

**DAWSAN'S**  
MATHS EXPRESS

D.Williams

*Mental Maths  
Challenges*

NAME



**DAWSAN'S**  
*Maths*  
**EXPRESS**

**S. Edwards & D. Williams**

These fun calculations are devised  
to be to be used in conjunction with the  
Dawsan's Maths Dictionary.

## DAWSAN'S MENTAL MATHS EXERCISES

These Mental Maths exercises are easily calculated with the use of the Dawsan's Dictionary. Calculators are not required as computations have been kept relatively simple.

With the absence of the calculator, it will become evident if a learner has not fully mastered a particular concept. For example – percentages. These are quick to solve with the aid of a calculator, but has the learner assimilated a full understanding of this concept and is he/she now in a position to compute the process mentally?

In order that learners strive for accuracy and the attainment of 100%, ALL EXERCISES HAVE A FINAL ANSWER THAT IS PALINDROMIC i.e. the number reads the same backwards and forwards e.g. 2345432. Thus if they don't arrive at a final answer that is palindromic they have the opportunity to go back and check their calculations.

Furthermore, ALL EXERCISES HAVE ANSWERS WHICH FOLLOW-ON i.e. each subsequent question depends on the previous answer and this previous answer is always recorded as the unknown 'y'. For example:

1. Find 25% of 80. **20**
2.  $y \times$  a dozen. **20**  $\times$  12 = **240**
3. Find  $\frac{2}{5}$  of  $y$ .  $\frac{2}{5} \times$  **240** = 96

|   |  |
|---|--|
| <p style="text-align: center;"><b>MENTAL CHALLENGE 1</b></p> <p>“y always represents your previous answer and your final answer should be palindromic.</p> <ol style="list-style-type: none"> <li>1. <math>2\frac{1}{4} + 3\frac{1}{6} + 4\frac{7}{12}</math> _____</li> <li>2. <math>y \times 1^{\text{st}}</math> prime number _____</li> <li>3. <math>y +</math> number of months with 31 days _____</li> <li>4. Find the sum of the factors of <math>y</math> _____</li> <li>5. A great gross - <math>y</math> _____</li> <li>6. <math>12\frac{1}{2}\%</math> of <math>y</math> _____</li> <li>7. <math>y \times 2,5</math> _____</li> <li>8. <math>y \times \frac{1}{5}</math> _____</li> <li>9. <math>y + 805,5</math> _____</li> <li>10. <math>y + \text{CCCX}</math> _____</li> </ol> | <p style="text-align: center;"><b>MENTAL CHALLENGE 3</b></p> <ol style="list-style-type: none"> <li>1. How many words are spelled incorrectly in the following sequence?<br/>Trigonometry; octagon; divisibility; multiplicand; hypotenuse _____</li> <li>2. <math>y^3 + 2</math> score _____</li> <li>3. <math>\frac{7}{8}</math> of <math>y</math> _____</li> <li>4. <math>y = \dots\dots</math> fortnights _____</li> <li>5. <math>y + 7\frac{3}{4} \times 8</math> _____</li> <li>6. <math>y \div 0,25</math> _____</li> <li>7. <math>y + \square =</math> no. of days in a leap year _____</li> <li>8. If <math>y = 10\%</math>, find 100% _____</li> <li>9. <math>y +</math> no. of years in 2 millennia _____</li> <li>10. <math>y + [1 \times 10^0] + [8 \times 10^1] + [9 + 10^2] + [7 \times 10^3]</math> _____</li> </ol> |
| <p style="text-align: center;"><b>MENTAL CHALLENGE 2</b></p> <ol style="list-style-type: none"> <li>1. <math>12 + 4 \times 8 + 2</math> _____</li> <li>2. <math>y + 3^3</math> _____</li> <li>3. <math>y \times 3^{\text{rd}}</math> counting number _____</li> <li>4. <math>y \times 2\frac{1}{2}</math> _____</li> <li>5. <math>y \div 0,25</math> _____</li> <li>6. Decrease <math>y</math> by no. of days in 102 wks _____</li> <li>7. <math>y - 1^{\text{st}}</math> natural number _____</li> <li>8. <math>y \div</math> number of years in <math>\frac{1}{2}</math> a decade _____</li> <li>9. <math>y + 3</math> baker's dozen _____</li> <li>10. <math>y \times 3 + 1</math> _____</li> </ol>  | <p style="text-align: center;"><b>MENTAL CHALLENGE 4</b></p> <ol style="list-style-type: none"> <li>1. Divide the number of degrees in a square by one score. _____</li> <li>2. <math>y +</math> no. of degrees in a <math>\Delta</math> _____</li> <li>3. <math>y - 15</math> dozen _____</li> <li>4. Complementary <math>\angle</math> of <math>y</math> _____</li> <li>5. <math>y \times 3\frac{1}{3}</math> _____</li> <li>6. <math>y \div 4 + 7 \times 12</math> _____</li> <li>7. If <math>y =</math> a gross <math>\div</math> by 3; if not <math>\div</math> by 4 _____</li> <li>8. ON is to NO as <math>y</math> is to ...? _____</li> <li>9. <math>y + \text{MDLV}</math> _____</li> <li>10. Increase <math>y</math> by <math>2^{\text{nd}}</math> multiple of 11 _____</li> </ol>   |

**MENTAL CHALLENGE 5**

1. Multiply the no. of sides on a heptagon by the no. of sides on an octagon. \_\_\_\_\_
2.  $y \div \frac{1}{8} + 6$  dozen \_\_\_\_\_
3.  $y -$  no. of degrees in a quadrilateral \_\_\_\_\_
4. 45% of  $y$  \_\_\_\_\_
5. If  $y =$  minutes, express as hours and minutes [mixed number] \_\_\_\_\_
6.  $y + [3\frac{9}{10} \times \frac{2}{3}] + \frac{1}{5}$  \_\_\_\_\_
7.  $y \times$  MDLV \_\_\_\_\_
8.  $y \div 0,25$  \_\_\_\_\_
9.  $y +$  1<sup>st</sup> prime number \_\_\_\_\_
10. Decrease  $y$  by 2 score \_\_\_\_\_

**MENTAL CHALLENGE 7**

1. Take the number of months with 30 days and multiply by a dozen. \_\_\_\_\_
2. Find the H.C.F. of  $y$  and 32 \_\_\_\_\_
3.  $(40 \times 20) \div y$  \_\_\_\_\_
4.  $y + \square =$  no. of years in 5 centuries \_\_\_\_\_
5.  $y +$  [90% of  $y$ ] \_\_\_\_\_
6.  $y +$  no. of degrees in  $\frac{1}{2}$  a right  $\angle$  \_\_\_\_\_
7.  $y +$  no. of sides on a nonagon \_\_\_\_\_
8.  $\square \div y = 100$  \_\_\_\_\_
9. Increase  $y$  by the value of the 4<sup>th</sup> composite number \_\_\_\_\_
10. Decrease  $y$  by 9 centuries \_\_\_\_\_

**MENTAL CHALLENGE 6**

1. 0,212  $\times$  MMMM \_\_\_\_\_
2.  $y + \frac{1}{15}$  hour [expressed as minutes] \_\_\_\_\_
3.  $y \div 3 - 255$  \_\_\_\_\_
4.  $y +$  [L.C.M. of 4, 8 and 11] \_\_\_\_\_
5.  $y -$  [H.C.F. of 11, 22 and 66] \_\_\_\_\_
6.  $y \div 0,2$  \_\_\_\_\_
7. Decrease  $y$  by 2 gross \_\_\_\_\_
8. Increase  $y$  by 50% \_\_\_\_\_
9.  $y \div \frac{1}{3}$  \_\_\_\_\_
10.  $12 \times 66 + y$  \_\_\_\_\_

**MENTAL CHALLENGE 8**

1. Find the perimeter of an equilateral  $\Delta$  with each side equal to 12cm. \_\_\_\_\_
2. Find the area of this  $\Delta$  if the height is 7 cm. \_\_\_\_\_
3.  $y + 1\frac{1}{6}$  of a dozen \_\_\_\_\_
4. No. of ml in  $1\frac{1}{2}$  litres -  $y$  \_\_\_\_\_
5. Great gross -  $y$  \_\_\_\_\_
6.  $\frac{1}{2}y \times \frac{1}{2}$  \_\_\_\_\_
7.  $y - \square =$  no. of degrees in a  $\Delta$  \_\_\_\_\_
8.  $y + 7 \times 13$  \_\_\_\_\_
9. 1% of  $y + y$  \_\_\_\_\_
10.  $y \times 10$  \_\_\_\_\_

**MENTAL CHALLENGE 9**

1. Find the volume of a box measuring 2m by 3m by 4m. \_\_\_\_\_
2. How many  $\text{cm}^3$  in  $y$ ? \_\_\_\_\_
3.  $y \div 10^3$  \_\_\_\_\_
4.  $y$  - number of ml in 8 litres \_\_\_\_\_
5.  $y \times 0,5$  \_\_\_\_\_
6. Decrease  $y$  by number of years in 1 millennium + 6 centuries \_\_\_\_\_
7.  $\sqrt{y}$  \_\_\_\_\_
8. Find 95% of  $y$  \_\_\_\_\_
9. Increase  $y$  by a great gross \_\_\_\_\_
10.  $y + 7^{\text{th}}$  multiple of 11 \_\_\_\_\_

**MENTAL CHALLENGE 11**

1.  $12\text{h } 30\text{min} - 6\text{h } 15\text{min} = \square \text{ min}$  \_\_\_\_\_
2. Express  $y$  as hours and min [mixed no. \_\_\_\_\_
3.  $y + 3\frac{5}{8} + 1\frac{1}{8}$  \_\_\_\_\_
4. If  $y =$  hours, convert to minutes \_\_\_\_\_
5.  $y \times 3^{\text{rd}}$  multiple of 4 \_\_\_\_\_
6.  $y \div$  a decade \_\_\_\_\_
7. Increase  $y$  by  $2^3$  \_\_\_\_\_
8.  $y + 4$  score \_\_\_\_\_
9.  $y \times \text{XV}$  \_\_\_\_\_
10.  $y + 32^{\text{nd}}$  prime number \_\_\_\_\_

**MENTAL CHALLENGE 10**

1. Find the next number in this sequence: 16; 25; 36; 49; 64; ... \_\_\_\_\_
2. If  $y = 30\%$  of a number, find 100% \_\_\_\_\_
3. If  $y =$  diameter of a  $\odot$ , find the radius \_\_\_\_\_
4.  $y \div 1,5$  \_\_\_\_\_
5. Find  $\frac{4}{5}$  of  $y$  \_\_\_\_\_
6.  $y + 9 \times 2 + 10$  \_\_\_\_\_
7.  $\sqrt{y}$  \_\_\_\_\_
8.  $y + \square =$  no. of grams in a kg \_\_\_\_\_
9.  $y +$  no. of sides on a nonagon \_\_\_\_\_
10.  $y + 1^{\text{st}}$  prime number \_\_\_\_\_

**MENTAL CHALLENGE 12**

1. Find the area of a rectangle with a length of 12cm and a breadth of 5cm \_\_\_\_\_
2. Find the perimeter of this rectangle \_\_\_\_\_
3.  $y \times 2^{\text{nd}}$  composite number \_\_\_\_\_
4. Find  $\frac{1}{3}$  of  $y$  \_\_\_\_\_
5.  $y +$  no. of ml in 0,25 litres \_\_\_\_\_
6.  $y + 2^4$  \_\_\_\_\_
7.  $y + \square =$  no. of degrees in a revolution \_\_\_\_\_
8.  $y \times 6^{\text{th}}$  counting number \_\_\_\_\_
9.  $y \div 0,5$  \_\_\_\_\_
10.  $y \times 2 + V$  \_\_\_\_\_

**MENTAL CHALLENGE 13**

1.  $2\frac{1}{3}$  of a dozen multiplied by the value of pi (as a common fraction). \_\_\_\_\_
2.  $y + \square = 10^2$  \_\_\_\_\_
3.  $y^2 - y$  \_\_\_\_\_
4.  $y =$  perimeter of a square.  $\therefore$  side = \_\_\_\_\_
5.  $y + \square = 3$  dozen \_\_\_\_\_
6.  $y^3$  \_\_\_\_\_
7. Decrease  $y$  by a tenth of its value. \_\_\_\_\_
8.  $y \times 10^3$  \_\_\_\_\_
9.  $y \times 1^{\text{st}}$  natural number \_\_\_\_\_
10.  $y + 6^{\text{th}}$  multiple of seven. \_\_\_\_\_

