BOOK 1

# Mastering Mathematics

## Selective and Scholarship Tests

Yvonne Kang

SAMPLE

A
FIVE SENSES
PUBLICATION

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Five Senses Education Pty Ltd
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# TEST 1



**1** If 10 millimetres equal 1 centimetre, how many square centimetres does 1 square millimetre equal?

**A** 0.01
**B** 0.1
**C** 10
**D** 100

**2** If John gives Allen 5 dollars and Allen gives Frank 2 dollars, the three boys will have the same amount of money. If Frank had $8 originally, how much more money does John have than Allen?

**A** $5
**B** $6
**C** $7
**D** $8

**3** What is numeral value of 57 tens, 2 ones, 3 tenths, 6 hundredths and 5 thousandths?

**A** 572365
**B** 57236.5
**C** 5723.65
**D** 572.365

**4** Of the following units which would be more likely used to measure the amount of water in a bathtub?

**A** kilograms
**B** litres
**C** millilitres
**D** centigrams

**5** What is the sum of the five consecutive even numbers whose average is 12?

**A** 30
**B** 60
**C** 90
**D** 120

**6** Which of the following fractions is the equivalent of 0.5%?

**A** $\frac{1}{20}$
**B** $\frac{1}{200}$
**C** $\frac{1}{2000}$
**D** $\frac{1}{5}$

**7** The weights of two ships are in the ratio of 5: 9. If together they weigh 5,600 tonnes, how many more tonnes does the larger ship weigh?

**A** 3,600
**B** 2,000
**C** 2,400
**D** 1,600

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**8** A class of 40 students is to be divided into smaller groups. If each group is to contain 3, 4, or 5 people, what is the largest number of groups possible?

**A** 10
**B** 12
**C** 13
**D** 14

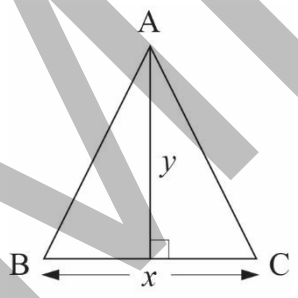
**9** If a train travels *n* kilometres in 5 hours, how many kilometres will it travel in 25 hours?

**A** $\frac{n}{25}$
**B** $\frac{n}{5}$
**C** $5 \times n$
**D** 25×n

**10** Steven travels from Shanghai to Beijing by his car in 2 hours. If he reduces the speed of his car by 30km/hr, then he takes 3.2 hours for the same distance. Find the distance between the two towns.

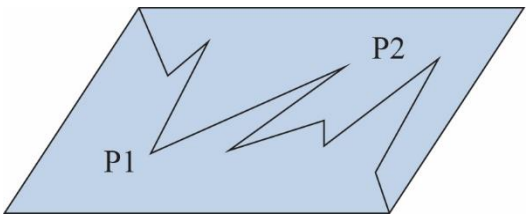
**A** 160 km
**B** 120 km
**C** 140 km
**D** 180 km

**11** Look at the triangle. The area of the triangle is 40 $cm^2$. Which dimension is not possible?




**A** x = 2 cm, y = 20 cm
**B** x = 40 cm, y = 2 cm
**C** x = 5 cm, y = 16 cm
**D** x = 10 cm, y = 8 cm

**12** A parallelogram is divided into two parts, P1 and P2, as shown on the picture. Which of the following statements is surely true?




**A** P2 has a greater perimeter than P1
**B** P1 and P2 have the same perimeter
**C** P2 has a smaller perimeter than P1
**D** P2 has a smaller area than P1

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**13** Michelle wants to expand her flowerbed by increasing the length and width each by 2 metres. What will the new area of the flowerbed be, if L and W represent the original dimensions of the flowerbed's length and width?

**A** $2 \times L \times W$
**B** $2 \times (L + W)$
**C** $2 \times L + 2 \times W$
**D** $(L + 2) \times (W + 2)$

**14** What is the mathematical average of the number of days in a typical year, the number of days in a week, and the number of hours in a day?

