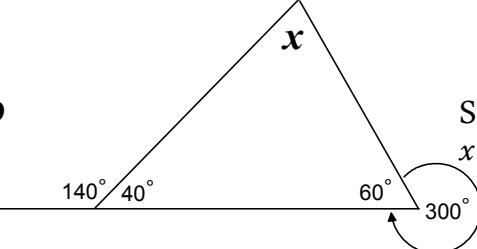


**SOUTH AFRICAN MATHEMATICS OLYMPIAD**  
**Junior Grade 8 Round 1 2011**  
**Solutions**

1. **B**  $2 + 3 \times 10 = 2 + 30 = 32$
2. **D**  $0.014 \times 0.4 = 0.0056$
3. **C**  $4 \times 365 = 1460$  and  $5 \times 365 = 1825$ ; since 1500 lies between these, the child has lived between 4 and 5 years: at the next birthday he will turn 5.
4. **A**  $4\frac{1}{4} - 3.25 = 4.25 - 3.25 = 1.00$ .
5. **D**  $1^2 = 1$  ends in 1;  $2^2 = 4$  ends in 4;  $3^2 = 9$  ends in 9;  $4^2 = 16$  ends in 6;  $5^2 = 25$  ends in 5. Only answer D remains.
6. **C**  $2030 \div 7 = 290$
7. **A**  $\underline{\quad 7 \quad \boxed{4} \quad 2 \quad}$  equals  $7 + 4 \div 2 = 7 + 2 = 9$
8. **E** The fractions are  $1 - \frac{1}{10}$ ;  $1 + \frac{1}{13}$ ;  $1 - \frac{1}{20}$ ;  $1 + \frac{1}{120}$ ;  $1 - \frac{1}{212}$  so the last one differs from 1 by least
9. **B**  $2011 - 201.1$  is 1809.9

10. **D**


Since the angles of a triangle add up to  $180^\circ$ ,  $x + 40^\circ + 60^\circ = 180^\circ$  and  $x = 80^\circ$

11. **D** The LCM of 3, 4 and 6 is 12; therefore the medication will be taken by all of them again at the same time after 12 hours, which will be at 18:00.
12. **C** Debbie is the tallest, so she must have height 150 cm. Amy is the shortest, with height 75 cm. Dawn is taller than Sarah, so has the larger remaining height.
13. **B** The shaded triangle CPQ is half of rectangle BCPQ. CP has length one-third of the length of CD, so BCPQ has area one-third of ABCD. Thus triangle CPQ has area  $\frac{1}{6}$  of ABCD.

14. **B** 8 km is 5 miles, and  $120 = 8 \times 15$ , so 120 km is  $5 \times 15 = 75$  miles.
15. **E** Continuing the pattern a bit further shows clearly that the last digits in the columns simply alternate, with all the numbers ending in 3 in the last column
- | <b>A</b> | <b>B</b> | <b>C</b> | <b>D</b> | <b>E</b> |
|----------|----------|----------|----------|----------|
| 1        | 4        | 7        | 10       | 13       |
| 28       | 25       | 22       | 19       | 16       |
| 31       | 34       | 37       | 40       | 43       |
|          |          | ...      | 49       | 46       |
16. **B** The eleven numbers have a sum of  $11 \times 18 = 198$ . When 42 is added we have twelve numbers with a total of 240, so their average must be  $240 \div 12 = 20$ .
17. **C** Pairing the terms shows the sum is  $(1 - 2) + (3 - 4) + \dots + (2009 - 2010) + 2011$ , which is  $-1 - 1 - 1 \dots + 2011$ , with the  $-1$  appearing  $2010/2 = 1005$  times. So the sum is  $2011 - 1005 = 1006$ .  
Alternatively, pair the numbers thus:  $1 + (-2 + 3) + (-4 + 5) + \dots + (-2010 + 2011)$ , obtaining  $1 + 1 + \dots$  with  $1 + \frac{1}{2}(2010)$  1s, totalling 1006.
18. **E** The last digits of the numbers given are 1-1, 9-4 etc. All end in 0 or 5 except for the last one which ends in 3.
19. **B** The number of polygons in the stages is 1; 4; 7; ..., adding 3 each time. By stage 100 a total of  $99 \times 3 = 297$  squares have been added to the original hexagon, giving 298 polygons.
20. **C** The pentagons have a total of  $12 \times 5 = 60$  edges, and the hexagons have a total of  $20 \times 6 = 120$  edges. All these 180 edges must be joined in pairs at the seams, so 90 pairings, i.e. seams, are needed.