ANSWER KEY

QUESTION	CORRECT ANSWER
1	C Given: 300 km per hour 240 km @ 9:45 AM Solution: 240/300 = 0.8 hour 0.8(60) = 48 mins 9:45 + 48 mins = 10:33 AM
2	E Given: 15 widgets per hour 3 machines in 12 mins = ? Solution: 1 hour = 60 mins 15/60 = 0.25 widgets per min ← convert to widgets per min ← 1 machine 0.25(12) (3) = 9 widgets ← multiplied by 12 because 12 mins ← multiplied by 3 because of 3 machines Therefore the answer is 9 widgets other solution: 12 min / 60 mins = 0.2 hour 0.2(3 machines) (15 widgets per hour) = 9 widgets

3	C By exterior angle theorem, m∠**ABD** = m∠**BDC** + m∠**BCD** = 45° + m∠**BCD**. Since the degree measure of the interior angle of a triangle cannot be zero or negative, this means the degree measure of angle **BCD** is not zero or negative. Hence, it follows that the degree measure of angle **BCD** will always be greater than 45 degrees. Note that there are three possible cases: 1. m∠**DBC** < 90°, this means m∠**ABD** > 90° 2. m∠**DBC** = 90°, this means m∠**ABD** = 90° 3. m∠**DBC** > 90°, this means m∠**ABD** < 90° In all three cases, the degree measure of angle **ABD** is always greater than 45°. Therefore, correct answer is C
4	D Given: Total = $3.5 35 coins Solution: Let X = $0.2 ; Y = $0.1 X = ½ Y 0.2(½ Y) + 0.1(Y) + 0.05 (35 - 1 ½ Y) = 3.5 Y = 14 X = Y/2 = 14/2 = 7

5	B Given: Start = 8:20 AM End = 1:50 PM Solution: 1:50 - 8:30 = 5 hours and 30 mins 30 km per hour 5.5 - 1 = 4.5 ← 1 hour for lunch 4.5 x 30 = 135 km
6	D Given: Donuts = $6 Brownies = $10 Solution: Brownies = 3 (donuts) 3X(10) +X(6) = sale ← substitute the choices X = whole number Choice A 3X(10) +X(6) = 108 X = 3 ← Correct Choice B 3X(10) +X(6) = 288 X = 8 ← Correct Choice C 3X(10) +X(6) = 360 X = 10 ← Correct Choice D 3X(10) +X(6) = 438 X = 12.167 ← Wrong Choice E 3X(10) +X(6) = 612 X = 17 ← Correct Therefore the answer is choice D

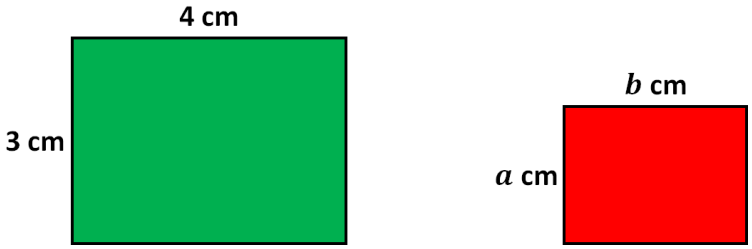
7	D Given: 3000 = bacteria 12 000 at the end Solution: 12 000 - 3000 = 9000 9000/3000 = 3 or 300 %
8	A Given: 3 bus ride 1st = 5 3rd = 10(2nd) Solution: Let 2nd = X 5 + X + 10X = 225 X = 20 km
9	B Given: 5 test Average of 4 = 92 Average of 5 = 90 Solution: Let X = fifth [4(92) + X]/ 5 = 90 X = 82
10	D Given: $ 1000 weekly salary plus 10% commission total = $4 800 weekly Solution: 4800 - 1000 = $3800 commission Let x = total sales x(0.1) = 3800 x = $38 000
11	C The ratio of the number of boys to the number of girls in each team is 2:3.

