes per ounce at Super Fruit $= \\$1.60 \div 6$ $\approx 27\text{¢}$ 17.5¢ is the lowest value. So, Happy Fruit Shop offers the best deal.
1	Student response includes 1 of the 2 elements.
0	Student response is incorrect or irrelevant.

Part B:

Score	Rubric
2	Student response includes each of the following 2 elements: • Correct equation in x • Correct work shown to determine the value of x Example: Price of grapes per pound after 25% discount $= \\$2.80 \times 0.75$ $= \\$2.10$ $2.1(x + 0.5) = 5.25$ $2.1x + 1.05 = 5.25$ $2.1x = 5.25 - 1.05$ $2.1x = 4.2$ $x = 4.2 \div 2.1$ $x = 2$ The value of x is 2.
1	Student response includes 1 of the 2 elements.
0	Student response is incorrect or irrelevant.

Section B

11 $a = 22.5, b = 45, c = 112.5$

12	Score	Rubric
	2	Student response includes each of the following 2 elements: • Correct values of m and n • Correct explanation of how the values of m and n are found Example: First, I will use the concept of vertically opposite angles to work out the value of n. $2n = 46$ $n = 46 \div 2$ $= 23$ Then, I will use the property that adjacent angles on a straight line add up to 180 degrees to solve for m. $(m - 20) + 90 + 46 = 180$ $m + 116 = 180$ $m = 180 - 116$ $m = 64$
	1	Student response includes 1 of the 2 elements.
	0	Student response is incorrect or irrelevant.

13 39

Cumulative Review 3**Section A**

- 1 A
 2 C
 3 B
 4 C
 5 D
 6 C
 7 D
 8 B
 9 C
 10 C

14	Score	Rubric
	2	Student response includes each of the following 2 elements: • Correct answer • Correct explanation given Example: I agree with Evan. Map A has a scale of 1 cm : 500 m. 1 centimeter of length on Map A represents 500 meters of actual length. 1 square centimeter of area on Map A represents 500×500 square meters, or 0.25 square kilometers of actual area. Map B has a scale of 1 : 80,000. 1 centimeter of length on Map B represents 80,000 centimeters of actual length. 1 square centimeter of area on Map B represents $80,000 \times 80,000$ square centimeters, or 0.64 square kilometers of actual area. Without loss of generality, we can assume that the actual area of the lake is 1 square kilometer. Its area on Map A will be $\frac{1}{0.25}$, or 4 square centimeters, and its area on Map B will be $\frac{1}{0.64}$, or 1.5625 square centimeters. $4 \div 1.5625 = 2.56$ So, it is correct that the area of the lake on Map A is 2.56 times its area on Map B.
	1	Student response includes 1 of the 2 elements.
	0	Student response is incorrect or irrelevant.

15 1 : 500

16	Score	Rubric
	2	Student response includes each of the following 2 elements: • Correct diameter of the actual dome • Correct work shown or explanation given to determine the diameter of the actual dome Example: $18 \text{ cm}^2 : 162 \text{ m}^2 = 1 \text{ cm}^2 : 9 \text{ m}^2$ $= (1 \text{ cm} \times 1 \text{ cm}) :$ $(3 \text{ m} \times 3 \text{ m})$ So, 1 centimeter of the model represents 3 meters of the actual dome. 2.4 centimeters of the model represents $2.4 \times 3 = 7.2$ meters of the actual dome. The diameter of the actual dome is 7.2 meters.
	1	Student response includes 1 of the 2 elements.
	0	Student response is incorrect or irrelevant.

17 440 in.

