

1. (a) Find the two numbers which multiply to give -20 and add to give 19 .

20, -1
..... [1]

- (b) Find a fraction which is halfway between $\frac{1}{3}$ and $\frac{1}{5}$.

$\frac{4}{15}$
..... [1]

-
2. Steve's dog, Charlie, puts on weight over a two week period in which his weight goes up by 20% to 30 kg. Calculate the dog's weight before the increase.

$$\frac{30}{1.2} = 25 \text{ kg}$$

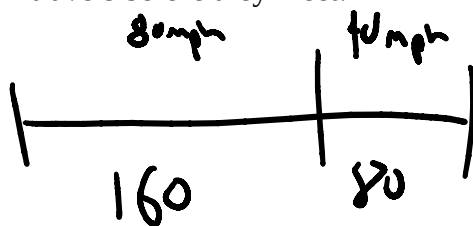
25
..... kg [2]

-
3. (a) The ages of three children are in the ratio $2 : 3 : 5$. Calculate the age of the youngest child if the total of their ages is 20.

$$\frac{20}{10} = 2$$

22 = 4
..... [2]

- (b) Two cars start off 240 miles apart and drive towards each other, one at 80 miles per hour and the other at 40 miles per hour. Calculate how far the first one travels before they meet.



160
..... miles [2]

4. Solve the equation:

$$4(3x + 2) = 2(x - 3)$$

$$12x + 8 = 2x - 6$$

$$10x = -14$$

$$x = -1.4 = -\frac{7}{5}$$

..... [2]

5. 25 students take a test which is marked out of 100.

Their mean mark is initially 65%.

One of the student's tests is remarked and goes up from 60% to 85%.

Find the new mean mark for the 25 students.

$$\frac{T}{25} = 65 \quad T_1 = 1625$$

$$T_2 = 1625 + 25 = 1650$$

$$m = \frac{1650}{25} = 66$$

66

..... [2]

6. The numbers 1 to 99 are written out. Calculate how many times the digit 6 is written.

1 2 3 4 5 6 7 8 9 10
11 12 13 14

62 72 82 92
10
10

91

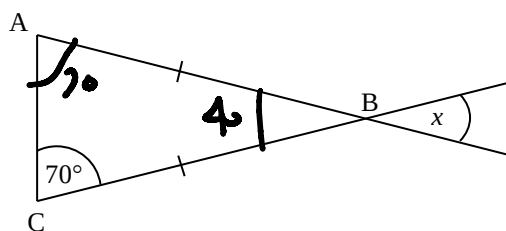
99

20

..... [2]

7. Find the size of the angles marked x :

(a)

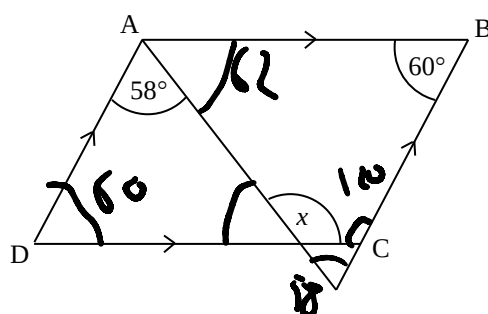


Note: ABC is an isosceles triangle

40

..... [2]

(b)



Note: ABCD is a parallelogram

$$360 - 58 - 60 - 120 = 118$$

118

..... [2]

8. A certain number has exactly six factors, including 1 and itself.
Two of the factors are 4 and 10.
What is the number?

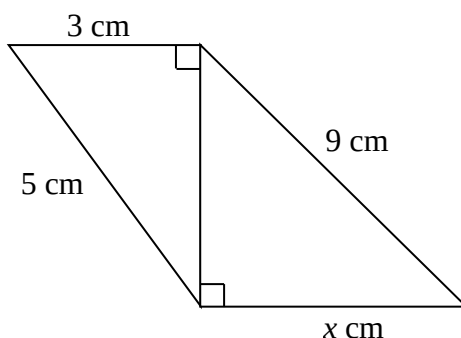
1 2 4 5 10 20

1 40
2 20
4 10
8 5 X

1 20
2 10
4 5

..... 20 [2]

9. Find the length of the side marked x in the following
Give your answer to 2 decimal places:



$$\begin{aligned}
 3^2 + x^2 &= 5^2 \\
 x &= 4 \\
 \sqrt{9^2 - 4^2} &= x \\
 \sqrt{65} &= 8.06
 \end{aligned}$$

$$x = 8.06 \text{ cm [3]}$$

10. Solve the simultaneous equations:

$$3x - 4y = 6$$

$$5x + 2y = 23 \quad \times 2$$

$$3x - 4y = 6$$

$$10x + 4y = 46$$

$$13x = 52$$

$$x = 4$$

$$12 - 4y = 6$$

$$4y = 6$$

$$y = \frac{3}{2}$$

$$x = 4 \quad y = \frac{3}{2} \text{ [3]}$$

11. (a) Simplify: $8xy + 7x^2 - 9y - 3xy + 3x^2$

$$5x^2 + 10x^2 - 9y$$

..... [2]