**A** 100
**B** 115
**C** 132
**D** 158

**15** 85% of what number is 136?

**A** 160
**B** 170
**C** 180
**D** 190

**16** The Chinese Calendar is based on a twelve-year cycle. Each year in the cycle corresponds to an animal: tiger, rabbit, dragon, snake, horse, sheep (or goat), monkey, rooster, dog, pig, rat and ox. The order of the animals never changes. The year 2010 in the Chinese Calendar is the Year of the Tiger. Which animal will mark the year 2111?

**A** pig
**B** sheep
**C** dog
**D** horse

**17** Which of the following is a true statement?

**A** The product of two negative numbers is negative.
**B** The product of one negative and one positive number is positive.
**C** When dividing a positive number by a negative number, the results are negative.
**D** When dividing a negative number by a positive number, the results are positive.

**18** A men's basketball team won 24 games and lost 32. What is the ratio of games lost to the number of games played?

**A** 32:24
**B** 4:7
**C** 3:4
**D** 4:2

**19** In a certain baseball league, each team plays 160 games. After playing half of their games, team A has won 60 games and team B has won 49 games. If team A wins half of its remaining games, how many more games must team B win to have the same record as team A at the end of the season?

**A** 48
**B** 49
**C** 50
**D** 51

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**20** An isosceles triangle has two lengths of 6 cm and 9 cm. An equilateral triangle has the same perimeter. What is the length in centimetres of each side of the equilateral triangle?

**A** 10 cm
**B** 7 cm
**C** 8 cm
**D** 6 cm

**21** There are 60 pupils in a school. 6 of these pupils wear glasses. Exactly half of the 60 pupils in the school are boys. From this information, what percentage of boys in this school wear glasses?

**A** 10%
**B** 50%
**C** 20%
**D** cannot be determined

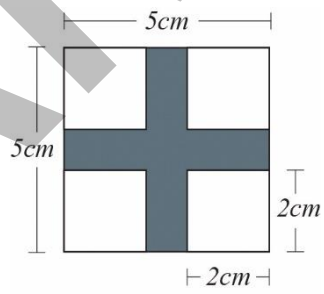
**22** On a farm 80 sheep gave birth. 30% of the sheep gave birth to two lambs each. The rest of the sheep gave birth to just one lamb each. How many sheep are there altogether?

**A** 48
**B** 56
**C** 104
**D** 184

**23** A team has $90.00 to buy balls. One ball costs $7. The team gets every fifth ball for free. What is the largest number of balls the team can get?

**A** 15 balls
**B** 12 balls
**C** 16 balls
**D** 20 balls

**24** The following is a 5 cm square. Four 2 cm squares are removed from each of the four corners. What is the area of the remaining shaded part of the figure?

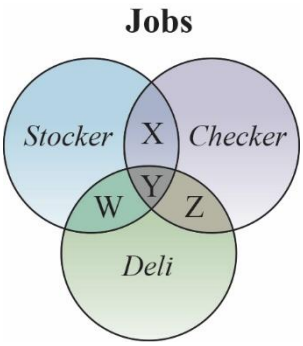



**A** 6 $cm^2$
**B** 9 $cm^2$
**C** 21 $cm^2$
**D** 25 $cm^2$

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**25** At a grocery store, jobs are recorded on a Venn diagram like the one below.




If an employee only works as a checker and in the deli, in which region of the diagram does the employee belong?

**A** W
**B** X
**C** Y
**D** Z

**26** Jane and Kate are ski racing. They both start at the same place, at the same time, and follow the same path. Jane is travelling at 5m/s and Kate is traveling at 8m/s. How many metres ahead is Kate after one minute?