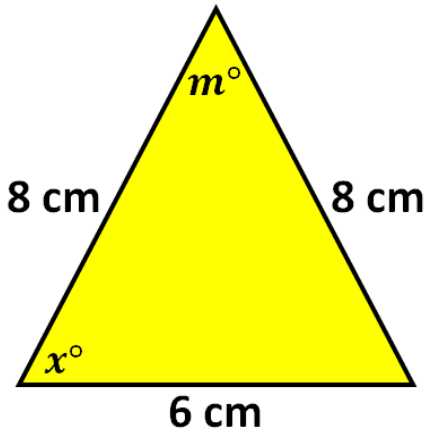
	Since there are 25 students in each team, it follows that there are 10 boys and 15 girls in each team. There are 12 teams in total. Total number of boys is 10 × 12 = 120 boys and total number of girls is 15 × 12 = 180 girls. Hence, the number of girls is 180 – 120 = 60 more than the number of boys. Correct answer is C.
12	E Given: Toaster = $68 @ 20% discount Solution: Let X = regular price X - X (0.2) = 68 X = $85
13	B Given: 3 pcs 1st = 4(2nd) 2nd = 4(3rd) Solution: Let 2nd = x 4x + x + x/4 = 1 5 ¼ x = 1 x = 4/21 Shortest = x/4 = 4/21 / 4 Shortest = 1/21

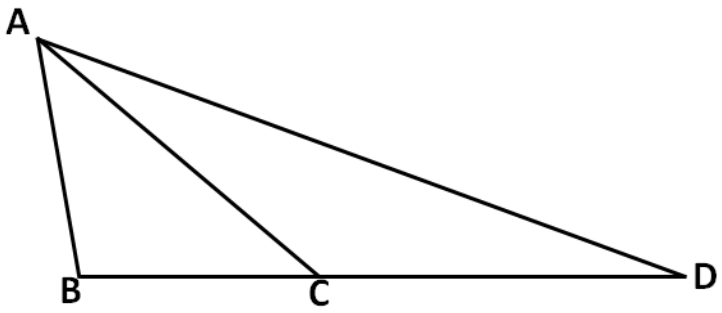
14	C Given: week 1 = increased by 20% week 2 = increased by 15% Solution: Assume original price = $ 100 100 + 20% = $120 ← week 1 120 + 120(0.15) = $138 138 - 100 = 38 38/100 = 0.38 or 38 %
15	C Given: 40kg per week 10 days = ? Solution: 40/7 kg per day 40/7 x 10 = 400/7 = 57 1/7 kg
16	A Given: 11:58 - 12:22 Solution: 12:22 - 11:58 = 24 mins 24/60 = ⅖ hour
17	D Given: **{24, 30, 33}** Solution: Average = 24+30+33 / 3 = 29 Median = 30 Range = 33 - 24 = 9 29 + 30 + 9 = 68

18	A Given: 10 copper 40 iron Average of copper = 35 g Average of all = 39 g Solution: Let X = Average of iron balls [10(35) + 40(X)] / 40 + 10 = 39 X = 40 grams
19	E Given: Train A =14 km per hour Train B = 16 km per hour 45 km Solution: Let X = Train A and Train B time 14(X) + 16(X) = 45 X = 1.5 hours
20	B Given: B = 8 cm A Triangle = A of Square L = 8 cm Solution: 8 x 8 = 64 cm^2 ← Area of square 64 = ½ BH = ½ 8 H H = 16 cm
21	C Given: Let 1st hour = X ; Last hour = Y X = Y + Y(0.2) = 1.2Y 1146 bacteria = 1st hour Solution: 1.2Y = 1146 Y = 955 bacteria

22	D Given: Average = 13 Ruben = 17 Solution: Carl + Michael + Ruben / 3 = 13 Carl + Michael + 17 / 3 = 13 Carl + Michael = 39 - 17 Carl + Michael = 22 Average = Carl + Michael / 2 = 22/2 = 11
23	A Given: Total surface area = 54 cm^2 V = ? Solution: 54/6 = 9 cm^2 ← 6 faces S x S = 9 S = 3 S^3 = 3^3 = 27 cm^3

24	D Given:  Solution: Width ratio Green:Red = 3/2 Length ratio Green:Red = 3/2 Let w = Width of red ; l = length of red 3/w = 3/2 w = 2 cm 4/l = 3/2 l = 8/3 A of green = 44 x 3 = 12 cm^2 A of red = 2 (8/3) = 16/3 A of green/ A of red = 12 / 16/3 = 9/4

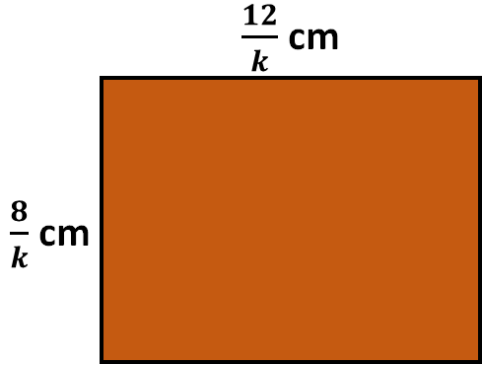
25	E Given:  Solution: Total angle of triangle = 180 degrees since its isosceles triangle we will have 2 equal angle 180 - x - x = m 180 - m = 2x x = 180 - m / 2 = (180/ 2) - m/2 = 90 - m/2

