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| **Question Number** | **Answer** | **Brief Explanation** |
| ***Unit 1*** |
| 1 | D | Rotational Symmetry$\frac{360°}{5}=72°$; $144° $is a multiple |
| 2 | C | $180° $turn around the center will match a parallelogram to itself |
| 3 | B | Reflection x = -1 is a vertical line and places the figure in the 1st quadrant; the figure then has to be moved down 5 units |
| 4 | a. (4, 2) | Draw straight lines from the image to the pre-image and find the point of intersection of all 4 lines |
| b. $\frac{1}{2}$ | Find the length of corresponding sides from the image and pre-image; scale factor $\frac{image (new)}{pre-image (old)}$ |
| c. | Each side of the image is parallel to the corresponding side of its pre-image and is ½ the length.  |
| 5 | B | Corresponding letters must be used with image and pre-image and both fractions must be set up the same way. $\frac{image}{pre-image}=\frac{image}{pre-image} $or $ \frac{pre-image}{image}=\frac{pre-image}{image}$ |
| 6 | D | The only scale factor that will increase the area and create a similar figure is a scale factor greater than 1.  |
| 7 | A | Draw straight lines from the image to the pre-image (use the way they named the segment to find corresponding endpoints) and find the point of intersection of both lines |
| 8 | C | Similar figures have **congruent angles** and proportional sides; the sum of a triangle is $180°$ |
| ***Unit 2*** |
| 9 | B | Triangle proportionality theorem$\frac{top}{bottom}=\frac{top}{bottom}$ or $\frac{bottom}{top}=\frac{bottom}{top}$ 🡪 $\frac{6}{4}=\frac{x}{3}$ 🡪 $4x=18$ |
| 10 | C | Given $GK∥HJ$, the angles are in the **same position** when cut by two different transversals |
| 11 | a. W’X’Y’Z’b. W’’X’’Y’’Z’’ |  |
| c. Yes | Rotations and translations are isometries that maintain size and shape which create congruent figures |
| 12 | A | Translation and rotations are isometries which create congruent figures; if figures are congruent, then they are also similar.  |
| 13 | D | Cannot skip a side and an angle when using triangle congruency |
| 14 | B | The only parts marked congruent in BOTH triangles |
| 15 | C | After marking the triangles throughout the proof, there are 2 sides marked and 1 included angle marked (SAS) |
| 16 | A | To prove two parts of two triangles are congruent, CPCTC ***MUST*** come ***AFTER*** proving two triangles are congruent.  |
| 17 | B | Rectangle/Square 🡪 Diagonals are bisected and congruentParallelograms 🡪 Diagonals ONLY bisectSquare 🡪 Diagonals are bisected, congruent, and perpendicularRhombus 🡪 Diagonals are bisected and are perpendicular |
| 18 | C | Parallelogram 🡪 opposite sides are parallel (slope) and congruent (distance)Rhombus/Square 🡪 all sides are congruent (distance)Rectangle/Square 🡪 adjacent sides are perpendicular (slope)Rectangle/Square 🡪 Diagonals are congruent (distance) |
| 19 | C | First step in constructing an angle bisector |
| 20 | D | Perpendicular bisector of the diameter will create the two other vertices of the inscribed square |
| ***Unit 3*** |
| 21 | A | Cosine and sine are complementary co-functionsSine of one angle = Cosine of the other angle |
| 22 | A | $$cos=\frac{adj}{hyp}=\frac{9}{15}=\frac{3}{5}$$ |
| 23 | C | If the$ \tan(\left(H\right))=1$, this means the legs are congruent since$ tan=\frac{opp}{adj}$. If the legs are congruent, then the sine and cosine of the same angle will be congruent.  |
| 24 | D | The wanted side is opposite from the given angle and the hypotenuse is also given. The only ratio that uses opposite and hypotenuse is sine since$ sin=\frac{opp}{hyp}$ |
| 25 | B | Angle of elevation = angle of depression since they are alternate interior angles. If you move the$ 54°$ to the angle of elevation spot you notice that you are given the opposite and trying to find the hypotenuse. The ratio that uses opposite and hypotenuse is sine since $sin=\frac{opp}{hyp}$ |
| ***Unit 4*** |
| 26 | a. $70°$ | Central angles = intercepted arc |
| b.  | Central angles = intercepted arc; inscribed angles = ½ intercepted arc |
| c. $35°$ | Inscribed angles = ½ intercepted arc |
| 27 | a. $80°$ | Angle APC and Angle BPC are supplementary |
| b. $40°$ | Find part c. first and then inscribed angles = ½ intercepted arc |
| c. $80°$ | Central angles = intercepted arc |
| d. $100°$ | Central angles = intercepted arc |
| 28 | B | $BC$ is a diameter (since it goes through the center) which makes $m\hat{BAC}=180°$ since it is a semicircle. This makes $m\hat{AC}=60°$ then inscribed angles = ½ intercepted arc |
| 29 | C | Length uses circumference $\frac{θ}{360°}=\frac{arc length}{2πr} $or $arc length=\frac{2πrθ}{360°}$ |
| 30 | D | Find the shaded angle ($360°-75°)$Sector area uses area$\frac{θ}{360°}=\frac{Sector area}{πr^{2}} $or $sector area=\frac{πr^{2}θ}{360°}$ |
| 31 | B | Measure of 1 angle is $36° $since $\frac{360°}{10}$Length uses circumference $\frac{θ}{360°}=\frac{arc length}{2πr} $or $arc length=\frac{2πrθ}{360°}$ |
| 32 | D | Cavalieri’s Principle |
| 33 | A | Cylinder uses $V=Bh $or $V=\left(πr^{2}\right)h $since the base is a circle |
| ***Unit 5*** |
| 34 | Cone | The mountain is a 3D shape and goes to a point |