**A** 180 m
**B** 120 m
**C** 240 m
**D** 200 m

**27** What is 1% of 10% of 100% of $1000?

**A** $10
**B** 1 cent
**C** $1
**D** $100

**28** Which point best represents the value of C divided by F?




**A** H
**B** B
**C** D
**D** E

**29** I multiply three positive integers that are greater than 1 and get 333. Find the one of the numbers.

**A** 3
**B** 11
**C** 9
**D** 111

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# SOLUTIONS

## TEST 1

1. **A**: 1 $cm^2$ = 10 $mm^2$ so 1 $mm^2$ = 0.01 $cm^2$.
2. **D**: If Frank has $8, he would have $10 after receiving $2 from Allen. Allen has $7 originally because when he receives $5 from John and gives $2 to Frank, he would have $10 left too. John has $15 originally so he would be left with $10 when he gives $5 to Allen. The difference of John's and Allen's money is $8.
3. **D**: 570 + 2+ 0.3 + 0.06 + 0.005 = 572.365
4. **B**
5. **B**: 5 × 12 = 60
6. **B**: 0.5% = 0.005 in decimal which is the same as $\frac{5}{1000} = \frac{1}{200}$.
7. **D**: There are a total of 11 parts so 1 part equals to 5600 ÷ 14 = 400. The weight of each ship is 400×5 = 2000 tonnes and 9×400 = 3600 tonnes. The difference is 1600 tonnes.
8. **C**: 12 × groups of 3 = 36 people and 1× group of 4 = 4 totals 40 people.
9. **C**
10. **A**: 2 × speed = 3.2 × (speed – 30). The speed is 80 km/h. So the distance is 160 km.
11. **A**: The area of a triangle is $\frac{1}{2} \times base \times height$ = 40. So the product of the base and the height has to be 80 $cm^2$.
12. **B**
13. **D**
14. **C**: The number of days in a typical year = 365, the number of days in a week = 7, the number of hours in a day = 24. The average of these three numbers is (365 + 7 + 24) ÷ 3 = 232.
15. **A**: 136 ÷ 85 = 16 which is 1% of the number. So the whole number is 160.
16. **B**: The year difference between 2111 and 2010 is 101 years. 101 ÷ 12 = 8 r 5 which indicates the fifth animal from the tiger. It's the sheep.
17. **C**
18. **B**: Ratio of 32 games lost to 56 games played is 4:7.
19. **D**: There are 80 games to play. If Team A wins half of the remaining games it will win 40 games which adds to be a total of 100 games won. Team B won 49 games so far so they need to win another 51 games to have the same record as the Team A.
20. **B**: The isosceles triangle has sides of 6, 6 and 9 cm which equals the perimeter of 21 cm. The equilateral triangle which has the same perimeter is 21 ÷3 = 7 cm.
21. **D**
22. **D**: 24 sheep (30% of 80) gave birth 2 lambs each = 48 lambs, 56 sheep (70% of 80 sheep) gave 1 lamb each = 56 lambs. 48 lambs + 56 lambs + 80 sheep = 184.
23. **A**: 5 balls = $28 (4 balls + 1 ball free). $90 ÷ $28 = 3 packs with $6 remaining. So 3 packs = 15 balls.
24. **B**: Total area of the square is 25 $cm^2$. There are 4 small squares the area of 4 $cm^2$. 25 – 16 = 9 $cm^2$.
25. **D**
26. **A**: Jane's distance = 5 m/s × 60 seconds = 300 metres. Kate's distance = 8 m/s × 60 seconds = 480 metres. The difference in distance = 180 metres.
27. **C**: 0.01× 0.1× 1 × $1000 = $1
28. **B**: C = 0.75, F = 1.5. 0.75÷ 105 = 0.5 which is point B.
29. **A**: 337 = 3× 3 × 37
30. **B**: 1,629,684,321 – 54321 = 1,629,630,000. The product of 30001 and 54321 is 1,629,684,321.
31. **D**: 8 packs of nine notebooks = 72 books + 6 books = 8× $8 + $5 = $69.
32. **C**: 48-minute games are played by 5 players = 240 minutes. 240 minutes is shared by 15 players = 16 minutes each.

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