**MENTAL CHALLENGE 15**

1. If  $5^3$  is a square number divide by 2. If not multiply by 2. \_\_\_\_\_
2.  $y + \text{CCL}$  \_\_\_\_\_
3.  $y +$  number of years in 2 millennia \_\_\_\_\_
4. Find 75% of  $y$  \_\_\_\_\_
5.  $y -$  number of degrees in a  $\Delta$  \_\_\_\_\_
6.  $y -$  number of degrees in a right  $\angle$  \_\_\_\_\_
7. Find  $\frac{1}{3}$  of  $y$  \_\_\_\_\_
8.  $y \div \square = 107$  \_\_\_\_\_
9. Increase  $y$  by  $2\frac{1}{4}$  score \_\_\_\_\_
10.  $y + \frac{1}{10}y$  \_\_\_\_\_

**MENTAL CHALLENGE 14**

1. Find the actual remainder when 256 is divided by 12. \_\_\_\_\_
2. If  $y$  is a square number, double your answer. If not halve it. \_\_\_\_\_
3.  $y + 2 \times 10$  \_\_\_\_\_
4.  $y \div \frac{1}{4}$  \_\_\_\_\_
5. Increase  $y$  by 20% \_\_\_\_\_
6.  $y + [(5 \times 100) + (2 \times 1) + (6 \times \frac{1}{10})]$  \_\_\_\_\_
7.  $y - 12^{\text{th}}$  prime number \_\_\_\_\_
8.  $y \times$  a score \_\_\_\_\_
9.  $y + \frac{1}{2}y + \frac{1}{4}y$  \_\_\_\_\_
10.  $y +$  the inverse of  $\frac{1}{12}$  \_\_\_\_\_

**MENTAL CHALLENGE 16**

1. How many legs on 12 dogs, 11 cats and 5 birds. \_\_\_\_\_
2.  $y \div 0,5$  \_\_\_\_\_
3.  $y \times 2\frac{1}{4}$  \_\_\_\_\_
4. Increase  $y$  by  $33\frac{1}{3}\%$  \_\_\_\_\_
5.  $y \times$  (no. of sides on a kite + a hexagon) \_\_\_\_\_
6.  $y \div$  by no. of min in  $\frac{1}{5}$  hour \_\_\_\_\_
7.  $y -$  no. of yrs in century + decade \_\_\_\_\_
8. Find the square root of  $y$  \_\_\_\_\_
9. Find the L.C.M of  $y$  and 15 \_\_\_\_\_
10.  $y +$  half a dozen \_\_\_\_\_

**MENTAL CHALLENGE 17**

1. Find the total no. of singers in 3 trios, 1 quartet, 5 solos and 2 quintets. \_\_\_\_\_
2. Find the H.C.F of  $y$  and 14 \_\_\_\_\_
3.  $y$  days =  $\square$  fortnights \_\_\_\_\_
4.  $y \div \frac{1}{8}$  \_\_\_\_\_
5.  $y^2$  \_\_\_\_\_
6. Increase  $y$  by 10% \_\_\_\_\_
7.  $y \times 0,5$  \_\_\_\_\_
8. How many tenths in  $y$ ? \_\_\_\_\_
9.  $y$  + one gross \_\_\_\_\_
10.  $y$  - 1<sup>st</sup> prime number \_\_\_\_\_

**MENTAL CHALLENGE 19**

1.  $9\frac{1}{6} - \frac{5}{6} \div 5 + 10$  \_\_\_\_\_
2.  $y \times 2^{\text{nd}}$  prime number \_\_\_\_\_
3.  $y + 2$  baker's dozen \_\_\_\_\_
4.  $y$  + no. of months with 31 days \_\_\_\_\_
5.  $y + \frac{1}{2}y$  \_\_\_\_\_
6.  $y$  + no. of degrees in 3  $\Delta$ 's \_\_\_\_\_
7.  $y + XXV$  \_\_\_\_\_
8.  $y$  + no. of degrees in a straight  $\angle$  \_\_\_\_\_
9.  $y$  + no. of min in  $1\frac{1}{2}$  hours \_\_\_\_\_
10.  $y + 3^2$  \_\_\_\_\_

**MENTAL CHALLENGE 18**

1. If a kite has parallel sides start with  $12^2$ . If not start with  $11^2$ . \_\_\_\_\_
2.  $y$  + number of min in  $2\frac{1}{2}$  hours. \_\_\_\_\_
3.  $y$  - 2<sup>nd</sup> counting number \_\_\_\_\_
4. Find a third of  $y$  \_\_\_\_\_
5. Find 20% of  $y$  \_\_\_\_\_
6.  $y \div \frac{1}{4}$  \_\_\_\_\_
7.  $y + \frac{1}{2}y$  \_\_\_\_\_
8.  $y \times 0,5$  \_\_\_\_\_
9.  $y + XC$  \_\_\_\_\_
10.  $y$  - the square root of 9 \_\_\_\_\_

**MENTAL CHALLENGE 20**

1. Find the volume of a crate with a length of 3m, breadth of 4m and height of 5m. \_\_\_\_\_
2.  $y$  + no. of sides on 6 cubes. \_\_\_\_\_
3.  $y + \square = 5$  score \_\_\_\_\_
4.  $\sqrt{y}$  \_\_\_\_\_
5.  $y + 10^2$  \_\_\_\_\_
6. 1 gross -  $y$  \_\_\_\_\_
7.  $y \times 2\frac{1}{2}$  \_\_\_\_\_
8.  $y + \frac{1}{3}y$  \_\_\_\_\_
9.  $y \times L$  \_\_\_\_\_
10.  $y + [22 \div \text{pi}(\text{as a common fraction})]$  \_\_\_\_\_

**MENTAL CHALLENGE 21**

1.  $[2 \times 10^2] + [1 \times 10^1] + [6 \times 10^0] \div$   
a dozen. \_\_\_\_\_
2.  $y \times (y - 6)$  \_\_\_\_\_
3.  $y +$  number of degrees in a  $\Delta$  \_\_\_\_\_
4.  $y +$  CIV \_\_\_\_\_
5. Increase  $y$  by a millennium \_\_\_\_\_
6.  $y + \sqrt{25}$  \_\_\_\_\_
7.  $y + \square =$  MM \_\_\_\_\_
8.  $y \times$  number of faces on a cube \_\_\_\_\_
9.  $2 \times y$  \_\_\_\_\_
10. Increase  $y$  by  $5\frac{1}{2}$  decades \_\_\_\_\_

**MENTAL CHALLENGE 23**

1. Find the product if the multiplier is 12  
and the multiplicand is 25. \_\_\_\_\_
2. How many decades in  $y$  years? \_\_\_\_\_
3.  $y +$  a millennium + 3 centuries. \_\_\_\_\_
4.  $y +$  number of degrees in 3  $\Delta$ 's \_\_\_\_\_
5. If  $y =$  diameter of a circle, radius = \_\_\_\_\_
6.  $y - 6 \times 12 + 17$  \_\_\_\_\_
7.  $y \times \frac{3}{4}$  \_\_\_\_\_
8. Increase  $y$  by 50% \_\_\_\_\_
9.  $y \div 9,9$  \_\_\_\_\_
10. Write in Roman numerals:  $y/4/1/100$  \_\_\_\_\_

**MENTAL CHALLENGE 22**

1. S P O T is to T O P S as 1234 is to \_\_\_\_\_
2. Decrease  $y$  by a great gross \_\_\_\_\_
3.  $y -$  XCIII \_\_\_\_\_
4. If  $y$  is ml express as litres (mixed no.) \_\_\_\_\_
5. If  $y$  is hours, how many minutes? \_\_\_\_\_
6. Increase  $y$  by 30% \_\_\_\_\_
7.  $y + \square = 10^2 \times 2$  \_\_\_\_\_
8.  $y^2 + \frac{3}{4}$  of  $[3 \times 10^3]$  \_\_\_\_\_
9. Increase  $y$  by  $1\frac{1}{2}$  dozen \_\_\_\_\_
10.  $y -$  20<sup>th</sup> prime number \_\_\_\_\_

**MENTAL CHALLENGE 24**

1. Find the quotient if the dividend is  
2 000 and the divisor is 50 \_\_\_\_\_
2.  $y + \square = 9^2$  \_\_\_\_\_
3. Increase  $y$  by MIX \_\_\_\_\_
4. How many  $\frac{1}{2}$  centuries in  $y$ ? \_\_\_\_\_
5.  $y \div 0,25$  \_\_\_\_\_
6.  $y \times 2\frac{1}{2} + 10$  \_\_\_\_\_
7.  $y -$  no. of minutes in 3 hours \_\_\_\_\_
8. Find 90% Of  $y$  \_\_\_\_\_
9. If  $y =$  area of a square, side = \_\_\_\_\_
10.  $y + 7 \times 12 + 3^2$  \_\_\_\_\_

**MENTAL CHALLENGE 25**

1. Find the distance covered by 5 standard marathons. \_\_\_\_\_
2. No. of degrees in 2 revolutions +  $y$  \_\_\_\_\_
3. Decrease  $y$  by  $4^3$  \_\_\_\_\_
4.  $y = \square$  dozen (write as mixed no.) \_\_\_\_\_
5.  $y \times 1^{\text{st}}$  composite number \_\_\_\_\_
6.  $y$  hours =  $\square$  days (as mixed no.) \_\_\_\_\_
7.  $y + \frac{5}{6} + 4\frac{1}{8}$  \_\_\_\_\_
8.  $y \div 0,2$  \_\_\_\_\_
9. Increase  $y$  by  $\frac{2}{3}$  of 180 \_\_\_\_\_
10. Decrease  $y$  by the  $2^{\text{nd}}$  prime number \_\_\_\_\_

**MENTAL CHALLENGE 27**

1. Multiply the  $6^{\text{th}}$  prime no. by the  $3^{\text{rd}}$  composite number. \_\_\_\_\_
2. Using digits in  $y$  create the highest no. \_\_\_\_\_
3.  $y \times 3^{\text{rd}}$  prime number \_\_\_\_\_
4. How many decades in  $y$ ? \_\_\_\_\_
5. Divide  $y$  by the  $\sqrt{25}$  \_\_\_\_\_
6. If  $y$  is a prime no.  $\times 2$ . If not  $\div$  by 2. \_\_\_\_\_
7.  $y + \frac{1}{2}y + 2y$  \_\_\_\_\_
8.  $y + \square = 10^3$  \_\_\_\_\_
9.  $y - \sqrt{64}$  \_\_\_\_\_
10.  $y + 10^3 + (6 \times 10) + (6 \times 1)$  \_\_\_\_\_

**MENTAL CHALLENGE 26**

1. Find the value of the word CIVIL in Roman numerals C + I + V + I + L \_\_\_\_\_
2. Increase  $y$  by  $5 \times 10^2 + 3 \times 10^0$  \_\_\_\_\_
3. Find  $12\frac{1}{2}\%$  of  $y$  \_\_\_\_\_
4.  $y \times 0,5 + 0,75$  \_\_\_\_\_
5. Find the H.C.F. of  $y$  and 48 \_\_\_\_\_
6. Find the L.C.M. of  $y$  and 5 \_\_\_\_\_
7. Multiply  $y$  by  $2\frac{1}{2}$  \_\_\_\_\_
8.  $y +$  no. of days in a leap year \_\_\_\_\_
9.  $y + \frac{1}{3}y$  \_\_\_\_\_
10.  $y + \text{IIC}$  \_\_\_\_\_

**MENTAL CHALLENGE 28**

1.  $1,2 + 3,2 \times 4 + 16$  \_\_\_\_\_
2.  $y +$  no. of degrees in 2 kites \_\_\_\_\_
3.  $y -$  value of the 5 in  $y$  \_\_\_\_\_
4. Find  $\frac{1}{7}$  of  $y$  \_\_\_\_\_
5. If  $y = \frac{1}{5}$ , find  $\frac{5}{5}$  \_\_\_\_\_
6. Find 75% of  $y$  \_\_\_\_\_
7.  $y \div (5 \times 2) + 25,5$  \_\_\_\_\_
8.  $y + 9$  dozen \_\_\_\_\_
9.  $y +$  no. of ml in  $1\frac{1}{4}$  litres \_\_\_\_\_
10. Increase  $y$  by 1 score \_\_\_\_\_

