

Vitamin M

A Dose a Day, Keeps D's and E's Away...



Directions for Use:

- 1. Open the packet and check that you have all 7 doses.***
- 2. By managing your time efficiently, follow a “one-a-day” plan, (taken in any order you desire).***
- 3. Each packet contains a mixture of ingredients (various exam style questions from topics learnt over your entire high school life). So if you need to reacquaint yourself with the content before taking the supplement consult a friend, the internet, a parent, a teacher, somebody, somewhere just get it done!!!***



Benefits:

The benefits of taking the supplements include: improved mathematical ability and confidence, increased chances of getting an A in the exam next year and earn extra credit!



Warning:

If you attempt to take the full week's supply in one day (or night) it may lead to negative side effects such as headache, stress and sleeplessness!!! So manage your intake efficiently!

1. Mixed Topics

Doreen cycles to her friend's home.
She leaves at 09 40 and arrives at 10 20.

(a) Write down the time taken

(i) in minutes,

Answer (a)(i) minutes [1]

(ii) as a fraction of an hour in its lowest terms.

Answer (a)(ii) hours [1]

(b) The distance Doreen cycles is 8.4 km.
Work out Doreen's average speed in km/h.

Answer (b) km/h [2]

(a) Six three-digit numbers can be made from the digits 1, 2 and 3 when each digit is used once.
One number is 231.
Write down all the other numbers.

Answer (a) 231,,,,, [2]

(b) One of the six numbers is picked from the above list at random.
Write down the probability that it is

(i) even,

Answer (b)(i) [1]

(ii) a multiple of 5.

Answer (b)(ii) [1]

Solve the simultaneous equations $2c + 5d = 49$,
 $3c + d = 15$.

Answer $c =$

$d =$ [4]

2. Numbers & Geometry

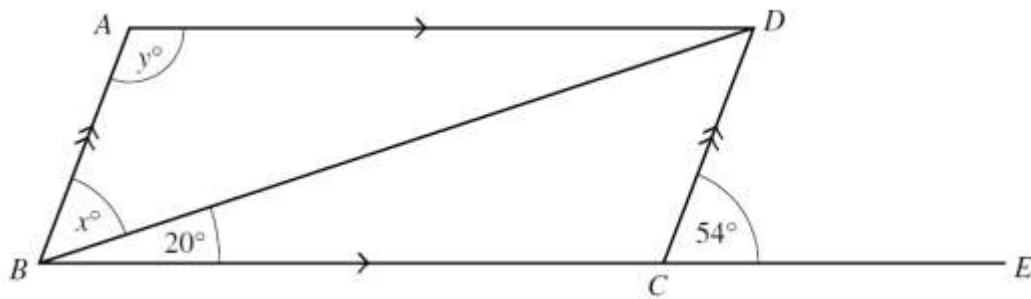
Luis and Hans both have their birthdays on January 1st.
 In 2002 Luis is 13 and Hans is 17 years old.

(a) Which is the next **year** after 2002 when both their ages will be prime numbers?

Answer (a) [1]

(b) In which **year** was Hans twice as old as Luis?

Answer (b) [1]



NOT TO SCALE

$ABCD$ is a parallelogram and BCE is a straight line. Angle $DCE = 54^\circ$ and angle $DBC = 20^\circ$.

Find x and y .

Answer $x =$

$y =$ [2]

The temperature decreases from 25°C to 22°C .
 Calculate the percentage decrease.

Answer % [2]

3. Inequalities, transpositions, polygons

Solve the inequality

$$3(x + 7) < 5x - 9.$$

Answer [2]

Make V the subject of the formula

$$T = \frac{5}{V+1}.$$

Answer $V =$ [3]

A seven-sided polygon has one interior angle of 90° .
The other six interior angles are all equal.

Calculate the size of one of the six equal angles.

Answer [3]

4. Algebra

(a) Factorise

(i) $x^2 - 5x$,

Answer (a)(i) [1]

(ii) $2x^2 - 11x + 5$.

Answer (a)(ii) [2]

(b) Simplify $\frac{x^2 - 5x}{2x^2 - 11x + 5}$.

Answer (b) [2]

(a) Write down the value of x^{-1} , x^0 , $x^{\frac{1}{2}}$, and x^2 when $x = \frac{1}{4}$.

Answer (a) x^{-1}

$x^0 =$

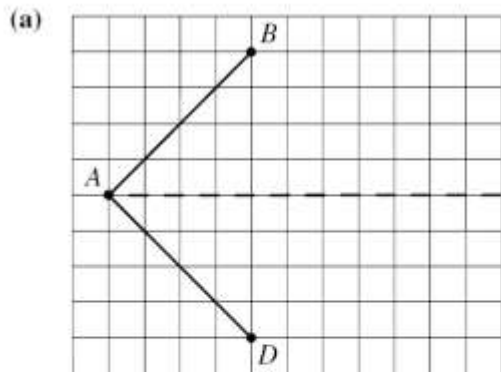
$x^{\frac{1}{2}} =$

$x^2 =$ [2]

(b) Write y^{-1} , y^0 , y^2 and y^3 in increasing order of size when $y < -1$.

