Pencil-chewing aids mathematical thought! That appears to be the belief of these students attempting the 1986 paper at Marist Brothers College, Pearce, A.C.T. (top) and at Wilkins High School, Petersham, N.S.W. (bottom).

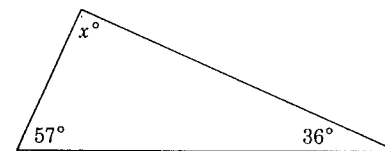**Questions 1–10, 3 marks each**

1. 2×0.4 equals

   (A) 8   (B) 0.6   (C) 0.24   (D) 0.8   (E) 0.08

2. $1.2 + 2.4 + 4.8$ equals

   (A) 8.16   (B) 7.14   (C) 8.4   (D) 16.8   (E) 8.64

3. $15 - (9 \div 3)$ equals

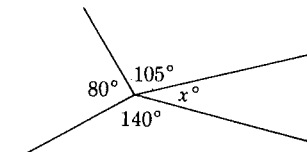   (A) 2   (B) 8   (C) 12   (D) 5   (E) $14\frac{2}{3}$

4. In this diagram x equals

   (A) 107   (B) 97   (C) 83

        (D) 93   (E) 87

5. $2\frac{2}{3} + 1\frac{1}{2}$ equals

   (A) $3\frac{5}{6}$ (B) $4\frac{1}{6}$ (C) $3\frac{1}{6}$ (D) $4\frac{1}{3}$ (E) $3\frac{3}{5}$

6. Using a pocket calculator to calculate 0.075×1.34, Anne forgot to enter the decimal points. The machine showed 10050. The answer should have been

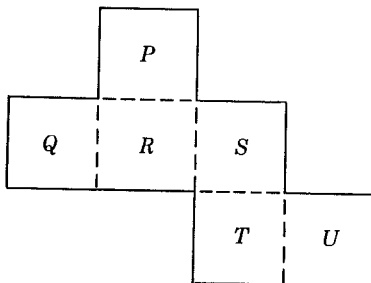   (A) 1.005   (B) 100.5   (C) 10.05   (D) 0.01005   (E) 0.1005

7. The value of x in the diagram is

   (A) 35   (B) 80   (C) 75

        (D) 40   (E) 45

8. When the diagram shown is folded to make a cube then the face marked U is opposite the face marked

    (A) P (B) Q (C) R

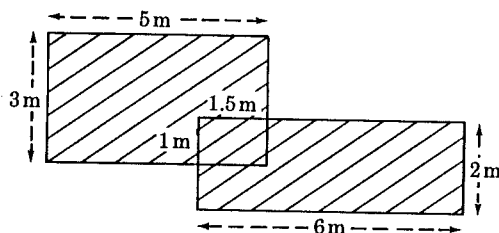   (D) S (E) T

9. Of the following numbers, which is the second greatest?

    (A) $\frac{1}{3}$ (B) $\frac{5}{12}$ (C) $\frac{2}{5}$ (D) $\frac{7}{20}$ (E) $\frac{3}{10}$

10. Two rectangles overlap in a smaller rectangle as shown. Find the shaded area in square metres.

    (A) 25.5   (B) 27   (C) 24

        (D) 26.5   (E) 28.5

Questions 11–20, 4 marks each

11. One million seconds is about

    (A) 3 days   (B) 12 days   (C) 3 months   (D) 1 year   (E) 2 years

12. If $\dfrac{1}{x} = \dfrac{2}{5} + \dfrac{5}{2}$ then the value of x is

    (A) $\frac{10}{29}$ (B) $\frac{29}{10}$ (C) $\frac{7}{10}$ (D) 1   (E) $\frac{10}{7}$

13. A one metre square sheet of cardboard is cut into the maximum number of squares of side one millimetre. If these squares could be laid side by side, how far would they stretch?