**MENTAL CHALLENGE 29**

1. 8 is to 64 as 9 is to ... \_\_\_\_\_
2.  $y \times 2^3$  \_\_\_\_\_
3. Increase  $y$  by the value of the 6 \_\_\_\_\_
4. A great gross -  $y$  \_\_\_\_\_
5.  $y = \square$  score \_\_\_\_\_
6.  $y$  hours =  $\square$  minutes \_\_\_\_\_
7.  $y \div 3^{\text{rd}}$  prime number \_\_\_\_\_
8.  $y \times$  number in a brace \_\_\_\_\_
9.  $y + 3$  baker's dozen \_\_\_\_\_
10. Increase  $y$  by the 6<sup>th</sup> multiple of 17 \_\_\_\_\_

**MENTAL CHALLENGE 31**

1. If  $w = 2$ ,  $t = 3$  and  $z = 4$ , find  $w + t \times z$  \_\_\_\_\_
2. Find the 3<sup>rd</sup> multiple of  $y$  \_\_\_\_\_
3.  $y +$  no. of degrees in  $\frac{1}{2}$  a right  $\angle$  \_\_\_\_\_
4.  $y \div 2^{\text{nd}}$  prime number \_\_\_\_\_
5. Find the complementary angle of  $y$  \_\_\_\_\_
6. If  $y =$  radius of a circle, find diameter \_\_\_\_\_
7. If  $y =$  sum of 2  $\angle$ 's in a  $\Delta$ , find 3<sup>rd</sup>  $\angle$  \_\_\_\_\_
8. If  $y =$  hours, how many minutes? \_\_\_\_\_
9. Increase  $y$  by the value of the 4 \_\_\_\_\_
10.  $y + 4^{\text{th}}$  counting number \_\_\_\_\_

**MENTAL CHALLENGE 30**

1. If one of the equal  $\angle$ 's in an isosceles  $\Delta$  is  $42^\circ$ , find the size of the 3<sup>rd</sup> angle. \_\_\_\_\_
2.  $y + 4$  dozen \_\_\_\_\_
3.  $y \times$  no. of lines of symmetry in a rectangle. \_\_\_\_\_
4.  $y \times 3^2$  \_\_\_\_\_
5.  $y + 25\%$  of  $y$  \_\_\_\_\_
6.  $y \div$  number of faces on a cube. \_\_\_\_\_
7. Five dozen +  $y$  \_\_\_\_\_
8.  $y + \frac{1}{2}y$  \_\_\_\_\_
9.  $(\frac{1}{3}y)^2$  \_\_\_\_\_
10.  $y + 4^{\text{th}}$  composite number \_\_\_\_\_

**MENTAL CHALLENGE 32**

1. How many hours from 2am to 4pm? \_\_\_\_\_
2. How many minutes in  $y$  hours? \_\_\_\_\_
3.  $y \div 1\frac{1}{2}$  \_\_\_\_\_
4. Decrease  $y$  by 10% \_\_\_\_\_
5.  $y \div 3^2$  \_\_\_\_\_
6.  $y \times 0,02 \times 100$  \_\_\_\_\_
7.  $y \times$  no. of sides on a hexagon \_\_\_\_\_
8.  $y \times \pi$  (pi) \_\_\_\_\_
9. Increase  $y$  by  $10^3$  \_\_\_\_\_
10.  $y - 2$  millennia + 1 year \_\_\_\_\_

**MENTAL CHALLENGE 33**

1. One side of an equilateral  $\Delta$  is 15cm, find the perimeter. \_\_\_\_\_
2. If the height of this  $\Delta$  is 10cm, find the area. \_\_\_\_\_
3. If  $y = 75\%$  of a no., find 100% \_\_\_\_\_
4.  $y \div 0,2$  \_\_\_\_\_
5.  $y + 2\frac{1}{2}$  of 60 \_\_\_\_\_
6.  $y +$  no. of degrees in a revolution \_\_\_\_\_
7.  $y \times 2^1$  \_\_\_\_\_
8. Decrease  $y$  by 3 score \_\_\_\_\_
9.  $y + XXIX$  \_\_\_\_\_
10.  $y + 2^{\text{nd}}$  natural number \_\_\_\_\_

**MENTAL CHALLENGE 35**

1. If 1 364 is divisible by 11, start with a gross. If not, start with a great gross. \_\_\_\_\_
2. Express 24 as a fraction of  $y$ . (Simplify) \_\_\_\_\_
3.  $y + 2\frac{2}{3} \times \frac{5}{16} +$  a score \_\_\_\_\_
4.  $y \times$  no. of Snow White's dwarfs \_\_\_\_\_
5.  $y \div (1^2 + 2^1)$  \_\_\_\_\_
6. If this is a man's age in 2012, in what year was he born? \_\_\_\_\_
7.  $y \div$  by 100 + 25,37 \_\_\_\_\_
8. Decrease  $y$  by 40% \_\_\_\_\_
9.  $(y - 6) \times \pi$  (as a common fraction) \_\_\_\_\_
10.  $y + DC$  \_\_\_\_\_

**MENTAL CHALLENGE 34**

1. Multiply the no. of faces on a dodecahedron by the no. of its edges. \_\_\_\_\_
2. If  $y =$  minutes, how many hours? \_\_\_\_\_
3. Find  $y^3$  \_\_\_\_\_
4.  $y + \frac{1}{9}y$  \_\_\_\_\_
5. Increase  $y$  by 40% \_\_\_\_\_
6.  $y \div V + 3,8$  \_\_\_\_\_
7. Find the supplementary  $\angle$  of  $y$  \_\_\_\_\_
8.  $y + y + y$  \_\_\_\_\_
9.  $y \times 10^2$  \_\_\_\_\_
10. Increase  $y$  by  $460 \times 0,05$  \_\_\_\_\_

**MENTAL CHALLENGE 36**

1. If  $w = 2; s = 5$  and  $t = 6$ , find  $w^2 + s \times t$  \_\_\_\_\_
2.  $y \div 0,4$  \_\_\_\_\_
3.  $y + 7\frac{1}{2} - \frac{1}{3} \times 1\frac{1}{2}$  \_\_\_\_\_
4.  $y + \square =$  degrees in a square \_\_\_\_\_
5.  $y \times$  no. of sides on a rhombus \_\_\_\_\_
6. Find  $\frac{5}{8}$  of  $y$  \_\_\_\_\_
7.  $y +$  half of  $y$  \_\_\_\_\_
8.  $y +$  a millennium + half a decade \_\_\_\_\_
9. Increase  $y$  by 20% \_\_\_\_\_
10.  $y + 2$  and a half dozen \_\_\_\_\_

**MENTAL CHALLENGE 37**

1. Take the number of the month with the least letters and multiply by the number of Santa's month. \_\_\_\_\_
2. Find the sum of the factors of  $\frac{1}{2}y$  \_\_\_\_\_
3. Express  $\frac{18}{y}$  as a percentage \_\_\_\_\_
4. Find  $y\%$  of 5 000 \_\_\_\_\_
5.  $y \times 1,2$  \_\_\_\_\_
6.  $y \div \frac{4}{5}$  \_\_\_\_\_
7.  $y \div \text{CXXV}$  \_\_\_\_\_
8. Find the 5<sup>th</sup> multiple of  $y$  \_\_\_\_\_
9.  $y \times$  no. of sides on a nonagon \_\_\_\_\_
10.  $y + 6 \times 7$  \_\_\_\_\_

**MENTAL CHALLENGE 39**

1. C A R S is to S C A R as a great gross is to ... \_\_\_\_\_
2.  $y +$  no. of colours on R.S.A.'s flag. \_\_\_\_\_
3. Find  $\frac{1}{3}$  of  $y$  \_\_\_\_\_
4.  $y - 5$  score \_\_\_\_\_
5. Decrease  $y$  by MDXV \_\_\_\_\_
6.  $y \div$  (a dozen - 1<sup>st</sup> natural no.) \_\_\_\_\_
7. If  $y$  is prime double your answer. If not halve it. \_\_\_\_\_
8.  $y +$  half  $y$  \_\_\_\_\_
9.  $y +$  no. of years in 2 millennia \_\_\_\_\_
10. Increase  $y$  by (3 dozen - 7) \_\_\_\_\_

**MENTAL CHALLENGE 38**

1. If 1 cup of tea holds 125ml, how many litres are needed for 40 cups? \_\_\_\_\_
2. How many millilitres in  $y$ ? \_\_\_\_\_
3. Decrease  $y$  by  $\frac{3}{8}$  of 1 400 \_\_\_\_\_
4.  $y \div C$  \_\_\_\_\_
5.  $y + 106\frac{1}{4}$  \_\_\_\_\_
6.  $4 \times y$  \_\_\_\_\_
7. Increase  $y$  by 50% \_\_\_\_\_
8.  $y \times 3\frac{1}{3}$  \_\_\_\_\_
9.  $y \times 2$  \_\_\_\_\_
10.  $y - 2 \times 17$  \_\_\_\_\_

**MENTAL CHALLENGE 40**

1. If a trundle wheel has a circumference of 500cm, how many revolutions will it take to cover a 1 500m track? \_\_\_\_\_
2.  $y^2$  \_\_\_\_\_
3.  $y \div$  by no. of ml in a litre \_\_\_\_\_
4.  $\sqrt{y - 3^2}$  \_\_\_\_\_
5.  $y \times$  13<sup>th</sup> prime number \_\_\_\_\_
6. Find  $\frac{2}{3}$  of  $y$  \_\_\_\_\_
7.  $y \times \text{XI}$  \_\_\_\_\_
8.  $y +$  no. of minutes in  $2\frac{1}{2}$  hours \_\_\_\_\_
9. Increase  $y$  by 2 dozen \_\_\_\_\_
10.  $y + \text{MIII}$  \_\_\_\_\_

**MENTAL CHALLENGE 41**

1. Write 0,4125 as a common fraction in its simplest form. \_\_\_\_\_
2.  $y \times \frac{8}{11}$  \_\_\_\_\_
3. Express  $y$  as a percentage \_\_\_\_\_
4. Find  $y\%$  of 420 \_\_\_\_\_
5.  $y \times 2\frac{2}{3}$  \_\_\_\_\_
6.  $y + 2$  gross \_\_\_\_\_
7.  $y + \square = 3$  revolutions \_\_\_\_\_
8.  $y +$  the value of the 5 in  $y$  \_\_\_\_\_
9.  $y \times 3$  \_\_\_\_\_
10. Increase  $y$  by  $3 \times 12 - 3$  \_\_\_\_\_

**MENTAL CHALLENGE 43**

1. Through how many degrees does the hour hand of a clock move from 6am to 9am? \_\_\_\_\_
2.  $y + \square =$  degrees in  $\frac{1}{2}$  a right  $\angle$  \_\_\_\_\_
3.  $y + \square =$  degrees in a rhombus \_\_\_\_\_
4.  $y \times$  no. in a brace \_\_\_\_\_
5. If  $y = 50\%$ , find 100% \_\_\_\_\_
6.  $y \div 0,3$  \_\_\_\_\_
7.  $y \times 2\frac{1}{2}$  \_\_\_\_\_
8.  $y +$  no. of mins in  $1\frac{1}{4}$  hours \_\_\_\_\_
9.  $y -$  CLXX \_\_\_\_\_
10. Decrease  $y$  by  $8^2 + 2^2$  \_\_\_\_\_

**MENTAL CHALLENGE 42**

1. Write down the greatest number in this sequence:  $2^4$ ;  $4^2$ ; 24; 42;  $4 \times 2$  \_\_\_\_\_
2.  $y \div \frac{1}{6}$  \_\_\_\_\_
3.  $y \times$  a score \_\_\_\_\_
4.  $y - (2 \times 10^3)$  \_\_\_\_\_
5. Decrease  $y$  by  $\sqrt{121}$  \_\_\_\_\_
6. Find 25% of  $y$  \_\_\_\_\_
7.  $y + 42,75$  \_\_\_\_\_
8.  $y \times 3^{\text{rd}}$  prime number \_\_\_\_\_
9. Increase  $y$  by  $20^2$  \_\_\_\_\_
10. Decrease  $y$  by  $132 \div \frac{1}{3}$  \_\_\_\_\_