| 35 | 12,100 rocks | 10 acres = 435,000 sq. feet; complete dimensional analysis$$435,600 ft^{2}\*\frac{10 rocks}{360 ft^{2}}$$ |
| 36 | 6 in x 6 in x 8 in | Since the diameter of the base of the bell is 6 inches, the width and length of the box cannot be smaller than 6 inches. Since the height of the bell is 8 inches, the height of the box cannot be smaller than 8 inches.  |
| 37 | A | $250 trees\*\frac{1000 ft^{2}}{10 trees}=25,000 ft^{2}for 25\% $ of the land$25,000 ft^{2}\*4=100,000 ft^{2}$ for 100% of land$$100000 ft^{2}\*\frac{1 acre}{43560 ft^{2}}$$ |
| 38 | C | $$Box volume-pyramid volume$$$$\left(l\*w\*h\right)-\frac{1}{3}\left(l\*w\right)\*h$$ |
| 39 | Center: (1, 2)Radius: $\sqrt{2}$ | Group like variables together and factor out the 8 BEFORE completing the square. Circle equation should end up being $\left(x-1\right)^{2}+\left(y-2\right)^{2}=2$ |
| 40 | C | Create the circle equation$ \left(x+2\right)^{2}+\left(y-3\right)^{2}=\left(3\right)^{2}$. Multiply out the groups $\left(x+2\right)\left(x+2\right)+\left(y-3\right)\left(y-3\right)=9 $🡪 $x^{2}+4x+4+y^{2}-6y+9=9$, group similar exponents together and combine like terms to one side |
| 41 | A | Complete the square; the equation becomes $\left(x-5\right)^{2}+y^{2}=36$ |
| 42 | Calculate the distance and slope of all 4 sides to prove opposite sides are parallel and congruent AND find the distance of the diagonals to prove those are congruent to prove the figure is a rectangle |
| 43 | $$n=-\frac{9}{7}$$ |  🡪 🡪 Opposite reciprocal of $-\frac{7}{3} $is $\frac{3}{7}$ |
| 44 | $$\left(1,\frac{7}{2}\right)$$ | Starting point is A$$\left(-1+\frac{1}{4}\left(7-\left(-1\right)\right), 2+\frac{1}{4}\left(8-2\right)\right)$$ |
| 45 | 20 | Find the length and width using distance formula and then $A=lw$$$AB=\sqrt{\left(3-\left(-3\right)\right)^{2}+\left(2-0\right)^{2}} BC=\sqrt{\left(4-3\right)^{2}+\left(-1-2\right)^{2}}$$$$AB=\sqrt{\left(6\right)^{2}+\left(2\right)^{2}} BC=\sqrt{\left(1\right)^{2}+\left(-3\right)^{2}}$$$$AB=\sqrt{40} BC=\sqrt{10}$$ |
| 46 | B | Rectangle/Square 🡪 Diagonals are bisected and congruentParallelograms 🡪 Diagonals ONLY bisectSquare 🡪 Diagonals are bisected, congruent, and perpendicularRhombus 🡪 Diagonals are bisected and are perpendicular |
| 47 | D | Replace x and y until you get an answer of 25$$\left(x-3\right)^{2}+\left(y+9\right)^{2}=25$$$$\left(6-3\right)^{2}+\left(-5+9\right)^{2}=25$$$$9+16=25$$$$25=25$$ |
| 48 | A | Starting point is P***BE CAREFUL!! It is still using the word ratio a = 3 and b = 2***$$\left(2+\frac{3}{5}\left(-9-2\right), -1+\frac{3}{5}\left(-6-\left(-1\right)\right)\right)$$ |
| 49 | D | New slope = 2 (opposite reciprocal) and new y-intercept = 8 when you use (-4, 0) for x and y$$0=2\left(-4\right)+b$$$$0=-8+b$$$$8=b$$ |
| 50 | C | The only distance formula using two congruent pieces of the diagonal is C$AM=MC $where $M\left(1, 0\right) $is the midpoint of the diagonals |
| 51 | B | $CA⊥BA $since the slope of $CA=1$ and the slope of$ BA=-1$. The height is $CA$ (or$AB)$ and the base is $AB $(or$ CA)$. Find $CA $and $AB$ by doing the distance formula. $A\_{triangle}=\frac{1}{2}bh$ |
| ***Unit 6*** |
| 52 | $$\frac{1}{3}$$ | P(Junior | owns a car) = $\frac{P\left(Junior ∩ owns a car\right)}{P\left(owns a car\right)}=\frac{6}{18}=\frac{1}{3}$ |
| 53 | a. {Joe, Mike, Linda, and Rose}; Owns a bicycle AND skateboard |
| b. {Ryan, Sarah, Mariko, Nina, Dion, Brett, Juan, Tobi, Joe, Mike, Linda, Rose}; Owns a bicycle OR skateboard |
| c. {Amy, Gabe, Abi}; Does NOT own a bicycle OR skateboard |
| 54 | No | Independent events follow$$P\left(A\right)\*P\left(B\right)=P\left(A and B\right)$$$$0.65\*0.40=0.25$$$$0.26\ne 0.25$$ |
| 55 | a. $\frac{20}{265}$ | P(Job | less than 18)$=\frac{P\left(Job ∩ less than 18\right)}{P\left(less than 18\right)}=\frac{20}{265}$ |
|  | b. $\frac{587}{679}$ | P(Job | 18 or greater)$=\frac{P\left(Job ∩ 18 or greater\right)}{P\left(18 or greater\right)}=\frac{587}{679}$ |
|  | c. No! | $$P\left(A\right)=\frac{604}{944}, P\left(B\right)=\frac{679}{944}, and P\left(A and B\right)=\frac{587}{944}$$Independent events follow$$P\left(A\right)\*P\left(B\right)=P\left(A and B\right)$$$$\frac{604}{944}\*\frac{679}{944}=\frac{587}{944}$$$$0.46\ne 0.62$$ |
| 56 | A | V = {begins with vowel}O = {ends with an odd number}$$P\left(V∩O^{'}\right)=begins with a vowel AND does not end in an odd number$$ |
| 57 | D | Independent events follow$$P\left(A\right)\*P\left(B\right)=P\left(A and B\right)$$ |
| 58 | D | $$\frac{P\left(HS senior AND lives on campus\right)}{P\left(goes to college\right)}=\frac{0.46}{0.72}$$ |
| 59 | C | P(blonde | male) = $\frac{P\left(blonde and male\right)}{P\left(male\right)}=\frac{876}{1506}$ |
| 60 | a. $\frac{17}{28}$ | P(A or B) = P(A) + P(B) – P(A and B)$$\frac{12}{28}+\frac{9}{28}-\frac{4}{28}$$ |
|  | b. $\frac{6}{7}$ | P(A or B) = P(A) + P(B) – P(A and B)$$\frac{16}{28}+\frac{19}{28}-\frac{11}{28}$$ |
| 61 | a. $\frac{4}{11}$ | P(prime sum | at least one roll is a 3) = $\frac{4}{11}$ (| 🡪 means ‘given’)P(prime AND at least one roll is a 3) =  P(one roll is at least a 3) =  |
| b. $\frac{11}{18}$ | P(prime sum or at least one roll is a 3) = $\frac{15}{36}+\frac{11}{36}-\frac{4}{36}=\frac{22}{36}=\frac{11}{18}$