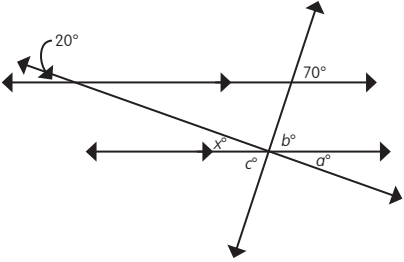
18 462 in^2

19 121 cm^2

20 192 m^3

Section C

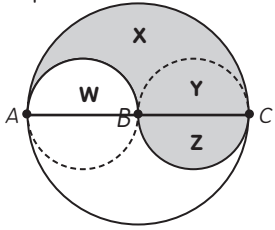
21 Part A:

Score	Rubric
1	Student response includes the following element: • Correct explanation given Example:  Refer to the notations in the figure. $x = 20 \quad \text{Corr. } \angle s$ $a = x = 20 \quad \text{Vert. } \angle s$ $b = 70 \quad \text{Corr. } \angle s$ $a + b = 20 + 70$ $= 90$ So, a° and b° are complementary angles.
0	Student response is incorrect or irrelevant.

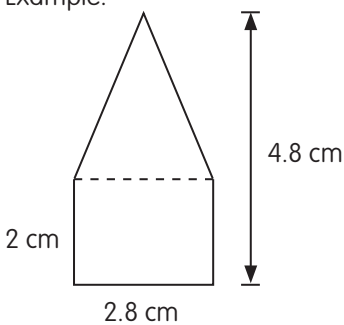
Part B:

Score	Rubric
2	Student response includes each of the following 2 elements: • Correct value of c • Correct work shown or explanation given to determine the value of c Example: $a + b = 90 \quad \text{Comp. } \angle s$ $x + 8 + 2x - 20 = 90$ $3x - 12 = 90$ $3x = 90 + 12$ $3x = 102$ $x = 102 \div 3$ $x = 34$ $c = b \quad \text{Vert. } \angle s$ $= 2x - 20$ $= 2(34) - 20$ $= 48$ The value of c is 48.
1	Student response includes 1 of the 2 elements.
0	Student response is incorrect or irrelevant.

22 Part A:

Score	Rubric
1	Student response includes the following element: • Correct explanation given Example:  Refer to the notations in the figure. The shaded region is made up of regions X, Y, and Z. Region Z has the same area as region W. So, the area of the shaded region is the total area of regions X, Y, and W. Regions X, Y, and W form a semicircle of radius r meters. So, the area of the shaded region is half the area of the largest circle.
0	Student response is incorrect or irrelevant.

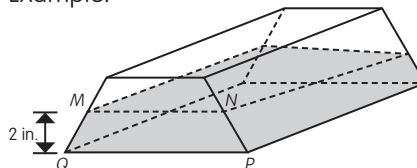
Part B:

Score	Rubric
2	Student response includes each of the following 2 elements: • Correct number of pendants • Correct work shown or explanation given to determine the number of pendants Example:  Area of one pendant $= 2 \times 2.8 + \frac{1}{2} \times 2.8 \times (4.8 - 2)$ $= 5.6 + 3.92$ $= 9.52 \text{ cm}^2$ Volume of one pendant $= 9.52 \times 0.2$ $= 1.904 \text{ cm}^3$ Volume of the rectangular block of gold $= 4 \times 6 \times 8$ $= 192 \text{ cm}^3$ As there is a loss of 2% in volume of gold due to melting and casting, the number of pendants made is given by $98\% \times 192 \div 1.904 \approx 98$ (after rounding down).
1	Student response includes 1 of the 2 elements.
0	Student response is incorrect or irrelevant.

23 Part A:

Score	Rubric
2	Student response includes each of the following 2 elements: • Correct height • Correct work shown or explanation given to determine the height Example: Area of trapezoid = $576 \div 16$ $= 36 \text{ in}^2$ So, $\frac{1}{2}(12 + 6) \cdot XY = 36$ $9XY = 36$ $XY = 4$ The height of the trapezoidal prism is 4 inches.
1	Student response includes 1 of the 2 elements.
0	Student response is incorrect or irrelevant.