**MENTAL CHALLENGE 44**

1. If  $2(3 + 4) = (2 \times 3) + (2 \times 4)$  find the value of  $3(4 + 5)$  \_\_\_\_\_
2.  $y + 3 \times 100$  \_\_\_\_\_
3.  $y + \square =$  minutes in  $6\frac{1}{2}$  hours \_\_\_\_\_
4. How many weeks in  $y$  days? \_\_\_\_\_
5.  $y \times$  no. of sides on a decagon \_\_\_\_\_
6.  $y +$  no. of degrees in 5 right  $\angle$ 's \_\_\_\_\_
7.  $y - 2^4$  \_\_\_\_\_
8.  $y \times$  a dozen \_\_\_\_\_
9. Decrease  $y$  by 3 score \_\_\_\_\_
10.  $y - 1^{\text{st}}$  prime number \_\_\_\_\_

**MENTAL CHALLENGE 45**

1. Find the sum of the first five multiples of 5. \_\_\_\_\_

2. If  $y = \frac{3}{4}$  of a number, find  $\frac{4}{4}$  \_\_\_\_\_3.  $y \times 4$  decades \_\_\_\_\_4. Find  $12\frac{1}{2}\%$  of  $y$  \_\_\_\_\_5.  $y$  mins =  $\square$  hours (as mixed no.) \_\_\_\_\_6.  $y + 2\frac{1}{3} \times \pi + \frac{1}{3}$  \_\_\_\_\_7. If  $y =$  radius, find the diameter \_\_\_\_\_8.  $y \times 2^3$  \_\_\_\_\_9.  $y +$  a gross  $+ 3$  score \_\_\_\_\_10. Decrease  $y$  by  $\frac{1}{3}$  of a dozen \_\_\_\_\_**MENTAL CHALLENGE 47**

1. Find the average of: 11; 13; 16; 17; 18. \_\_\_\_\_

2.  $y +$  the mode of: 6,6,7,8,9,9,9. \_\_\_\_\_3. If  $y =$  hours, how many minutes? \_\_\_\_\_4.  $y \div$  a gross \_\_\_\_\_5.  $y + 7,5 \times 1,5 + 3,75$  \_\_\_\_\_6.  $y \times \frac{5}{6}$  of 24 \_\_\_\_\_7.  $y \times (M \div L)$  \_\_\_\_\_8. Increase  $y$  by 25% \_\_\_\_\_9. Find the sum of  $y$  and  $5^2$  \_\_\_\_\_10. Decrease  $y$  by 1<sup>st</sup> composite no. \_\_\_\_\_**MENTAL CHALLENGE 46**1. "All odd numbers are prime." If this is true start with  $3^4$ . If not start with 4 dozen. \_\_\_\_\_2. If  $y =$  hours, how many days? \_\_\_\_\_3. Find  $y$  to the power of 6 \_\_\_\_\_4. If  $y =$  area of a square, find the length of one side. \_\_\_\_\_5.  $y \times$  no. of sides on a heptagon \_\_\_\_\_6.  $y \times 7\frac{1}{2}$  \_\_\_\_\_7.  $y \times$  no. of faces on a cube \_\_\_\_\_8. Increase  $y$  by CCCL \_\_\_\_\_9.  $y + 10\%$  of  $y$  \_\_\_\_\_10. Decrease  $y$  by  $[2^2 \times 10] + [2^2 \times 1]$  \_\_\_\_\_**MENTAL CHALLENGE 48**

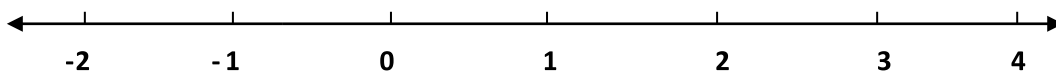
1. Add 14% VAT to an item marked at R150 \_\_\_\_\_

2. How many 50c coins in  $y$ ? \_\_\_\_\_3.  $y \times \frac{7}{9}$  \_\_\_\_\_4.  $y + \square = 30$  dozen \_\_\_\_\_5. Find the supplementary  $\angle$  of  $y$  \_\_\_\_\_6.  $y \times$  no. of right  $\angle$ 's in a square \_\_\_\_\_7.  $y + 2$  baker's dozen \_\_\_\_\_8.  $y \times 0,2$  \_\_\_\_\_9.  $y \div$  the inverse of  $\frac{1}{2}$  \_\_\_\_\_10. Decrease  $y$  by the L.C.M. of 2, 6, 9.  
Record your answer as a Roman numeral. \_\_\_\_\_

### MENTAL CHALLENGE 49

1. On the number line below show the relative positions of the following:

$2,5$ ;  $\frac{1}{4}$ ;  $175\%$ ;  $-1\frac{1}{2}$ ;  $3\frac{1}{2}$ ;  $-0,5$



2. Add all the positive values given in question 1. \_\_\_\_\_
3. Subtract all the negative numbers from your answer in question 2. \_\_\_\_\_
4. If  $y$  = the number of faces on a cube, multiply by 8. If not multiply by 10. \_\_\_\_\_
5. If  $y$  = the perimeter of a rhombus, find the length of one side. \_\_\_\_\_
6. Now find the area of the same rhombus. \_\_\_\_\_
7. Multiply your answer by the number of the month for fooling people. \_\_\_\_\_
8. If  $y$  = the no. of children in a school, in the ratio of 4 boys : 5 girls, find the no. of boys. \_\_\_\_\_
9. If  $\frac{3}{4}$  of the boys play rugby, how many rugby players are there? \_\_\_\_\_
10. Increase  $y$  by  $[1 \times 100] + [1 \times 101] + [1 \times 102]$  \_\_\_\_\_

### MENTAL CHALLENGE 50

1. Identify all the letters in the boy's name MAXIMILIAN that are found in the system of Roman numerals. Now find the sum of their individual values. For example in the word MIXED the letters  $M + I + X + D = 1\ 000 + 1 + 10 + 500$ . The total is therefore 1 511. \_\_\_\_\_
2. Increase  $y$  by the 7<sup>th</sup> multiple of 15 \_\_\_\_\_
3.  $y - 5 \times$  the distance of a standard marathon. \_\_\_\_\_
4. Decrease  $y$  by  $33\frac{1}{3}\%$  \_\_\_\_\_
5. If  $y$  is the perimeter of a rhombus, find the length of one side. \_\_\_\_\_
6.  $y - LIX$  \_\_\_\_\_
7. Express  $y$  as a product of its prime factors (there are four). Now find the sum of the factors. \_\_\_\_\_
8.  $y + 2$  score  $+ 7^{\text{th}}$  multiple of 16 \_\_\_\_\_
9.  $y + [6 \times 10^3] + [5 \times 10^2] + [4 \times 10^1] + [3 \times 10^0]$  \_\_\_\_\_
10. Increase  $y$  by  $5^2 + 5^2 + 3^1$  \_\_\_\_\_

### MENTAL CHALLENGE 51

1. Take the number of the 1<sup>st</sup> month with 30 days and multiply it by the number of the 3<sup>rd</sup> month with 30 days. \_\_\_\_\_
2.  $y + 60\%$  of 60 \_\_\_\_\_
3.  $y \div$  the number of baker's dozen in 52. \_\_\_\_\_
4. LIVE is to EVIL as 6131 is to what number? Add this to no. 3's answer. \_\_\_\_\_
5. If each rabbit can jump 5 feet high, how high can 2 rabbits jump? Divide no. 4's answer by this number. \_\_\_\_\_
6.  $y$  minus the total number of singers in a trio of tenors, a double octet, two sextets, a pair of baritones, four quintets and a solitary soprano. \_\_\_\_\_
7. If 277 is prime divide your answer by 4, if not, divide by 5. \_\_\_\_\_
8.  $y$  minus the number of misspelled words in the following group:  
TRISKAIDEKAPHOBIA; MILLENIUM; RECIPROCAL; PARRALLELOGRAM. \_\_\_\_\_
9. From your previous answer subtract the following:  
40 times 2 divided by 2 minus what number equals 11? \_\_\_\_\_
10. Multiply your answer by the only whole number that is not prime, not composite and not even. \_\_\_\_\_

### MENTAL CHALLENGE 52

1. Take the number of the month for fooling people and multiply by the number of years in 5 score. \_\_\_\_\_
2.  $y \div XL$  \_\_\_\_\_
3. NOEL is to LEON as 0121 is to what number? Add this latter number to no. 2's answer. \_\_\_\_\_
4. If a galleon is 4 quarts, multiply no. 3's answer by 5. If it is a Spanish ship, divide by 5. \_\_\_\_\_
5.  $y -$  the number of minutes in 4 hours. \_\_\_\_\_
6. Reading from left to right, how many numbers can you find (spelled out) in this sentence?  
"Weight, quinine, money and tension were discussed in the fourth talk."  
Add together the numbers you found and add that total to no.5's answer. \_\_\_\_\_
7. What number does not belong in this series? 25; 27; 29; 31; 32; 33; 35; 37.  
Subtract this number from no. 6's answer. \_\_\_\_\_
8. In the following sentence, all but how many of the letters of the alphabet were used? " Then a quick, sly fox jumped over the high wall."  
Subtract the number of letters not used from no. 7's answer. \_\_\_\_\_
9.  $y$  multiplied by the number of gills in a gallon. \_\_\_\_\_
10.  $y + 25^2 - 14^{\text{th}}$  prime number. \_\_\_\_\_



**DAWSAN'S**  
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**S. Edwards & D. Williams**

*Answers*

# ANSWERS

| <b>MENTAL CHALLENGE 1</b>   | <b>MENTAL CHALLENGE 3</b>   |
|---|---|
| <p>“y always represents your previous answer and your final answer should be palindromic.</p> <p>1. <math>2\frac{1}{4} + 3\frac{1}{6} + 4\frac{7}{12}</math>                      10</p> <p>2. <math>y \times 1^{\text{st}}</math> prime number                      20</p> <p>3. <math>y +</math> number of months with 31 days    27</p> <p>4. Find the sum of the factors of <math>y</math>              40</p> <p>5. A great gross - <math>y</math>                              1688</p> <p>6. <math>12\frac{1}{2}\%</math> of <math>y</math>                                      211</p> <p>7. <math>y \times 2,5</math>    527,5</p> <p>8. <math>y \times \frac{1}{5}</math>    105,5</p> <p>9. <math>y + 805,5</math>                                        911</p> <p>10. <math>y + \text{CCX}</math>                                        1 221</p> | <p>1. How many words are spelled incorrectly in the following sequence?<br/>Trigonometry; octagon; divisibility; multiplicand; hypotenuses                      4</p> <p>2. <math>y^3 + 2</math> score                                      104</p> <p>3. <math>\frac{7}{8}</math> of <math>y</math>    91</p> <p>4. <math>y</math> days = ..... fortnights                      <math>6\frac{1}{2}</math></p> <p>5. <math>y + 7\frac{3}{4} \times 8</math>                                        <math>68\frac{1}{2}</math></p> <p>6. <math>y \div 0,25</math>    274</p> <p>7. <math>y + \square =</math> no. of days in a leap year    92</p> <p>8. If <math>y = 10\%</math>, find 100%                          920</p> <p>9. <math>y +</math> no. of years in 2 millennia                2 920</p> <p>10. <math>y + [1 \times 10^0] + [8 \times 10^1] + [9 + 10^2] + [7 \times 10^3]</math>                      10 901</p> |
| <b>MENTAL CHALLENGE 2</b>   | <b>MENTAL CHALLENGE 4</b>   |
| <p>1. <math>12 + 4 \times 8 + 2</math>                                  46</p> <p>2. <math>y + 3^3</math>    73</p> <p>3. <math>y \times 3^{\text{rd}}</math> counting number                      146</p> <p>4. <math>y \times 2\frac{1}{2}</math>    365</p> <p>5. <math>y \div 0,25</math>    1 460</p> <p>6. Decrease <math>y</math> by no. of days in 102 wks    746</p> <p>7. <math>y - 1^{\text{st}}</math> natural number                        745</p> <p>8. <math>y \div</math> number of years in <math>\frac{1}{2}</math> a decade    149</p> <p>9. <math>y + 3</math> baker's dozen                          188</p> <p>10. <math>y \times 3 + 1</math>                                        565</p>  | <p>1. Divide the number of degrees in a square by one score.                      18</p> <p>2. <math>y +</math> no. of degrees in a <math>\Delta</math>                      198</p> <p>3. <math>y - 15</math> dozen                                      18</p> <p>4. Complementary <math>\angle</math> of <math>y</math>                        72</p> <p>5. <math>y \times 3\frac{1}{3}</math>    240</p> <p>6. <math>y \div 4 + 7 \times 12</math>                                  144</p> <p>7. If <math>y =</math> a gross <math>\div</math> by 3; if not <math>\div</math> by 4        48</p> <p>8. ON is to NO as <math>y</math> is to ...?                      84</p> <p>9. <math>y + \text{MDLV}</math>                                        1 639</p> <p>10. Increase <math>y</math> by 2<sup>nd</sup> multiple of 11        1 661</p>   |

