

AGS Maths Stars

Solve the following equations.

a) $7x + 19 = 75$

$7x = 56$

$x = 8$

b) $\frac{x}{3} - 8 = 4$

$\frac{x}{3} = 12$

$x = 36$



Which offer is best? (Explain your answer fully)

$\frac{2}{5}$ off
£420

$420 \div 5 = 84$

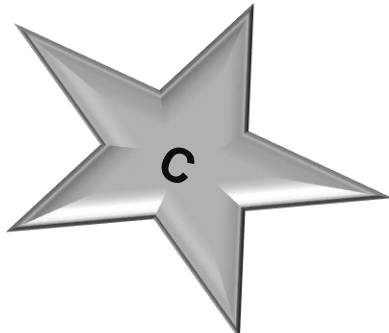
$84 \times 2 = 168$

$420 - 168 = \text{£}252$

28% off
£360

$360 \times 0.72 = \text{£}259.20$

$\frac{2}{5}$ off £420 is cheaper by £7.20



(* Question)

John thinks a pentagon tessellates.

Is he correct? (You must show all working out)

Exterior angle = $\frac{360}{5} = 72^\circ$

Interior angle = $180 - 72 = 108^\circ$

$360 \div 108 = 3.33333 \dots$

$360 - (3 \times 108) = 36^\circ$

No it doesn't tessellate
gap of 36°

Complete this table for a histogram

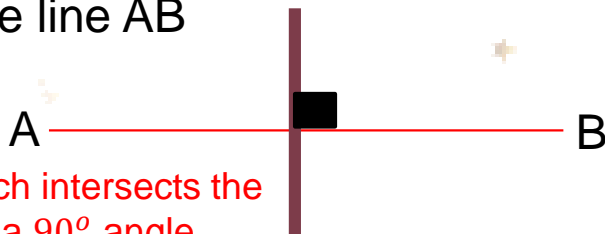
Height (cm)	Frequency	Frequency Density
$110 < h \leq 120$	16	1.6
$120 < h \leq 140$	48	2.4
$140 < h \leq 180$	60	1.5
$180 < h \leq 200$	46	2.3



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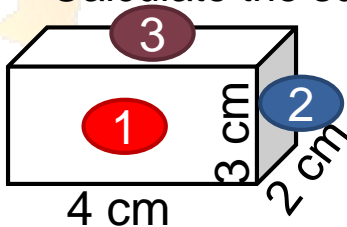


Draw a line perpendicular to the line AB

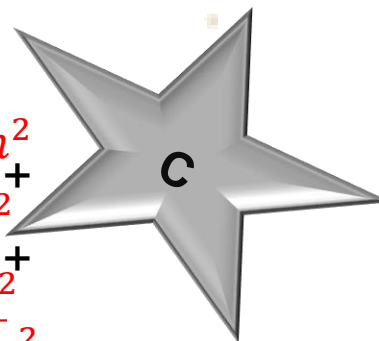


A line which intersects the line AB at a 90° angle.

Calculate the surface area of the cuboid.



$$\begin{aligned} 1 \quad & 4 \times 3 = 12cm^2 \\ 2 \quad & 3 \times 2 = 6cm^2 \\ 3 \quad & 4 \times 2 = 8cm^2 \\ & \underline{26cm^2} \end{aligned}$$



Surface Area = $26 \times 2 = 52cm^2$

What is the equation of the line parallel to $y = 3x + 2$, which passes through the point $(0, -1)$

$$y = 3x - 1$$



Find the solutions.

$$\begin{aligned} 2x^2 + 5x - 12 &= 0 \\ (2x - 3)(x + 4) &= 0 \end{aligned}$$

$$2x - 3 = 0$$

$$2x = 3$$

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

$$x + 4 = 0$$

$$x = -4$$



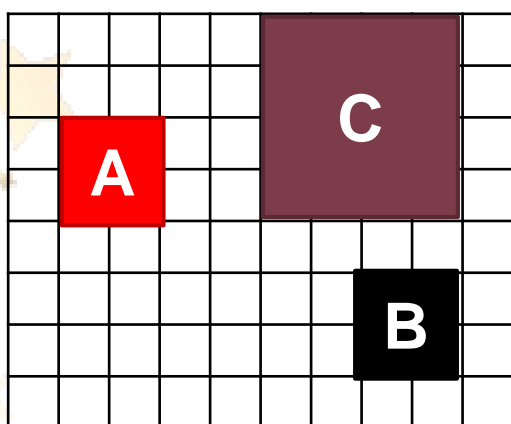
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I set off from Acklam Grange School at 8:46am and arrive at the Riverside Stadium at 9:32am. How long did the journey take?