26	A Given:  Solution: AB = BC AC = CD ABC = 120 deg ADC = ? Triangle ABC = isosceles triangle 180 - <A - <C = <B <ABC = <B <A = <C 2<A = 180 - 120 <A = 30 deg ← <C small <C on small Triangle + <C on big triangle = 180 ← forms a straight line 180 - <C small = <C big <C big = 150 deg Triangle ACD = isosceles triangle 180 - <A big - <D big = <C big <A big = <D big 2(<A big) = 180 - 150 <A big = 15 deg ← alsoequalt to <ADC Therefore the answer is 15 deg

27	D Given: Ratio = 1:2:3 Solution: Total Ratio = 1 + 2 + 3 = 6 180 / 6 = 30 deg Angles are 30 deg , 60 deg , 90 deg Therefore it is a right triangle
28	E Given: A = 3 cm^2 ← with S = k Solution: 4k = ? k x k = 3 k = √3 A = 4k x 4k ← k = √3 A = 4(√3) x 4(√3) A = 48 cm^2
29	A Given: 2 ¾ = almond 1 ½ = pecans 2 ⅓ = raisin ¼ = dried cherries Solution: Almond and pecans : raisin and cherries 2 ¾ + 1 ½ = 17/4 2 ⅓ + ¼ = 31/ 12 17/4 / 31/12 = 51/31

30	A Given: $80 to $60 Solution: Let X = percentage 80 - 80(X) = 60 20/80 = X X = ¼ or 25 %
31	C Given: butter:sugar = 3:8 110 grams = butter cream Solution: Total ratio = ratio of butter cream = 3 + 8 = 11 3/11 = B/ 110 B = 30 grams

32	D Given: Pencil = $0.5 Pen = $0.7 Total = $5.60 Solution: 0.5(X - Y) + 0.7Y = 5.6 Let = X = Total number of pen and pencil Substitute X on from the choices , Y should be whole number Choice A 0.5(7 - Y) + 0.7Y = 5.6 Y = 10.5 ← Wrong Choice B 0.5(8 - Y) + 0.7Y = 5.6 Y = 8 ← Wrong, because X = total so in here he will not buy pencil Choice C 0.5(9 - Y) + 0.7Y = 5.6 Y = 5.5 ← Wrong Choice D 0.5(10 - Y) + 0.7Y = 5.6 Y = 3 ← Correct Choice E 0.5(11 - Y) + 0.7Y = 5.6 Y = 0.5 ← Wrong Therefore the answer is choice D
33	E Given: 3 ⅜ L per 15 hours Solution: 3 ⅜ / 15 per hour 3 ⅜ / 15 x 24 hours = 27/5 = 5.4 L
34	D Given: 8 red 12 yellow Average red = 12.75 m Average yellow = 15.25 m Solution: [12.75 (8) + 15.25(12)] / 12 + 8 = 14.25 m

35	A Given:  Solution: P = 2(L + W) 10 = 2 (12/k + 8/k) k = 4 L = 12/k = 12/4 = 3 W = 8/k = 8/4 = 2 A = 3 x 2 = 6 cm^2
36	C Given: 4 machine = 110 pencil every 30 secs Solution: 110 x 2 = 220 pencil per min 220 /4 = 55 pencil per min ← 1 machine 10 (55) = 550 pencil per min 550 (5) = 2750 pencils

37	A Phoebe's age + Piper's age < Paige's age Since Phoebe's age = Paige's age – 2 and Piper's age = Paige's age – 20, then (Paige's age – 2) + (Paige's age – 20) < Paige's age 2(Paige's age) – 22 < Paige's age Paige's age < 22 Among the answer choices, only option A is less than 22. Correct answer is A.
38	E Given: Car A = 70 km per hour Car B = 60 km per hour 715 km apart Solution : Let X = time 70(X) + 60(X) = 715 X = 5.5 hours or 5 hours and 30 mins
39	A Given: 100 000 000 copies in 8 hours 4 copier 100 000 000 copies Solution: 100 000 000 / 8 = 12 500 000 copies per hour 12 500 000 x 4 machines = 50 000 000 copies per hour 100 000 000 / 50 000 000 = 2 hours

40	D Given: 90% = colored 50% = Red 40% = Blue Remaining = 360 green Solution: Let X = colored X = 0.5X + 0.4X + 360 X = 3600 colored balls 90/100 = 3600 / T T = 4000 balls