## ANSWERS

| <b>MENTAL CHALLENGE 5</b>   | <b>MENTAL CHALLENGE 7</b>  |
|---|--|
| 1. Multiply the no. of sides on a heptagon by the no. of sides on an octagon.      56 | 1. Take the number of months with 30 days and multiply by a dozen.      48             |
| 2. $y \div \frac{1}{8} + 6$ dozen      520  | 2. Find the H.C.F. of $y$ and 32      16   |
| 3. $y$ - no. of degrees in a quadrilateral      160                                   | 3. $(40 \times 20) \div y$ 50  |
| 4. 45% of $y$ 72  | 4. $y + \square =$ no. of years in 5 centuries      450                                |
| 5. If $y =$ minutes, express as hours and minutes [mixed number] $1\frac{1}{5}$       | 5. $y + [90\% \text{ of } y]$ 855  |
| 6. $y + [3\frac{9}{10} \times \frac{2}{3}] + \frac{1}{5}$ 4                           | 6. $y +$ no. of degrees in $\frac{1}{2}$ a right $\angle$ 900                          |
| 7. $y \times$ MDLV      6 220   | 7. $y +$ no. of sides on a nonagon      909  |
| 8. $y \div 0,25$ 24 880   | 8. $\square \div y = 100$ 90 900   |
| 9. $y +$ 1 <sup>st</sup> prime number      24 882                                     | 9. Increase $y$ by the value of the 4 <sup>th</sup> composite number      90 909       |
| 10. Decrease $y$ by 2 score      24 842   | 10. Decrease $y$ by 9 centuries      90 009  |
| <b>MENTAL CHALLENGE 6</b>   | <b>MENTAL CHALLENGE 8</b>  |
| 1. 0,212 $\times$ MMMM      848   | 1. Find the perimeter of an equilateral $\Delta$ with each side equal to 12cm.      36 |
| 2. $y + \frac{1}{15}$ hour [expressed as minutes]      852                            | 2. Find the area of this $\Delta$ if the height is 7 cm.      42                       |
| 3. $y \div 3 - 255$ 29  | 3. $y + 1\frac{1}{6}$ of a dozen      56   |
| 4. $y +$ [L.C.M. of 4, 8 and 11]      117   | 4. No. of ml in $1\frac{1}{2}$ litres - $y$ 1 444                                      |
| 5. $y -$ [H.C.F. of 11, 22 and 66]      106   | 5. Great gross - $y$ 284   |
| 6. $y \div 0,2$ 530   | 6. $\frac{1}{2}y \times \frac{1}{2}$ 71  |
| 7. Decrease $y$ by 2 gross      242   | 7. $y + \square =$ no. of degrees in a $\Delta$ 109                                    |
| 8. Increase $y$ by 50%      363   | 8. $y + 7 \times 13$ 200   |
| 9. $y \div \frac{1}{3}$ 1 089   | 9. 1% of $y + y$ 202   |
| 10. $12 \times 66 + y$ 1 881  | 10. $y + 1$ score      222   |

## ANSWERS

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| <p style="text-align: center;"><b>MENTAL CHALLENGE 9</b></p> <ol style="list-style-type: none"> <li>1. Find the volume of a box measuring 2m by 3m by 4m. <span style="float: right;">24m<sup>3</sup></span></li> <li>2. How many cm<sup>3</sup> in y? <span style="float: right;">24 000 000</span></li> <li>3. <math>y \div 10^3</math> <span style="float: right;">24 000</span></li> <li>4. <math>y</math> - number of ml in 8 litres <span style="float: right;">16 000</span></li> <li>5. <math>y \times 0,5</math> <span style="float: right;">8 000</span></li> <li>6. Decrease <math>y</math> by number of years in 1 millennium + 6 centuries <span style="float: right;">6 400</span></li> <li>7. <math>\sqrt{y}</math> <span style="float: right;">80</span></li> <li>8. Find 95% of <math>y</math> <span style="float: right;">76</span></li> <li>9. Increase <math>y</math> by a great gross <span style="float: right;">1 804</span></li> <li>10. <math>y + 7^{\text{th}}</math> multiple of 11 <span style="float: right;">1 881</span></li> </ol>                 | <p style="text-align: center;"><b>MENTAL CHALLENGE 11</b></p> <ol style="list-style-type: none"> <li>1. 12h 30min - 6h 15min = <input type="text"/> min <span style="float: right;">375</span></li> <li>2. Express <math>y</math> as hours and min [mixed no.] <span style="float: right;"><math>6\frac{1}{4}</math></span></li> <li>3. <math>y + 3\frac{5}{8} + 1\frac{1}{8}</math> <span style="float: right;">11</span></li> <li>4. If <math>y</math> = hours, convert to minutes <span style="float: right;">660</span></li> <li>5. <math>y \times 3^{\text{rd}}</math> multiple of 4 <span style="float: right;">7 920</span></li> <li>6. <math>y \div</math> a decade <span style="float: right;">792</span></li> <li>7. Increase <math>y</math> by <math>2^3</math> <span style="float: right;">800</span></li> <li>8. <math>y + 4</math> score <span style="float: right;">880</span></li> <li>9. <math>y \times \text{XV}</math> <span style="float: right;">13 200</span></li> <li>10. <math>y + 32^{\text{nd}}</math> prime number <span style="float: right;">13 331</span></li> </ol> |
| <p style="text-align: center;"><b>MENTAL CHALLENGE 10</b></p> <ol style="list-style-type: none"> <li>1. Find the next number in this sequence: 16; 25; 36; 49; 64; ... <span style="float: right;">81</span></li> <li>2. If <math>y = 30\%</math> of a number, find 100% <span style="float: right;">270</span></li> <li>3. If <math>y =</math> diameter of a circle, find the radius <span style="float: right;">135</span></li> <li>4. <math>y \div 1,5</math> <span style="float: right;">90</span></li> <li>5. Find <math>\frac{4}{5}</math> of <math>y</math> <span style="float: right;">72</span></li> <li>6. <math>y + 9 \times 2 + 10</math> <span style="float: right;">100</span></li> <li>7. <math>\sqrt{y}</math> <span style="float: right;">10</span></li> <li>8. <math>y + \square =</math> no. of grams in a kg <span style="float: right;">990</span></li> <li>9. <math>y +</math> no. of sides on a nonagon <span style="float: right;">999</span></li> <li>10. <math>y + 1^{\text{st}}</math> prime number <span style="float: right;">1 001</span></li> </ol> | <p style="text-align: center;"><b>MENTAL CHALLENGE 12</b></p> <ol style="list-style-type: none"> <li>1. Find the area of a rectangle with a length of 12cm and a breadth of 5cm <span style="float: right;">60</span></li> <li>2. Find the perimeter of this rectangle <span style="float: right;">34</span></li> <li>3. <math>y \times 2^{\text{nd}}</math> composite number <span style="float: right;">204</span></li> <li>4. Find <math>\frac{1}{3}</math> of <math>y</math> <span style="float: right;">68</span></li> <li>5. <math>y +</math> no. of ml in 0,25 litres <span style="float: right;">318</span></li> <li>6. <math>y + 2^4</math> <span style="float: right;">334</span></li> <li>7. <math>y + \square =</math> no. of degrees in a revolution <span style="float: right;">26</span></li> <li>8. <math>y \times 6^{\text{th}}</math> counting number <span style="float: right;">130</span></li> <li>9. <math>y \div 0,5</math> <span style="float: right;">260</span></li> <li>10. <math>y \times 2 + V</math> <span style="float: right;">525</span></li> </ol>               |

## ANSWERS

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| <p style="text-align: center;"><b>MENTAL CHALLENGE 13</b></p> <p>1. <math>2\frac{1}{3}</math> of a dozen multiplied by the value of pi (as a common fraction). 88</p> <p>2. <math>y + \square = 10^2</math> 12</p> <p>3. <math>y^2 - y</math> 132</p> <p>4. <math>y =</math> perimeter of a square. <math>\therefore</math> side = 33</p> <p>5. <math>y + \square = 3</math> dozen 3</p> <p>6. <math>y^3</math> 27</p> <p>7. Decrease <math>y</math> by a tenth of its value. 24,3</p> <p>8. <math>y \times 10^3</math> 24 300</p> <p>9. <math>y \times 1^{\text{st}}</math> natural number 24 300</p> <p>10. <math>y + 6^{\text{th}}</math> multiple of seven. 24 342</p>                                | <p style="text-align: center;"><b>MENTAL CHALLENGE 15</b></p> <p>1. If <math>5^3</math> is a square number divide it by 2. If not multiply it by 2. 250</p> <p>2. <math>y + \text{CCL}</math> 500</p> <p>3. <math>y +</math> number of years in 2 millennia 2 500</p> <p>4. Find 75% of <math>y</math> 1 875</p> <p>5. <math>y -</math> number of degrees in a <math>\Delta</math> 1 695</p> <p>6. <math>y -</math> number of degrees in a right <math>\angle</math> 1 605</p> <p>7. Find <math>\frac{1}{3}</math> of <math>y</math> 535</p> <p>8. <math>y \div \square = 107</math> 5</p> <p>9. Increase <math>y</math> by <math>2\frac{1}{4}</math> score 50</p> <p>10. <math>y + \frac{1}{10}y</math> 55</p> |
| <p style="text-align: center;"><b>MENTAL CHALLENGE 14</b></p> <p>1. Find the actual remainder when 256 is divided by 12. 4</p> <p>2. If <math>y</math> is a square number, double your answer. If not halve it. 8</p> <p>3. <math>y + 2 \times 10</math> 28</p> <p>4. <math>y \div \frac{1}{4}</math> 112</p> <p>5. Increase <math>y</math> by 20% 134,4</p> <p>6. <math>y + [(5 \times 100) + (2 \times 1) + (6 \times \frac{1}{10})]</math> 637</p> <p>7. <math>y - 12^{\text{th}}</math> prime number 600</p> <p>8. <math>y \times</math> a score 12 000</p> <p>9. <math>y + \frac{1}{2}y + \frac{1}{4}y</math> 11 000</p> <p>10. <math>y +</math> the inverse of <math>\frac{1}{12}</math> 21 012</p> | <p style="text-align: center;"><b>MENTAL CHALLENGE 16</b></p> <p>1. How many legs on 12 dogs, 11 cats and 5 birds. 102</p> <p>2. <math>y \div 0,5</math> 204</p> <p>3. <math>y \times 2\frac{1}{4}</math> 459</p> <p>4. Increase <math>y</math> by <math>33\frac{1}{3}\%</math> 612</p> <p>5. <math>y \times</math> (no. of sides on a kite + a hexagon) 6 120</p> <p>6. <math>y \div</math> by no. of min in <math>\frac{1}{5}</math> hour 510</p> <p>7. <math>y -</math> no. of yrs in century + decade 400</p> <p>8. Find the square root of <math>y</math> 20</p> <p>9. Find the L.C.M of <math>y</math> and 15 60</p> <p>10. <math>y +</math> half a dozen 66</p>  |