Part B:

Score	Rubric
2	Student response includes each of the following 2 elements: • Correct area of the sand that is not in contact with the container • Correct work shown or explanation given to determine the area of the sand that is not in contact with the container Example:  Refer to the notations in the figure. Area of trapezoid $MNPQ = 336 \div 16$ $= 21 \text{ in}^2$ So, $\frac{1}{2}(12 + MN) \cdot 2 = 21$ $12 + MN = 21$ $MN = 21 - 12$ $= 9 \text{ in.}$ The area of the sand that is not in contact with the container $= 9 \times 16$ $= 144 \text{ in}^2$
1	Student response includes 1 of the 2 elements.
0	Student response is incorrect or irrelevant.

Cumulative Review 4

Section A

- ① B
- ② B
- ③ A, E, and F
- ④ D
- ⑤ B
- ⑥ A, B, C, and D
- ⑦ C, D, and F
- ⑧ A, B, and C
- ⑨ C
- ⑩ C and D

Section B

11	Score	Rubric
	2	Student response includes each of the following 2 elements: • Correct values of x and y • Correct explanation of how the values of x and y are found Example: It is twice as likely to get the number 1 than any other number. So, $x = 2y$. The probabilities of all the outcomes add up to 1. $x + y + y + y = 1$ $2y + y + y + y = 1$ $5y = 1$ $y = 0.2$ $x = 2 \times 0.2$ $= 0.4$ The values of x and y are 0.4 and 0.2 respectively.
	1	Student response includes 1 of the 2 elements.
	0	Student response is incorrect or irrelevant.

- ⑫ Sample mean = 45 kg, estimated population mean = 45 kg

- ⑬ {GGG, GGB, GBB, GBG}

14	Score	Rubric
	2	Student response includes each of the following 2 elements: • Correct probability of randomly choosing a peach tree • Correct explanation given to determine the probability Example: Percent of the trees that are oranges = 50% of 60% = 30% Percent of the trees that are peaches = $100\% - 40\% - 30\%$ = 30% $30\% = \frac{3}{10}$ So, the probability of randomly choosing a peach tree from the orchard is $\frac{3}{10}$.
	1	Student response includes 1 of the 2 elements.
	0	Student response is incorrect or irrelevant.

15 Part A:

Outcome	1	2	3	4	5	6
Observed Frequency	48	53	52	47	51	49
Experimental Frequency	50	50	50	50	50	50

Score	Rubric
1	Student response includes the following element: Correct explanation given Example: The observed frequencies of all outcomes are pretty close to the number 50. In other words, the chance of getting any outcome is about the same. So, the die is fair.
0	Student response is incorrect or irrelevant.

Part B:

Score	Rubric
2	Student response includes each of the following 2 elements: - Correct experimental probability and correct theoretical probability - Correct explanation given Example: Experimental probability of getting the number 1 = $\frac{48}{300}$ ≈ 0.16 Theoretical probability of getting the number 1 = $\frac{1}{6}$ ≈ 0.167 Yes, the two probabilities are close to each other because the number of tosses is quite large (300 times).
1	Student response includes 1 of the 2 elements.
0	Student response is incorrect or irrelevant.

16

Die 1

–	1	2	3	4	5	6
1	0	1	2	3	4	5
2	1	0	1	2	3	4
3	2	1	0	1	2	3
4	3	2	1	0	1	2
5	4	3	2	1	0	1
6	5	4	3	2	1	0

Die 2

1

17

Score	Rubric
2	Student response includes each of the following 2 elements: - Correct probability of picking 2 ties of different color - Correct work shown or explanation given to determine the probability Example: Probability of picking two ties of different color = P(first black, second white) + P(first white, second black) = $\frac{3}{6} \cdot \frac{3}{6} + \frac{3}{6} \cdot \frac{3}{6}$ = $\frac{1}{4} + \frac{1}{4}$ = $\frac{1}{2}$ The probability of picking 2 ties of different color is $\frac{1}{2}$.
1	Student response includes 1 of the 2 elements.
0	Student response is incorrect or irrelevant.

