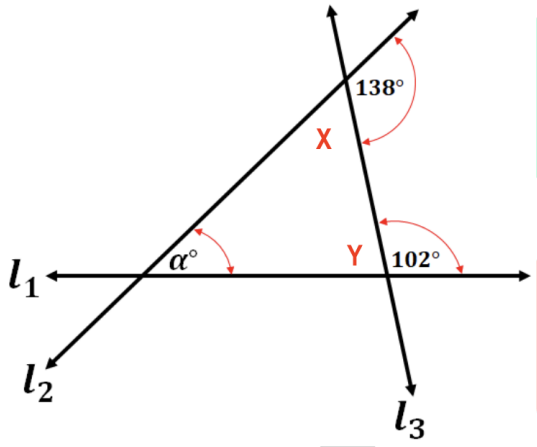
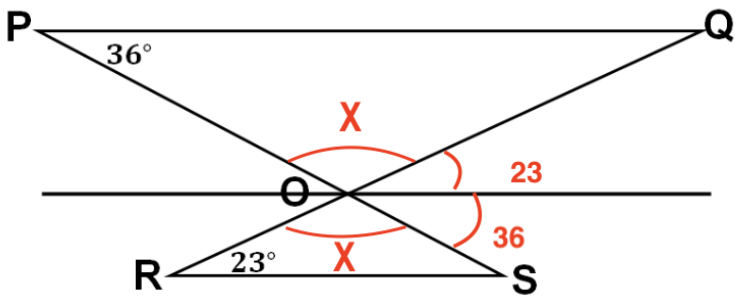
ANSWER KEY

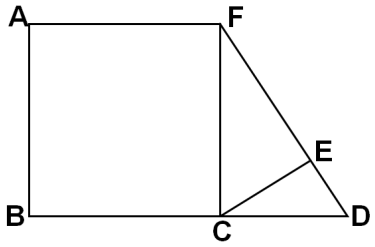
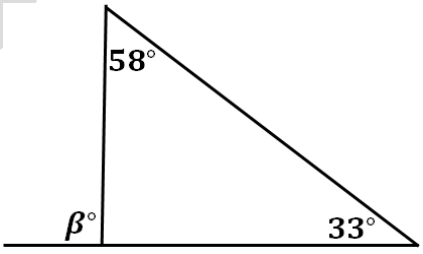
QUESTION	CORRECT ANSWER
1	C Given: Total = $3.5 If all 5 cents replaced to 10 cents and all 10 cents replaced to 5 cents, Total = $4.3 Solution: Let T = number of 10 cents ; F = number of 5 cents F (0.05) + T (0.1) = $3.5 F(0.1) + T(0.05) = $4.3 F = [4.3 - T(0.05)] / 0.1 {[4.3 - T(0.05)] / 0.1 } (0.05) + T (0.1) = 3.5 **T = 18 coins** F = [4.3 - T(0.05)] / 0.1 = [4.3 - (18)(0.05)] / 0.1 **F = 34 coins** 34 + 18 = **52 coins in total**
2	E Given: Average of 6 = 400 grams 2 additional rock Average of 8 = 425 grams Solution: [6(400) + 2(X)]/ 8= 425 3400 + 2X = 2400 2X = 1000 **X = 500 grams**
3	B Given: Flashlight + 2 Screwdrivers = $105 2 Flashlights + Screwdriver = $135 Solution: Flashlight + 2 Screwdrivers = $105 ← multiply by 2 2 Flashlights + 4 Screwdrivers = $210

	2 Flashlights + 4 Screwdrivers = $210 - 2 Flashlights + Screwdriver = $135 —---------- 3 screwdrivers = $75 75/3 = **$25**
4	B Given: 70% = pass Math = 70% Solution: Math = 40(0.7) = 28 correct Science = Math - 3 = 28 - 3 = 25 correct 40 - 25 = **15 questions**
5	D Given: Average boys = 83 Average girls = 83 - 20 = 63 Average total = 78 b/x Solution: Let X = Total 83 (b) + 63(X -b) / X = 78 83b + 63X - 63b = 78X 15X = 20b b = 15X/20 b/X = (15X/20) / X = ¾ X / X = ¾ or 0.75 or **75%**
6	E Given: 9 mins and 20 seconds = 14 table napkins 20 table napkins Solution: 9 ⅓ mins = 14 napkins 9 ⅓ / 14 = ⅔ mins per napkin ⅔ (20) = 40/3 mins or **13 mins 20 seconds**