## ANSWERS

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| <p style="text-align: center;"><b>MENTAL CHALLENGE 21</b></p> <p>1. <math>[2 \times 10^2] + [1 \times 10^1] + [6 \times 10^0] \div</math><br/>a dozen. <span style="float: right;">18</span></p> <p>2. <math>y \times (y - 6)</math> <span style="float: right;">216</span></p> <p>3. <math>y +</math> number of degrees in a <math>\Delta</math> <span style="float: right;">396</span></p> <p>4. <math>y +</math> CIV <span style="float: right;">500</span></p> <p>5. Increase <math>y</math> by a millennium <span style="float: right;">1 500</span></p> <p>6. <math>y + \sqrt{25}</math> <span style="float: right;">1 505</span></p> <p>7. <math>y + \square =</math> MM <span style="float: right;">495</span></p> <p>8. <math>y \times</math> number of faces on a cube <span style="float: right;">2 970</span></p> <p>9. <math>2 \times y</math> <span style="float: right;">5 940</span></p> <p>10. Increase <math>y</math> by <math>5\frac{1}{2}</math> decades <span style="float: right;">5 995</span></p>     | <p style="text-align: center;"><b>MENTAL CHALLENGE 23</b></p> <p>1. Find the product if the multiplier is 12<br/>And the multiplicand is 25. <span style="float: right;">300</span></p> <p>2. How many decades in <math>y</math> years? <span style="float: right;">30</span></p> <p>3. <math>y +</math> a millennium + 3 centuries. <span style="float: right;">1 330</span></p> <p>4. <math>y +</math> number of degrees in 3 <math>\Delta</math>'s <span style="float: right;">1 870</span></p> <p>5. If <math>y =</math> diameter of a circle, radius = <span style="float: right;">935</span></p> <p>6. <math>y - 6 \times 12 + 17</math> <span style="float: right;">880</span></p> <p>7. <math>y \times \frac{3}{4}</math> <span style="float: right;">660</span></p> <p>8. Increase <math>y</math> by 50% <span style="float: right;">990</span></p> <p>9. <math>y \div 9,9</math> <span style="float: right;">100</span></p> <p>10. Write in Roman numerals: <math>y/4/1/100</math><br/>CIVIC</p> |
| <p style="text-align: center;"><b>MENTAL CHALLENGE 22</b></p> <p>1. S P O T is to T O P S as 1234 is to <span style="float: right;">4 321</span></p> <p>2. Decrease <math>y</math> by a great gross <span style="float: right;">2 593</span></p> <p>3. <math>y -</math> XCIII <span style="float: right;">2 500</span></p> <p>4. If <math>y</math> is ml express as litres (mixed no.) <math>2\frac{1}{2}</math></p> <p>5. If <math>y</math> is hours, how many minutes? <span style="float: right;">150</span></p> <p>6. Increase <math>y</math> by 30% <span style="float: right;">195</span></p> <p>7. <math>y + \square = 10^2 \times 2</math> <span style="float: right;">5</span></p> <p>8. <math>y^2 + \frac{3}{4}</math> of <math>[3 \times 10^3]</math> <span style="float: right;">2 275</span></p> <p>9. Increase <math>y</math> by <math>1\frac{1}{2}</math> dozen <span style="float: right;">2 293</span></p> <p>10. <math>y -</math> 20<sup>th</sup> prime number <span style="float: right;">2 222</span></p> | <p style="text-align: center;"><b>MENTAL CHALLENGE 24</b></p> <p>1. Find the quotient if the dividend is<br/>2 000 and the divisor is 50 <span style="float: right;">40</span></p> <p>2. <math>y + \square = 9^2</math> <span style="float: right;">41</span></p> <p>3. Increase <math>y</math> by MIX <span style="float: right;">1 050</span></p> <p>4. How many <math>\frac{1}{2}</math> centuries in <math>y</math>? <span style="float: right;">21</span></p> <p>5. <math>y \div 0,25</math> <span style="float: right;">84</span></p> <p>6. <math>y \times 2\frac{1}{2} + 10</math> <span style="float: right;">220</span></p> <p>7. <math>y -</math> no. of minutes in 3 hours <span style="float: right;">40</span></p> <p>8. Find 90% Of <math>y</math> <span style="float: right;">36</span></p> <p>9. If <math>y =</math> area of a square, side = <span style="float: right;">6</span></p> <p>10. <math>y + 7 \times 12 + 3^2</math> <span style="float: right;">99</span></p>                 |

## ANSWERS

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| <p style="text-align: center;"><b>MENTAL CHALLENGE 25</b></p> <ol style="list-style-type: none"> <li>1. Find the distance covered by 5 standard marathons. <span style="float: right;">211</span></li> <li>2. No. of degrees in 2 revolutions + <math>y</math> <span style="float: right;">931</span></li> <li>3. Decrease <math>y</math> by <math>4^3</math> <span style="float: right;">867</span></li> <li>4. <math>y = \square</math> dozen (write as mixed no.) <span style="float: right;"><math>72\frac{1}{4}</math></span></li> <li>5. <math>y \times 1^{\text{st}}</math> composite number <span style="float: right;">289</span></li> <li>6. <math>y</math> hours = <math>\square</math> days (as mixed no.) <span style="float: right;"><math>12\frac{1}{24}</math></span></li> <li>7. <math>y + \frac{5}{6} + 4\frac{1}{8}</math> <span style="float: right;">17</span></li> <li>8. <math>y \div 0,2</math> <span style="float: right;">85</span></li> <li>9. Increase <math>y</math> by <math>\frac{2}{3}</math> of 180 <span style="float: right;">205</span></li> <li>10. Decrease <math>y</math> by the <math>2^{\text{nd}}</math> prime number <span style="float: right;">202</span></li> </ol> | <p style="text-align: center;"><b>MENTAL CHALLENGE 27</b></p> <ol style="list-style-type: none"> <li>1. Multiply the <math>6^{\text{th}}</math> prime no. by the <math>3^{\text{rd}}</math> composite number. <span style="float: right;">104</span></li> <li>2. Using digits in <math>y</math> create the highest no. <span style="float: right;">410</span></li> <li>3. <math>y \times 3^{\text{rd}}</math> prime number <span style="float: right;">2 050</span></li> <li>4. How many decades in <math>y</math>? <span style="float: right;">205</span></li> <li>5. Divide <math>y</math> by the <math>\sqrt{25}</math> <span style="float: right;">41</span></li> <li>6. If <math>y</math> is a prime no. <math>\times 2</math>. If not <math>\div</math> by 2. <span style="float: right;">82</span></li> <li>7. <math>y + \frac{1}{2}y + 2y</math> <span style="float: right;">287</span></li> <li>8. <math>y + \square = 10^3</math> <span style="float: right;">713</span></li> <li>9. <math>y - \sqrt{64}</math> <span style="float: right;">705</span></li> <li>10. <math>y + 10^3 + (6 \times 10) + (6 \times 1)</math> <span style="float: right;">1 771</span></li> </ol> |
| <p style="text-align: center;"><b>MENTAL CHALLENGE 26</b></p> <ol style="list-style-type: none"> <li>1. Find the value of the word CIVIL in Roman numerals C + I + V + I + L <span style="float: right;">157</span></li> <li>2. Increase <math>y</math> by <math>5 \times 10^2 + 3 \times 10^0</math> <span style="float: right;">660</span></li> <li>3. Find <math>12\frac{1}{2}\%</math> of <math>y</math> <span style="float: right;"><math>82\frac{1}{2}</math></span></li> <li>4. <math>y \times 0,5 + 0,75</math> <span style="float: right;">42</span></li> <li>5. Find the H.C.F. of <math>y</math> and 48 <span style="float: right;">6</span></li> <li>6. Find the L.C.M. of <math>y</math> and 5 <span style="float: right;">30</span></li> <li>7. Multiply <math>y</math> by <math>2\frac{1}{2}</math> <span style="float: right;">75</span></li> <li>8. <math>y +</math> no. of days in a leap year <span style="float: right;">441</span></li> <li>9. <math>y + \frac{1}{3}y</math> <span style="float: right;">588</span></li> <li>10. <math>y +</math> IIC <span style="float: right;">686</span></li> </ol>  | <p style="text-align: center;"><b>MENTAL CHALLENGE 28</b></p> <ol style="list-style-type: none"> <li>1. <math>1,2 + 3,2 \times 4 + 16</math> <span style="float: right;">30</span></li> <li>2. <math>y +</math> no. of degrees in 2 kites <span style="float: right;">750</span></li> <li>3. <math>y -</math> value of the 5 in <math>y</math> <span style="float: right;">700</span></li> <li>4. Find <math>\frac{1}{7}</math> of <math>y</math> <span style="float: right;">100</span></li> <li>5. If <math>y = \frac{1}{5}</math>, find <math>\frac{5}{5}</math> <span style="float: right;">500</span></li> <li>6. Find 75% of <math>y</math> <span style="float: right;">375</span></li> <li>7. <math>y \div (5 \times 2) + 25,5</math> <span style="float: right;">63</span></li> <li>8. <math>y + 9</math> dozen <span style="float: right;">171</span></li> <li>9. <math>y +</math> no. of ml in <math>1\frac{1}{4}</math> litres <span style="float: right;">1 421</span></li> <li>10. Increase <math>y</math> by 1 score <span style="float: right;">1 441</span></li> </ol>   |

## ANSWERS

| <b>MENTAL CHALLENGE 29</b>  | <b>MENTAL CHALLENGE 31</b>   |
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| 1. 8 is to 64 as 9 is to ... <span style="float: right;">81</span>  | 1. If $w = 2$ , $t = 3$ and $z = 4$ , find $w + t \times z$ <span style="float: right;">14</span>                    |
| 2. $y \times 2^3$ <span style="float: right;">648</span>  | 2. Find the 3 <sup>rd</sup> multiple of $y$ <span style="float: right;">42</span>                                    |
| 3. Increase $y$ by the value of the 6 <span style="float: right;">1 248</span>  | 3. $y +$ no. of degrees in $\frac{1}{2}$ a right $\angle$ <span style="float: right;">87</span>                      |
| 4. A great gross - $y$ <span style="float: right;">480</span>   | 4. $y \div 2^{\text{nd}}$ prime number <span style="float: right;">29</span>   |
| 5. $y = \square$ score <span style="float: right;">24</span>  | 5. Find the complementary angle of $y$ <span style="float: right;">61</span>   |
| 6. $y$ hours = $\square$ minutes <span style="float: right;">1 440</span>   | 6. If $y =$ radius of a circle, find diameter <span style="float: right;">122</span>                                 |
| 7. $y \div 3^{\text{rd}}$ prime number <span style="float: right;">288</span>   | 7. If $y =$ sum of 2 $\angle$ 's in a $\Delta$ , find 3 <sup>rd</sup> $\angle$ <span style="float: right;">58</span> |
| 8. $y \times$ number in a brace <span style="float: right;">576</span>  | 8. If $y =$ hours, how many minutes? <span style="float: right;">3 480</span>  |
| 9. $y + 3$ baker's dozen <span style="float: right;">615</span>   | 9. Increase $y$ by the value of the 4 <span style="float: right;">3 880</span>                                       |
| 10. Increase $y$ by the 6 <sup>th</sup> multiple of 17 <span style="float: right;">717</span>   | 10. $y + 4^{\text{th}}$ counting number <span style="float: right;">3 883</span>                                     |
| <b>MENTAL CHALLENGE 30</b>  | <b>MENTAL CHALLENGE 32</b>   |
| 1. If one of the equal $\angle$ 's in an isosceles $\Delta$ is $42^\circ$ , find the size of the 3 <sup>rd</sup> angle. <span style="float: right;">96</span> | 1. How many hours from 2am to 4pm? <span style="float: right;">14</span>   |
| 2. $y + 4$ dozen <span style="float: right;">144</span>   | 2. How many minutes in $y$ hours? <span style="float: right;">840</span>   |
| 3. $y \times$ no. of lines of symmetry in a rectangle. <span style="float: right;">288</span>   | 3. $y \div \frac{1}{2}$ <span style="float: right;">560</span>   |
| 4. $y \times 3^2$ <span style="float: right;">2 592</span>  | 4. Decrease $y$ by 10% <span style="float: right;">50</span>   |
| 5. $y + 25\%$ of $y$ <span style="float: right;">3 240</span>   | 5. $y \div 3^2$ <span style="float: right;">56</span>  |
| 6. $y \div$ number of faces on a cube. <span style="float: right;">540</span>   | 6. $y \times 0,02 \times 100$ <span style="float: right;">112</span>   |
| 7. Five dozen + $y$ <span style="float: right;">600</span>  | 7. $y \times$ no. of sides on a hexagon <span style="float: right;">672</span>                                       |
| 8. $y + \frac{1}{2}y$ <span style="float: right;">900</span>  | 8. $y \times \pi$ (pi) <span style="float: right;">2 112</span>  |
| 9. $(\frac{1}{3}y)^2$ <span style="float: right;">90 000</span>   | 9. Increase $y$ by $10^3$ <span style="float: right;">3 112</span>   |
| 10. $y + 4^{\text{th}}$ composite number <span style="float: right;">90 009</span>  | 10. $y - 2$ millennia + 1 year <span style="float: right;">1 111</span>  |