18	Score	Rubric
	2	Student response includes each of the following 2 elements: • Correct probability of drawing 2 different types of coins • Correct work shown or explanation given to determine the probability Example: Probability of drawing 2 different types of coins $= P(\text{first dime, second nickel}) + P(\text{first nickel, second dime})$ $= \frac{5}{9} \cdot \frac{4}{8} + \frac{4}{9} \cdot \frac{5}{8}$ $= \frac{20}{72} + \frac{20}{72}$ $= \frac{40}{72}$ $= \frac{5}{9}$ The probability of drawing 2 different types of coins is $\frac{5}{9}$.
	1	Student response includes 1 of the 2 elements.
	0	Student response is incorrect or irrelevant.

19	Score	Rubric
	2	Student response includes each of the following 2 elements: • Correct value of x • Correct work shown or explanation given to determine the value of x Example: Given that the probability of picking 2 black socks is $\frac{x+1}{9}$, $\frac{4}{6} \cdot \frac{3}{5} = \frac{x+1}{9}$ $\frac{4}{10} = \frac{x+1}{9}$ So, $4 = x + 1$ $x = 3$ The value of x is 3.
	1	Student response includes 1 of the 2 elements.
	0	Student response is incorrect or irrelevant.

Section C

20	Score	Rubric
	3	Student response includes each of the following 3 elements: • Correct explanation of Jack's mistake • Correct probability of picking a pair of black shoes • Correct explanation of how the answer is found Example: Jack mixed up the shoes for left foot and the shoes for right foot. Therefore, he calculated a wrong number of possible outcomes, which had resulted in a wrong probability. Two pairs of black shoes include 2 black shoes for left foot (B_L, B_L) and 2 black shoes for right foot (B_R, B_R). One pair of white shoes includes 1 white shoe for left foot (W_L) and 1 white shoe for right foot (W_R). So, the number of possible outcomes should be 6, not 3. Among the 6 shoes, 2 of them are black shoes for left foot and 2 of them are black shoes for right foot. The correct probability of picking a pair of black shoes is given by $P(\text{first black shoe for left foot, second black shoe for right foot}) + P(\text{first black shoe for right foot, second black shoe for left foot})$ $= \frac{2}{6} \cdot \frac{2}{5} + \frac{2}{6} \cdot \frac{2}{5}$ $= \frac{4}{15}$
	2	Student response includes 2 of the 3 elements.
	1	Student response includes 1 of the 3 elements.
	0	Student response is incorrect or irrelevant.

21 Part A: 196 students

Part B:

Score	Rubric
2	Student response includes each of the following 2 elements: • Correct total number of pets • Correct explanation given Example: Number of pets that students with 1 pet have $= 0.25 \times 560 \times 1$ $= 140$ Number of pets that students with 2 pets have $= 0.1 \times 560 \times 2$ $= 112$ Number of pets that students with 3 pets have $= 0.05 \times 560 \times 3$ $= 84$ Number of pets that students with 4 pets have $= 0.1 \times 560 \times 4$ $= 224$ Number of pets that students with 5 pets have $= 0.2 \times 560 \times 5$ $= 560$ Total number of pets that the students in the school have $= 140 + 112 + 84 + 224 + 560$ $= 1,120$ It is predicted that the total number of pets that the students in the school have is 1,120.
1	Student response includes 1 of the 2 elements.
0	Student response is incorrect or irrelevant.

22

Score	Rubric
4	Student response includes each of the following 4 elements: • Correct probability of picking 2 blue balls • Correct probability of picking 2 red balls • Correct probability of picking 2 balls of the same color • Correct work shown or explanation given Example: Probability of picking 2 blue balls $= \frac{2}{5} \cdot \frac{2}{5}$ $= \frac{4}{25}$ Probability of picking 2 red balls $= \frac{3}{5} \cdot \frac{2}{4}$ $= \frac{3}{10}$ Probability of picking 2 balls of the same color $= \frac{4}{25} + \frac{3}{10}$ $= \frac{23}{50}$ The probability of picking 2 balls of the same color is $\frac{23}{50}$.
3	Student response includes 3 of the 4 elements.
2	Student response includes 2 of the 4 elements.
1	Student response includes 1 of the 4 elements.
0	Student response is incorrect or irrelevant.