- (b) Multiply out and simplify: $(4m - 3)(2n + 1)$

$$8mn + 4n - 6n - 3$$

..... [2]

- (c) Simplify:

(i) $2xy^2 \times (3y)^2$

$$2xy^2 \times 9y^2 = 18xy^4$$

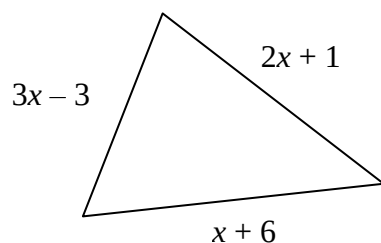
..... [2]

(ii) $\frac{3a}{b} + \frac{a}{3b}$

$$\frac{9a}{3b} + \frac{a}{3b} = \frac{10a}{3b}$$

..... [2]

- (d) Calculate the value of x if the perimeter of the following triangle is 19 cm.



$$6x + 4 = 19$$

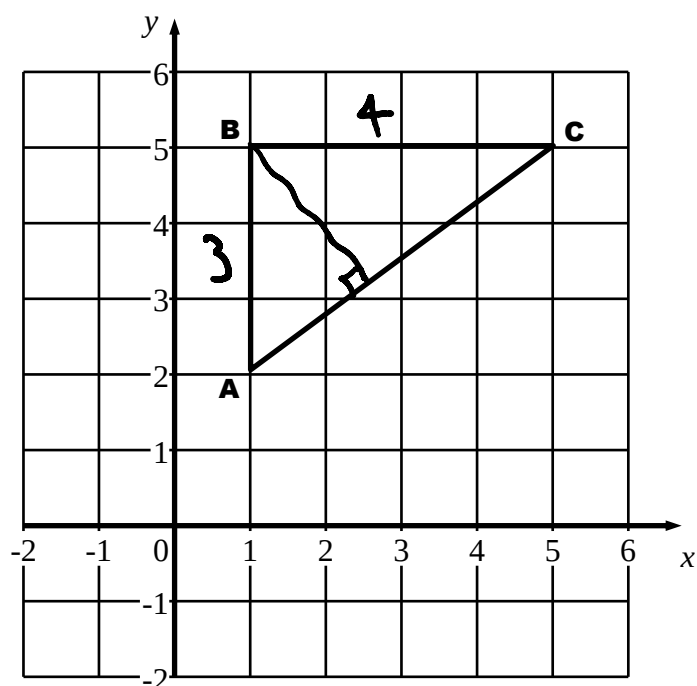
$$6x = 15$$

$$x = \frac{5}{2}$$

$$x = 2.5$$

..... [3]

12.



The triangle ABC has been drawn on the 1 cm square grid above.

Calculate:

(a) the gradient of the line AC,

$$\frac{3}{4}$$

..... [2]

(b) the area of the triangle ABC,

$$\frac{1}{2} \times 3 \times 4 = 6$$

..... 6 cm² [1]

(c) the shortest distance from the line AC to the point B.

$$AC = 5 \text{ cm}$$

$$\frac{1}{2} \times 5 \times h = 6$$

$$h = \frac{12}{5} = 2.4$$

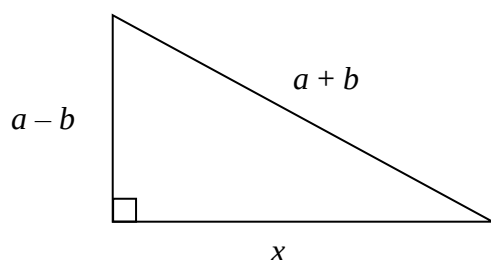
..... cm [2]

13. The smallest angle in a triangle is 15° . Find the largest size that the largest angle in the triangle could be.



150°
..... [2]

14. A right angled triangle has sides in terms of x , a and b as shown:



Find an expression for x in terms of a and b .

$$(a-b)^2 + x^2 = (a+b)^2$$

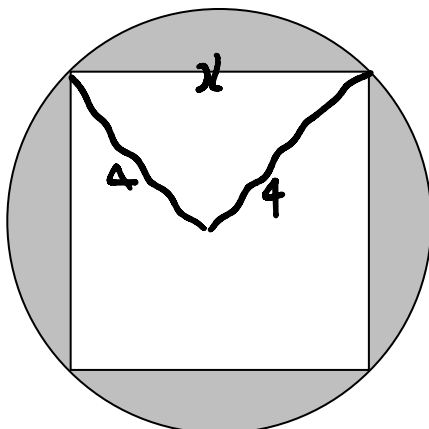
$$a^2 - 2ab + b^2 + x^2 = a^2 + 2ab + b^2$$

$$x^2 = 4ab$$

$$x = 2\sqrt{ab}$$

..... cm [3]

15. A square is drawn inside a circle of radius 4 cm as shown.



Calculate the area of the shaded region, giving your answer as an exact expression if possible.

$$x^2 = 4^2 + 4^2$$

$$x = 4\sqrt{2}$$

$$x^2 = 32$$

$$\pi \times 4^2 - 32 = 16\pi - 32$$

$$= 18.3$$

$$\dots\dots\dots 18.3 \text{ cm}^2 [3]$$

THE END