## ANSWERS

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| <p style="text-align: center;"><b>MENTAL CHALLENGE 33</b></p> <ol style="list-style-type: none"> <li>1. One side of an equilateral <math>\Delta</math> is 15cm, find the perimeter. <span style="float: right;">45cm</span></li> <li>2. If the height of this <math>\Delta</math> is 10cm, find the area. <span style="float: right;">75cm<sup>2</sup></span></li> <li>3. If <math>y = 75\%</math> of a no., find 100% <span style="float: right;">100</span></li> <li>4. <math>y \div 0,2</math> <span style="float: right;">500</span></li> <li>5. <math>y + 2\frac{1}{2}</math> of 60 <span style="float: right;">650</span></li> <li>6. <math>y +</math> no. of degrees in a revolution <span style="float: right;">1 010</span></li> <li>7. <math>y \times 2^1</math> <span style="float: right;">2 020</span></li> <li>8. Decrease <math>y</math> by 3 score <span style="float: right;">1 960</span></li> <li>9. <math>y +</math> XXIX <span style="float: right;">1 989</span></li> <li>10. <math>y + 2^{\text{nd}}</math> natural number <span style="float: right;">1 991</span></li> </ol> | <p style="text-align: center;"><b>MENTAL CHALLENGE 35</b></p> <ol style="list-style-type: none"> <li>1. If 1 364 is divisible by 11, start with a gross. If not, start with a great gross. <span style="float: right;">144</span></li> <li>2. Express 24 as a fraction of <math>y</math>. (Simplify) <span style="float: right;"><math>\frac{1}{6}</math></span></li> <li>3. <math>y + 2\frac{2}{3} \times \frac{5}{16} +</math> a score <span style="float: right;">21</span></li> <li>4. <math>y \times</math> no. of Snow White's dwarfs <span style="float: right;">147</span></li> <li>5. <math>y \div (1^2 + 2^1)</math> <span style="float: right;">49</span></li> <li>6. If this is a man's age in 2012, in what year was he born? <span style="float: right;">1963</span></li> <li>7. <math>y \div</math> by 100 + 25,37 <span style="float: right;">45</span></li> <li>8. Decrease <math>y</math> by 40% <span style="float: right;">27</span></li> <li>9. <math>(y - 6) \times \pi</math> (as a common fraction) <span style="float: right;">66</span></li> <li>10. <math>y +</math> DC <span style="float: right;">666</span></li> </ol> |
| <p style="text-align: center;"><b>MENTAL CHALLENGE 34</b></p> <ol style="list-style-type: none"> <li>1. Multiply the no. of faces on a dodecahedron by the no. of its edges. <span style="float: right;">360</span></li> <li>2. If <math>y =</math> minutes, how many hours? <span style="float: right;">6</span></li> <li>3. Find <math>y^3</math> <span style="float: right;">216</span></li> <li>4. <math>y + \frac{1}{9}y</math> <span style="float: right;">240</span></li> <li>5. Increase <math>y</math> by 40% <span style="float: right;">336</span></li> <li>6. <math>y \div V + 3,8</math> <span style="float: right;">71</span></li> <li>7. Find the supplementary <math>\angle</math> of <math>y</math> <span style="float: right;">109</span></li> <li>8. <math>y + y + y</math> <span style="float: right;">327</span></li> <li>9. <math>y \times 10^2</math> <span style="float: right;">32 700</span></li> <li>10. Increase <math>y</math> by 460 x 0,05 <span style="float: right;">32 723</span></li> </ol>  | <p style="text-align: center;"><b>MENTAL CHALLENGE 36</b></p> <ol style="list-style-type: none"> <li>1. If <math>w = 2; s = 5</math> and <math>t = 6</math>, find <math>w^2 + s \times t</math> <span style="float: right;">34</span></li> <li>2. <math>y \div 0,4</math> <span style="float: right;">85</span></li> <li>3. <math>y + 7\frac{1}{2} - \frac{1}{3} \times 1\frac{1}{2}</math> <span style="float: right;">92</span></li> <li>4. <math>y + \square =</math> degrees in a square <span style="float: right;">268</span></li> <li>5. <math>y \times</math> no. of sides on a rhombus <span style="float: right;">1 072</span></li> <li>6. Find <math>\frac{5}{8}</math> of <math>y</math> <span style="float: right;">670</span></li> <li>7. <math>y +</math> half of <math>y</math> <span style="float: right;">1 005</span></li> <li>8. <math>y +</math> a millennium + half a decade <span style="float: right;">2 010</span></li> <li>9. Increase <math>y</math> by 20% <span style="float: right;">2 412</span></li> <li>10. <math>y + 2</math> and a half dozen <span style="float: right;">2 442</span></li> </ol>                 |

## ANSWERS

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| <p style="text-align: center;"><b>MENTAL CHALLENGE 37</b></p> <ol style="list-style-type: none"> <li>1. Take the number of the month with the least letters and multiply by the number of Santa's month. <span style="float: right;">60</span></li> <li>2. Find the sum of the factors of <math>\frac{1}{2}y</math> <span style="float: right;">72</span></li> <li>3. Express <math>\frac{18}{y}</math> as a percentage <span style="float: right;">25</span></li> <li>4. Find <math>y\%</math> of 5 000 <span style="float: right;">1 250</span></li> <li>5. <math>y \times 1,2</math> <span style="float: right;">1 500</span></li> <li>6. <math>y \div \frac{4}{5}</math> <span style="float: right;">1 875</span></li> <li>7. <math>y \div \text{CXXV}</math> <span style="float: right;">15</span></li> <li>8. Find the 5<sup>th</sup> multiple of <math>y</math> <span style="float: right;">75</span></li> <li>9. <math>y \times</math> no. of sides on a nonagon <span style="float: right;">675</span></li> <li>10. <math>y + 6 \times 7</math> <span style="float: right;">717</span></li> </ol> | <p style="text-align: center;"><b>MENTAL CHALLENGE 39</b></p> <ol style="list-style-type: none"> <li>1. C A R S is to S C A R as a great gross is to ... <span style="float: right;">8 172</span></li> <li>2. <math>y +</math> no. of colours on R.S.A.'s flag. <span style="float: right;">8 178</span></li> <li>3. Find <math>\frac{1}{3}</math> of <math>y</math> <span style="float: right;">2 726</span></li> <li>4. <math>y - 5</math> score <span style="float: right;">2 626</span></li> <li>5. Decrease <math>y</math> by MDXV <span style="float: right;">1 111</span></li> <li>6. <math>y \div</math> (a dozen - 1<sup>st</sup> natural no.) <span style="float: right;">101</span></li> <li>7. If <math>y</math> is prime double your answer. If not halve it. <span style="float: right;">202</span></li> <li>8. <math>y +</math> half <math>y</math> <span style="float: right;">303</span></li> <li>9. <math>y +</math> no. of years in 2 millennia <span style="float: right;">2 303</span></li> <li>10. Increase <math>y</math> by (3 dozen - 7) <span style="float: right;">2 332</span></li> </ol>    |
| <p style="text-align: center;"><b>MENTAL CHALLENGE 38</b></p> <ol style="list-style-type: none"> <li>1. If 1 cup of tea holds 125ml, how many litres are needed for 40 cups? <span style="float: right;">5</span></li> <li>2. How many millilitres in <math>y</math>? <span style="float: right;">5 000</span></li> <li>3. Decrease <math>y</math> by <math>\frac{3}{8}</math> of 1 400 <span style="float: right;">4 475</span></li> <li>4. <math>y \div C</math> <span style="float: right;">44,75</span></li> <li>5. <math>y + 106\frac{1}{4}</math> <span style="float: right;">151</span></li> <li>6. <math>4 \times y</math> <span style="float: right;">604</span></li> <li>7. Increase <math>y</math> by 50% <span style="float: right;">906</span></li> <li>8. <math>y \times 3\frac{1}{3}</math> <span style="float: right;">3 020</span></li> <li>9. <math>y \times 2</math> <span style="float: right;">6 040</span></li> <li>10. <math>y - 2 \times 17</math> <span style="float: right;">6006</span></li> </ol>  | <p style="text-align: center;"><b>MENTAL CHALLENGE 40</b></p> <ol style="list-style-type: none"> <li>1. If a trundle wheel has a circumference of 500cm, how many revolutions will it take to cover a 1 500m track? <span style="float: right;">300</span></li> <li>2. <math>y^2</math> <span style="float: right;">90 000</span></li> <li>3. <math>y \div</math> by no. of ml in a litre <span style="float: right;">90</span></li> <li>4. <math>\sqrt{y - 3^2}</math> <span style="float: right;">9</span></li> <li>5. <math>y \times</math> 13<sup>th</sup> prime number <span style="float: right;">369</span></li> <li>6. Find <math>\frac{2}{3}</math> of <math>y</math> <span style="float: right;">246</span></li> <li>7. <math>y \times \text{XI}</math> <span style="float: right;">2 706</span></li> <li>8. <math>y +</math> no. of minutes in <math>2\frac{1}{2}</math> hours <span style="float: right;">2 856</span></li> <li>9. Increase <math>y</math> by 2 dozen <span style="float: right;">2 880</span></li> <li>10. <math>y + \text{MIII}</math> <span style="float: right;">3 883</span></li> </ol> |

## ANSWERS

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| <p style="text-align: center;"><b>MENTAL CHALLENGE 41</b></p> <p>1. Write 0,4125 as a common fraction in its simplest form. <span style="float: right;"><math>\frac{33}{80}</math></span></p> <p>2. <math>y \times \frac{8}{11}</math> <span style="float: right;"><math>\frac{3}{10}</math></span></p> <p>3. Express <math>y</math> as a percentage <span style="float: right;">30%</span></p> <p>4. Find <math>y\%</math> of 420 <span style="float: right;">126</span></p> <p>5. <math>y \times 2\frac{2}{3}</math> <span style="float: right;">336</span></p> <p>6. <math>y + 2</math> gross <span style="float: right;">624</span></p> <p>7. <math>y + \square = 3</math> revolutions <span style="float: right;">456</span></p> <p>8. <math>y +</math> the value of the 5 in <math>y</math> <span style="float: right;">506</span></p> <p>9. <math>y \times 3</math> <span style="float: right;">1 518</span></p> <p>10. Increase <math>y</math> by <math>3 \times 12 - 3</math> <span style="float: right;">1 551</span></p>  | <p style="text-align: center;"><b>MENTAL CHALLENGE 43</b></p> <p>1. Through how many degrees does the hour hand of a clock move from 6am to 9am? <span style="float: right;">90</span></p> <p>2. <math>y + \square =</math> degrees in <math>\frac{1}{2}</math> a right <math>\angle</math> <span style="float: right;">135</span></p> <p>3. <math>y + \square =</math> degrees in a rhombus <span style="float: right;">225</span></p> <p>4. <math>y \times</math> no. in a brace <span style="float: right;">450</span></p> <p>5. If <math>y = 50\%</math>, find 100% <span style="float: right;">900</span></p> <p>6. <math>y \div 0,3</math> <span style="float: right;">3 000</span></p> <p>7. <math>y \times 2\frac{1}{2}</math> <span style="float: right;">7 500</span></p> <p>8. <math>y +</math> no. of mins in <math>1\frac{1}{4}</math> hours <span style="float: right;">7 575</span></p> <p>9. <math>y -</math> CLXX <span style="float: right;">7 405</span></p> <p>10. Decrease <math>y</math> by <math>8^2 + 2^2</math> <span style="float: right;">7 337</span></p> |
| <p style="text-align: center;"><b>MENTAL CHALLENGE 42</b></p> <p>1. Write down the greatest number in this sequence: <math>2^4</math>; <math>4^2</math>; 24; 42; <math>4 \times 2</math> <span style="float: right;">42</span></p> <p>2. <math>y \div \frac{1}{6}</math> <span style="float: right;">252</span></p> <p>3. <math>y \times</math> a score <span style="float: right;">5 040</span></p> <p>4. <math>y - (2 \times 10^3)</math> <span style="float: right;">3 040</span></p> <p>5. Decrease <math>y</math> by <math>\sqrt{121}</math> <span style="float: right;">3 029</span></p> <p>6. Find 25% of <math>y</math> <span style="float: right;">757,25</span></p> <p>7. <math>y + 42,75</math> <span style="float: right;">800</span></p> <p>8. <math>y \times 3^{\text{rd}}</math> prime number <span style="float: right;">4 000</span></p> <p>9. Increase <math>y</math> by <math>20^2</math> <span style="float: right;">4 400</span></p> <p>10. Decrease <math>y</math> by <math>132 \div \frac{1}{3}</math> <span style="float: right;">4 004</span></p> | <p style="text-align: center;"><b>MENTAL CHALLENGE 44</b></p> <p>1. If <math>2(3 + 4) = (2 \times 3) + (2 \times 4)</math> find the value of <math>3(4 + 5)</math> <span style="float: right;">27</span></p> <p>2. <math>y + 3 \times 100</math> <span style="float: right;">327</span></p> <p>3. <math>y + \square =</math> mins in <math>6\frac{1}{2}</math> hours <span style="float: right;">63</span></p> <p>4. How many weeks in <math>y</math> days? <span style="float: right;">9</span></p> <p>5. <math>y \times</math> no. of sides on a decagon <span style="float: right;">90</span></p> <p>6. <math>y +</math> no. of degrees in 5 right <math>\angle</math>'s <span style="float: right;">540</span></p> <p>7. <math>y - 2^4</math> <span style="float: right;">524</span></p> <p>8. <math>y \times</math> a dozen <span style="float: right;">6 288</span></p> <p>9. Decrease <math>y</math> by 3 score <span style="float: right;">6 228</span></p> <p>10. <math>y - 1^{\text{st}}</math> prime number <span style="float: right;">6 226</span></p>                   |