    (A) 100 metres   (B) 10 metres   (C) 1 000 000 metres

        (D) 1 000 metres   (E) 10 000 metres

14. In a school 30 boys and 20 girls entered a competition. Prizes were awarded to 10% of the boys and 20% of the girls. The total percentage of entrants receiving prizes was

    (A) 15   (B) 30   (C) 14   (D) 16   (E) 7

15. Angles of size $a°$, $b°$ and $x°$ are shown. The expression which always gives the value of x is
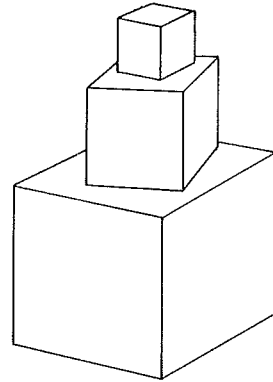
    (A) $180 - a - b$ (B) $90 + a + b$ (C) $360 - a - b$

        (D) $a + b$ (E) $180 + a + b$
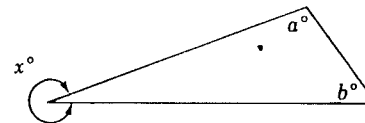
16. On 12 April 1790 the colony of Sydney Cove had among its remaining rations 10 840 kg of pork. There were 590 people to feed and it was estimated that this pork would last until 26 August 1790. The average daily ration of pork, in grams per person, is best approximated by

    (A) 125   (B) 0.125   (C) 875   (D) 12.5   (E) 600

17. A sculpture consists of three large cubes, sitting, without overhang, one upon the other. It is to have its exposed surfaces painted bright yellow after being placed in the centre of Melbourne. The largest cube sits flat on the ground and has side length of 3 metres. The other two have side lengths of 2 and 1 metres respectively. One tin of paint is needed to cover each square metre. The number of tins required is

(A) 36   (B) 65   (C) 70   (D) 74   (E) 75

18. If m and n are positive integers, what is the smallest number m can be when $2940m = n^2$?

(A) 2940   (B) 60   (C) 15   (D) 210   (E) 9

19. My bicycle wheels have a diameter of 69 cm. I ride my bicycle to school, which is 8 km from home. Of the following numbers, which one most closely approximates the number of revolutions made by one wheel during such a journey?

(A) 4 000   (B) 6 000   (C) 16 000   (D) 2 000   (E) 8 000

20. The four digits 1, 9, 8 and 6 are each used once only to form two numbers, each of which is of one, two or three digits. The largest possible product two such numbers can have is

(A) 7776   (B) 7688   (C) 7749   (D) 7826   (E) 9861

Questions 21–30, 5 marks each

21. A fence runs north-south. A bird leaves its position P on the fence and flies due north for one kilometre, then west for two kilometres, then due north again for half a kilometre. Finally, it flies south-east. The point at which it crosses the line of the fence is

(A) at P (B) half a kilometre south of P (C) half a kilometre north of P

(D) one kilometre south of P (E) two and a half kilometres north of P

22. At the end of 1983 the average annual rainfall in my town for the ten year period just ended was 631 mm. A year later the ten year average was 601 mm, and 450 mm had fallen in 1984. What was the rainfall, in millimetres, in 1974?

(A) 750   (B) 616   (C) 1232   (D) 30   (E) 480

23. Trains leave Brisbane for Toowoomba on the hour every hour and trains leave Toowoomba for Brisbane on the hour every hour. The journey time in each case is 3 hours and 45 minutes.
You can catch a train from Toowoomba for Brisbane at 12 noon. The number of Toowoomba-bound trains which you pass during your journey is

(A) 3   (B) 4   (C) 5   (D) 6   (E) 7

24. A 5 litre container full of orange juice has 2 litres of juice removed and is filled up with water and mixed thoroughly. It then has 2 litres of the mixture removed and is again filled up with water. What percentage of the final mixture is orange juice?

(A) 27   (B) 25   (C) 30   (D) 36   (E) 24

25. A shopkeeper has only seven 50¢ and fifteen 20¢ coins left in the till. In how many ways can she make up $3.40 in change?

(A) 4   (B) 2   (C) 3   (D) 5   (E) 10

26. At a party there were 20 students. Mary danced with seven boys, Jane with eight, Mabel with nine and so on for all the girls up to the last girl Nellie who danced with all the boys. The number of boys at the party was

(A) 11   (B) 12   (C) 13   (D) 14   (E) 15

27. I walk at 4 km/h and run at 6 km/h. I find that I can save $3\frac{3}{4}$ minutes by running instead of walking from my house to the station. The distance from my house to the station, in kilometres, is

(A) $1\frac{1}{4}$ (B) $3\frac{3}{4}$ (C) $7\frac{1}{2}$ (D) $\frac{3}{4}$

(E) not determined by the given information