7	C Given:  Solution: Total angle of triangle = 180 degrees X = 180 - 138 = 42 degrees Y = 180 - 102 = 78 degrees α = 180 - 42 - 78 = **60 degrees**
8	B Given: 4 large pack = 6 small pack = 1 necklace 4 necklace Solution: Choice A 2 large pack = 2/4 = 0.5 necklace 24 small pack = 24 / 6 = 4 necklace 4 + 0.5 = 4.5 necklace in total ← wrong Choice B 4 large pack = 4/4 = 1 necklace 18 small pack = 18 / 6 = 3 necklace 1 + 3 = **4 necklace in total** ← correct Choice C 6 large pack = 6/4 = 1.5 necklace 16 small pack = 16 / 6 = 8/3 necklace 1.5 + 8/3 = 25/6 necklace in total ← wrong Choice D 8 large pack = 8/4 = 2 necklace 8 small pack = 8 / 6 = 4/3 necklace

	2 + 4/3 = 10/3 necklace in total ← wrong Choice D 12 large pack = 12/4 = 3 necklace 12 small pack = 12 / 6 = 2 necklace 3 + 2 = 5 necklace in total ← wrong Therefore the answer is **choice B**
9	E Given: $3 = long distance , $0.45 per mins 10 long distance ; ½ = 1 min ½ 3 mins Solution: (10)3 + (10(½) (1)(0.45)) + (10(½)(3)(0.45)) = **$39**
10	D Given:  Solution: X = equals because they are opposite angle 2X + 2(23 +36) = 360 **X = 121 degrees**
11	B Given: Hypotenuse = 26 cm S = 10 cm A = 120 cm^2 Solution: A = ½ bh 120 = ½ (10) H **H =24 cm**

12	A Given: Average of black goats = 0.6 m Average of white goats = 0.72 m Average of all = 0.68 Solution: [(0.6) B + (0.72)(W)] / B + W = 0.68 (0.6) B + (0.72)(W) = 0.68B + 0.68W B(0.08) = W(0.04) B = W(0.04) / (0.08) B /W = W(0.04) / (0.08) / W B/W = 0.04/0.08 = ½ or **1 to 2**
13	B Given: $22 = 1 bag $55 = 3 bags spends $100 or more = 10% less 8 bags Solution: 2(55) = $110 ← 6 bags 2(22) = $44 ← 2 bags Total = 110 + 44 = $154 ← 10% less 154 - (154)(0.1) = **$138.6**
14	E Given: 32= Red Total = 80 Solution: 32/80 = 0.4 or **40%**

15	B Given:  Solution: ABCF = 36 cm^2 ABDF = 48 cm^2 Solution: A = S^2 36 = S^2 S = 6 cm = BC A = (a+b / 2)h S = a = h = 6 48 = [(6+b)/2](6) b = 10 cm = BD CD = BD - BC **CD = 10 - 6 = 4 cm**
16	D Given:  Solution: Total angle of a triangle = 180 180 - 58 - 33 = 89 degree ← 3rd angle of the triangle 180 - 89 = **91 degrees**

17	D Given: J = 2 R J - 8 = 3(R-8) - 6 Solution: 2R - 8 = 3R - 24 - 6 R = 22 J = 2 (22) = 44 years old ← present age 44 + 10 = **54 years old**
18	A Given: 11 ¼ m = 42.75 kg 6 m = ? Solution: Weight / Length = Mass per meter ← get the mass per meter 42.75 / (11 ¼) = 19/5 kg per m (19/5) (6) = 114/5 or **22 ⅘ kg** multiply to the length we need
19	A Given: P = 36 cm Solution: Sum of 2 sides should be greater than the 3rd side **I. 36 - 15 = 21 cm← Correct 21 cm = sum of 2 sides is greater than 15 cm** II. 36 -18 = 18 cm ← Wrong 18 cm = sum of 2 sides is equal to third side = 18 cm, it should be greater III. 36 -21 = 15 cm ← Wrong 15 cm = sum of 2 sides is less than to third side = 21 cm, it should be greater Therefore the answer is **Choice A**
20	D Given: 5 cm S = 40 cm Solution: Sides = 40 cm x 40 cm h = 5 cm Volume increase = 40 x 40 x 5 = 8000 cm^3 ← also Volume of rubik's cube

	V = S x S x S ← Formula for Volume of rubik's cube S x S x S = 8000 **S = 20 cm**
21	C Given: Solution: Total = 20 + 17 + 19 = 56 19/56 = 57/T 19T = 3192 **T = 168 figurines**
22	A Given: Jessa = 9 bracelets = 3 mins Roma = 10 bracelets = 2 mins Solution: Jessa = 3/9 mins per bracelet Roma = 2/10 mins per bracelet 1/T = 1/(3/9) + 1/(2/10) T = ⅛ mins per bracelets ⅛ (56) = **7 mins**
23	C Given: 90 % = reflects Filter = 40% ← absorbs Solution: 0.9R - 0.9R (0.4) = 0.54 or **54%**
24	A Given: 40 hours = 36 500 widgets ← 18 machines 24 machines Solution:

MONTH	FIGURINES PAINTED
January	20
February	17
March	19

	36 500/18 widgets per machine for 40 hours 36500/18 = 18250/9 widgets per machine for 40 hours (18250/9) / 40 = 18250/36 widgets per machine for 1 hour (1825/36) x 24 = **3650/3** widgets using 24 machine for 1 hour ← 24 machine working for 1 hour We need a total of 36 500 widgets 36 500 / (3650/3) = 30 hours ← 24 machines will only need 30 hours Time for 18 machines - Time for 24 machines = time difference 40 - 30 = **10 hours fewer**
25	A Given: Brown:White = 3:2 = 20 kg removed 10 kg add 10 kg brown sugar removes 10 kg again add 10 kg brown sugar again Solution: Let B = Brown sugar ; W = White sugar ⅗ = B/20 = **B = 12** ← ratio becomes ⅗(Brown:Total) B + W = 20 12 + W = 20 **W = 8** 12B + 8W = 20 ← original mixture Remove 10 kg mixture or ½ of the mixture: (12B + 8W) - ½ (12B + 8W) = 20 - 10 6B + 4W = 10 ← remove 10 kg of the mixture Added 10 kg Brown sugar: 6B + 4W + 10B = 10 + 10 16B + 4 W = 20← added 10 kg of brown sugar Remove 10 kg mixture or ½ of the mixture: (16B + 4W) - ½ (16B + 4W) = 20 - 10 8B + 2W = 10 ← Remove 10 kg of the mixture Added 10 kg Brown sugar: 8B + 2W + 10B = 10 + 10 **18B + 2W** = 20 ← added 10 kg of brown sugar

	B = 18 W = 2 B/W = 18/2 = 9/1 or **9 to 1**
26	D Given: 8 machines = 80 L in 24 days 36 machines in 30 days Solution: 80/8 = 10L in 24 days for each machine 10/24 = 5/12 L per day for each machine (5/12)(36) = 15L per day for 36 machine 15 (30) = **450 L**
27	B Given: 27 smaller cubes ← No sides were painted Solution: Let X = Side of cube Assume that small cubes are 1 unit X - 2 ← Dimension of the not painted cubes / Dimension of inner cubes that will not be painted Formula (X - 2)^3 = number of cubes that is not painted (X -2)^3 = 27 X = 5 units/ cubes Total cubes = Volume of cube = 5 x 5 x 5 = **125 smaller cubes** other formula: all edges on the large cube were painted black Let X = number of cubes the edge / Length of the large cube since in length the 2 end cubes will be painted we get, X - 2 ← number of cubes - 2 cubes that will be painted therefore this will be the dimension of the cubes that will not be painted on all side (X -2) (X -2)(X -2) = 27 (X -2)^3 = 3^3 ← cancel out ^3 (X -2) = 3 X = 5 units ← Dimension of the large cube 5 x 5 x 5 = 125 small cubes

28	D Given: 10 km per hour 12 mins break every 10 km 60 km Solution: 12 mins break every 10 mins therefore 60 km = 5 times break time 60/10 = 6 hours 6 + 5(12/60) = 7 hours 7 x 60 = **420 mins**
29	E Given: A = 49 m^2 Solution: A = L x W or S x S 49 = 7 x 7 or 49 x 1 49(2) + 1(2) = 100 m 7 (4) = **28 m ← smallest** Therefore the answer is **Choice E**
30	C Given: 8 days = 1500 widgets ← 7 hours a day for 5 machines 2 added Solution: 1500/8(7) = 375/14 machines per hour for 5 machines (375/14) / 5 = 75/14 machine per hour ← 1 machine 1500 = (75/14) T (4)(5+2) **T = 10 hours**
31	C Given: Total = 1020 marbles Small = 204 marbles Medium = Large Solution:

	Large = 1020 - 204 /2 = 408 marbles 408 / 204 = 2/1 or **2 to 1**
32	B Given: Total = 6000 Tokens 30% A = Black 60% B = Black 40% T = Black Solution: 0.4(6000) = 0.3(6000 -B) + 0.6(B) B = **2000 Tokens**
33	C Given: F + I = 48 F + 3 = 4(I+-) Solution: (48 - I) + 3 = 4(I -1) 51 -I = 4I - 4 5I = 55 I = **11 years old**
34	A Given: ¼ Kg = 60 cents Solution: ¼ kg = 250 grams 60/250 = 0.24 cents per gram 0.24 (600) = 144 cents or **$1.44**
35	C Given: 1 hour = (4/9) T Solution: 1/ (9/4) = T T = 9/4 hours or 2 hours and 15 mins ← Total time 2 hours and 15 mins - 1 hour = **1 hour and 15 mins more to fill the tank**