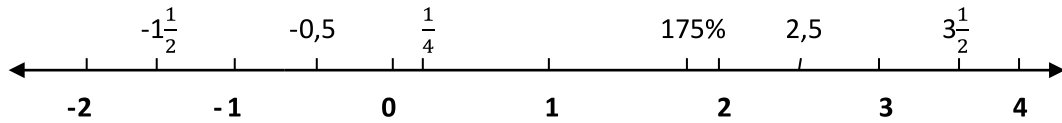
## ANSWERS

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| <p style="text-align: center;"><b>MENTAL CHALLENGE 45</b></p> <ol style="list-style-type: none"> <li>1. Find the sum of the first five multiples of 5. <span style="float: right;">75</span></li> <li>2. If <math>y = \frac{3}{4}</math> of a number, find <math>\frac{4}{4}</math> <span style="float: right;">100</span></li> <li>3. <math>y \times 4</math> decades <span style="float: right;">4 000</span></li> <li>4. Find <math>12\frac{1}{2}\%</math> of <math>y</math> <span style="float: right;">500</span></li> <li>5. <math>y</math> mins = <math>\square</math> hours (as mixed no.) <span style="float: right;"><math>8\frac{1}{3}</math></span></li> <li>6. <math>y + 2\frac{1}{3} \times \pi + \frac{1}{3}</math> <span style="float: right;">16</span></li> <li>7. If <math>y =</math> radius, find the diameter <span style="float: right;">32</span></li> <li>8. <math>y \times 2^3</math> <span style="float: right;">256</span></li> <li>9. <math>y +</math> a gross + 3 score <span style="float: right;">460</span></li> <li>10. Decrease <math>y</math> by <math>1\frac{1}{3}</math> of a dozen <span style="float: right;">444</span></li> </ol>      | <p style="text-align: center;"><b>MENTAL CHALLENGE 47</b></p> <ol style="list-style-type: none"> <li>1. Find the average of: 11; 13; 16; 17; 18. <span style="float: right;">15</span></li> <li>2. <math>y +</math> the mode of: 6,6,7,8,9,9,9. <span style="float: right;">24</span></li> <li>3. If <math>y =</math> hours, how many minutes? <span style="float: right;">1 440</span></li> <li>4. <math>y \div</math> a gross <span style="float: right;">10</span></li> <li>5. <math>y + 7,5 \times 1,5 + 3,75</math> <span style="float: right;">25</span></li> <li>6. <math>y \times \frac{5}{6}</math> of 24 <span style="float: right;">500</span></li> <li>7. <math>y \times (M \div L)</math> <span style="float: right;">10 000</span></li> <li>8. Increase <math>y</math> by 25% <span style="float: right;">12 500</span></li> <li>9. Find the sum of <math>y</math> and <math>5^2</math> <span style="float: right;">12 525</span></li> <li>10. Decrease <math>y</math> by 1<sup>st</sup> composite no. <span style="float: right;">12 521</span></li> </ol>   |
| <p style="text-align: center;"><b>MENTAL CHALLENGE 46</b></p> <ol style="list-style-type: none"> <li>1. "All odd numbers are prime." If this is true start with <math>3^4</math>. If not start with 4 dozen <span style="float: right;">48</span></li> <li>2. If <math>y =</math> hours, how many days? <span style="float: right;">2</span></li> <li>3. Find <math>y</math> to the power of 6 <span style="float: right;">64</span></li> <li>4. If <math>y =</math> area of a square, find the length of one side. <span style="float: right;">8</span></li> <li>5. <math>y \times</math> no. of sides on a heptagon <span style="float: right;">56</span></li> <li>6. <math>y \times 7\frac{1}{2}</math> <span style="float: right;">420</span></li> <li>7. <math>y \times</math> no. of faces on a cube <span style="float: right;">2 520</span></li> <li>8. Increase <math>y</math> by CCCL <span style="float: right;">2 870</span></li> <li>9. <math>y + 10\%</math> of <math>y</math> <span style="float: right;">3 157</span></li> <li>10. Decrease <math>y</math> by <math>[2^2 \times 10] + [2^2 \times 1]</math> <span style="float: right;">3 113</span></li> </ol> | <p style="text-align: center;"><b>MENTAL CHALLENGE 48</b></p> <ol style="list-style-type: none"> <li>1. Add 14% VAT to an item marked at R150 <span style="float: right;">171</span></li> <li>2. How many 50c coins in <math>y</math>? <span style="float: right;">342</span></li> <li>3. <math>y \times \frac{7}{9}</math> <span style="float: right;">266</span></li> <li>4. <math>y + \square = 30</math> dozen <span style="float: right;">94</span></li> <li>5. Find the supplementary <math>\angle</math> of <math>y</math> <span style="float: right;">86</span></li> <li>6. <math>y \times</math> no. of right <math>\angle</math>'s in a square <span style="float: right;">344</span></li> <li>7. <math>y + 2</math> baker's dozen <span style="float: right;">370</span></li> <li>8. <math>y \times 0,2</math> <span style="float: right;">74</span></li> <li>9. <math>y \div</math> the inverse of <math>\frac{1}{2}</math> <span style="float: right;">37</span></li> <li>10. Decrease <math>y</math> by the L.C.M. of 2, 6, 9.<br/>Record your answer as a Roman numeral.<br/><span style="float: right;">XIX</span></li> </ol> |

## ANSWERS

### MENTAL CHALLENGE 49

1. Show the relative positions of the following:  $2,5$ ;  $\frac{1}{4}$ ;  $175\%$ ;  $-1\frac{1}{2}$ ;  $3\frac{1}{2}$ ;  $-0,5$



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| 2. Add all the <b>positive</b> values given in question 1.   | 8   |
| 3. Subtract all the <b>negative</b> numbers from your answer in question 2.                          | 6   |
| 4. If $y$ = the number of faces on a cube, multiply by 8. If not multiply by 10.                     | 48  |
| 5. If $y$ = the perimeter of a rhombus, find the length of one side.                                 | 12  |
| 6. Now find the area of the same rhombus.  | 144 |
| 7. Multiply your answer by the number of the month for fooling people.                               | 576 |
| 8. If $y$ = the no. of children in a school, in the ratio of 4 boys : 5 girls, find the no. of boys. | 256 |
| 9. If $\frac{3}{4}$ of the boys play rugby, how many rugby players are there?                        | 192 |
| 10. Increase $y$ by $[1 \times 10^0] + [1 \times 10^1] + [1 \times 10^2]$                            | 303 |

### MENTAL CHALLENGE 50

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| 1. Identify all the letters in the boy's name MAXIMILIAN that are found in the system of Roman numerals. Now find the sum of their individual values. For example in the word MIXED the letters $M + I + X + D = 1\ 000 + 1 + 10 + 500$ . The total is therefore 1 511. | 2 063 |
| 2. Increase $y$ by the 7 <sup>th</sup> multiple of 15   | 2 168 |
| 3. $y - 5 \times$ the distance of a standard marathon.  | 1 957 |
| 4. Decrease $y$ by $33\frac{1}{3}\%$ of 603   | 1 756 |
| 5. If $y$ is the perimeter of a rhombus, find the length of one side.   | 439   |
| 6. $y - LIX$  | 380   |
| 7. Express $y$ as a product of its prime factors (there are four). Now find the sum of these factors.   | 28    |
| 8. $y + 2$ score $+ 7^{\text{th}}$ multiple of 16   | 180   |
| 9. $y + [6 \times 10^3] + [5 \times 10^2] + [4 \times 10^1] + [3 \times 10^0]$  | 6 723 |
| 10. Increase $y$ by $5^2 + 5^2 + 3^1$   | 6 776 |

# ANSWERS

## MENTAL CHALLENGE 51

1. Take the number of the 1<sup>st</sup> month with 30 days and multiply it by the number of the 3<sup>rd</sup> month with 30 days.  $4 \times 5 = 20$
2.  $y + 60\%$  of 60  $20 + 36 = 56$
3.  $y \div$  the number of baker's dozen in 52.  $56 \div 4 = 14$
4. LIVE is to EVIL as 6131 is to what number? Add this to no. 3's answer.  $14 + 1316 = 1330$
5. If each rabbit can jump 5 feet high, how high can 2 rabbits jump? Divide no. 4's answer by this number.  $1330 \div 5 = 266$
6.  $y$  minus the total number of singers in a trio of tenors, a double octet, two sextets, a pair of baritones, four quintets and a solitary soprano.  $266 - (3 + 16 + 12 + 2 + 20 + 1) = 266 - 54 = 212$
7. If 277 is prime divide your answer by 4, if not, divide by 5.  $212 \div 4 = 53$
8.  $y$  minus the number of misspelled words in the following group:  
TRISKAIDEKAPHOBIA; **MILLENIU**M; RECIPROCAL; **PARRALLELOGRAM**.  $53 - 2 = 51$
9. From your previous answer subtract the following:  
40 times 2 divided by 2 minus what number equals 11?  $(40 \times 2 \div 2 - 29 = 11) \therefore 51 - 29 = 22$
10. Multiply your answer by the only whole number that is not prime, not composite and not even.  $22 \times 1 = 22$

## MENTAL CHALLENGE 52

1. Multiply the no. of the month for fooling people and by the no. of years in 5 score.  $4 \times 100 = 400$
2.  $y \div$  XL  $400 \div 40 = 10$
3. NOEL is to LEON as 0121 is to what number? Add this to no. 2's answer.  $10 + 1210 = 1220$
4. It is a Spanish ship, divide by 5.  $1220 \div 5 = 244$
5.  $y -$  the number of minutes in 4 hours.  $244 - 240 = 4$
6. "Weight, quinine, money and tension were discussed in the fourth talk."  
Add the numbers you found to the total of no.5's answer.  $4 + (8 + 9 + 1 + 10 + 4) = 36$
7. What number does not belong in this series? 25; 27; 29; 31; 32; 33; 35; 37.  
Subtract this number from no. 6's answer.  $36 - 32 = 4$
8. Only B and Z: " Then a quick, sly fox jumped over the high wall." (B and Z)  $\therefore 2 - 2 = 2$
9.  $y$  multiplied by the number of gills in a gallon.  $2 \times 32 = 64$
10.  $y + 25^2 - 14^{\text{th}}$  prime number.  $64 + 625 - 43 = 646$



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