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| 1, 1 | 1, 2 | 2, 1 | 1, 4 |
| 4, 1 | 1, 6 | 6, 1 | 2, 3 |
| 3, 2 | 2, 5 | 5, 2 | 3, 4 |
| 4, 3 | 5, 6 | 6, 5 |  |

P(prime sum) = P(at least one roll is a 3) =  P(prime sum AND at least one roll is a 3) =  |
| 62 | C | P(A or B) = P(A) + P(B) – P(A and B)P(female) + P(not owning a red car) – P(females that don’t own red cards)$$\frac{285}{525}+\frac{300}{525}-\frac{215}{525}$$ |
| 63 | C | P(odd sum | at least one spin is a 4) = $\frac{4}{7}$

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| 4, 1 | 1, 4 | 3, 4 | 4, 3 |

P(odd sum AND at least one spin is a 4) =

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| --- | --- | --- | --- |
| 4, 1 | 4, 2 | 4, 3 | 4, 4 |
| 1, 4 | 2, 4 | 3, 4 |  |

P(one spin is at least a 4) =  |
| 64 | B | P(black OR A OR Z) = P(black) + P(A) + P(Z) – P(black A) – P(black Z)$$\frac{26}{52}+\frac{2}{52}+\frac{2}{52}-\frac{1}{52}-\frac{1}{52}$$ |