$$\begin{array}{r}
 8:46 \\
 9:00 \\
 9:32
 \end{array}
 \begin{array}{l}
 \left. \begin{array}{l} \rightarrow \\ \rightarrow \end{array} \right\} 14\text{mins} \\
 \left. \begin{array}{l} \rightarrow \\ \rightarrow \end{array} \right\} 32\text{mins}
 \end{array}
 \quad
 \begin{array}{r}
 14+32 \\
 = \underline{\underline{46 \text{ minutes}}}
 \end{array}$$

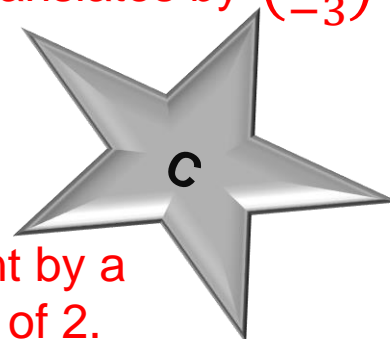
Describe the following transformations.



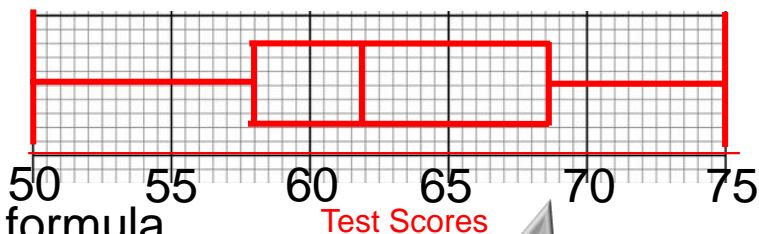
1) A to B Translates by $\begin{pmatrix} 6 \\ -3 \end{pmatrix}$

2) B to C

Enlargement by a scale factor of 2.



Draw a boxplot for the following information about the marks students scored on a test. The Maximum mark is 75 and the range is 25. The Lower Quartile is 58, with a median score 4 marks more. The Interquartile range is 10.



Make y the subject for the formula.

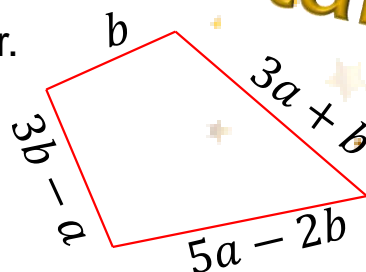
$$\begin{aligned}
 3y - p &= h(2 + y) \\
 3y - p &= 2h + hy \\
 3y - hy &= 2h + p \\
 y(3 - h) &= 2h + p \\
 y &= \frac{2h + p}{3 - h}
 \end{aligned}$$



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Write a formula for the perimeter.

$$p = 7a + 3b$$



D

3, 9, 15, 21, ...

a) Find the next two terms of the sequence.

27, 33

b) What is the nth term rule of the sequence?

$6n - 3$

c) Calculate the 15th term.

$$\begin{aligned} &6 \times 15 - 3 \\ &= 90 - 3 = \mathbf{87} \end{aligned}$$

I invest £3500 into a bank account for three years. I get 15% interest on the first year and then 18% on the last two years. How much money will I have after 3 years?

$$\begin{aligned} &3500 \times 1.15 \times (1.18)^2 \\ &= \mathbf{£5604,41} \end{aligned}$$

C

B

Rationalise the denominator

$$\frac{6\sqrt{3}}{\sqrt{5}} \times \frac{\sqrt{5}}{\sqrt{5}} = \frac{6\sqrt{15}}{\sqrt{25}} = \frac{6\sqrt{15}}{5}$$

A/A*

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What is the reciprocal of 6?

$$\frac{1}{6}$$

D

There are four balls in a bag, yellow, red, black and blue. What is the probability of a yellow?

Colour Ball	Probability
Yellow	$\frac{1}{6} = \frac{4}{24}$
Red	$\frac{5}{12} = \frac{10}{24}$
Black	$\frac{3}{8} = \frac{6}{24}$
Blue	$\frac{1}{6} = \frac{4}{24}$

C

Find a solution for x to 1 decimal place when $x^2 + 4x = 25$

x value	$x^2 + 4x$	Big/Small
3	21	Small
4	32	Big
3.5	26.25	Big
3.4	25.16	Big
3.3	24.09	Small
3.35	24.6225	Small

$$x = 3.4 \text{ (1dp)}$$

B

Write the equation of a line perpendicular to $y = 3x + 5$, which passes through the point $(0, -2)$.

$$y = -\frac{1}{3}x - 2$$

A/A*