Answer (b)<.....<.....<..... [2]

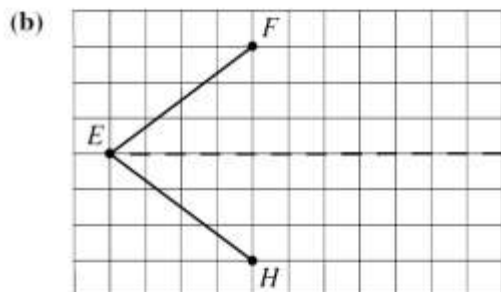
5. Geometry & Functions



(i) Complete quadrilateral $ABCD$ so that the dotted line is the **only** line of symmetry. [1]

(ii) Write down the special name for quadrilateral $ABCD$.

Answer (a)(ii) [1]



(i) Complete quadrilateral $EFGH$ so that the dotted line is one of **two** lines of symmetry. [1]

(ii) Write down the order of rotational symmetry for quadrilateral $EFGH$.

Answer (b)(ii) [1]

$f(x) = x^{\frac{1}{2}}$ and $g(x) = 2x^2 - 5$ for all values of x .

(a) Find

(i) $g(4)$,

Answer (a)(i) [1]

(ii) $fg(4)$.

Answer (a)(ii) [1]

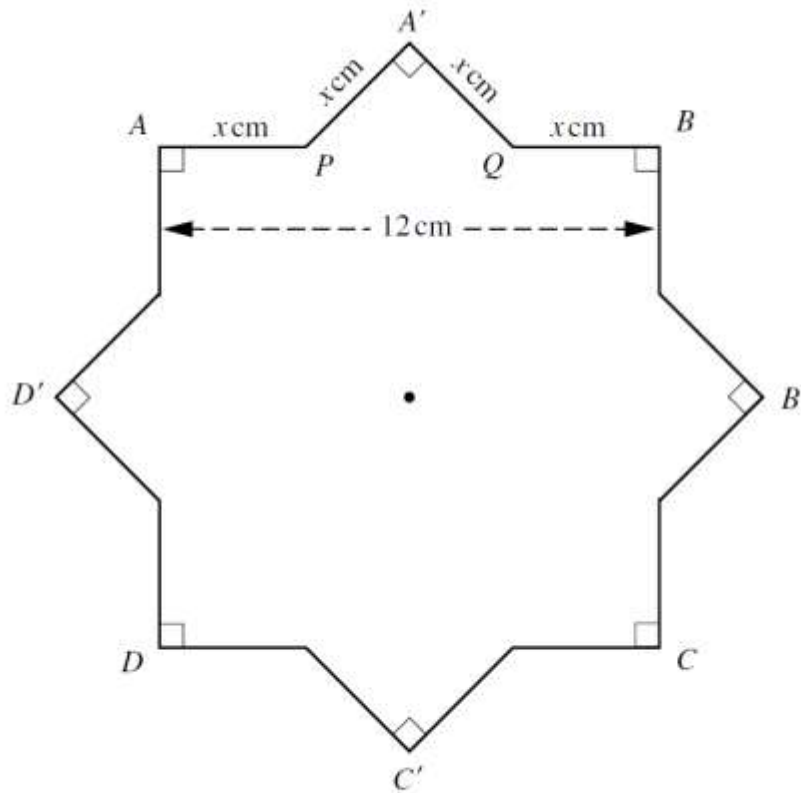
(b) Find an expression for $gf(x)$ in terms of x .

Answer (b) $gf(x)$ [1]

(c) Find $f^{-1}(x)$.

Answer (c) $f^{-1}(x)$ [1]

6. Algebra-quadratic equations



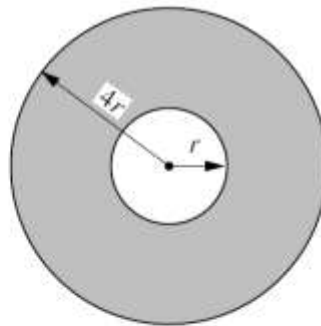
An equilateral 16-sided figure $APA'QB \dots\dots$ is formed when the square $ABCD$ is rotated 45° clockwise about its centre to position $A'B'C'D'$.

$AB = 12$ cm and $AP = x$ cm.

{try using Pythagoras for ai). Even if you can't do this part use ai) to do aii)

- (a) (i) Use triangle $PA'Q$ to explain why $2x^2 = (12 - 2x)^2$. [3]
 (ii) Show that this simplifies to $x^2 - 24x + 72 = 0$. [3]
 (iii) Solve $x^2 - 24x + 72 = 0$. Give your answers correct to 2 decimal places. [4]
- (b) (i) Calculate the perimeter of the 16-sided figure. [2]
 (ii) Calculate the area of the 16-sided figure. [3]
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7. Algebra & Number



NOT TO SCALE

Two circles have radii r cm and $4r$ cm.
Find, in terms of π and r .

- (a) the area of the circle with radius $4r$ cm,

Answer (a) cm^2 [1]

- (b) the area of the shaded ring,

Answer (b) cm^2 [1]

- (c) the total length of the inner and outer edges of the shaded ring.

Answer (c) cm [2]

- (a) Omar changed 800 rands into dollars when the rate was $\$1 = 6.25$ rands.

- (i) How many dollars did Omar receive?

Answer (a)(i) \$ [1]

- (ii) Three months later he changed his dollars back into rands when the rate was $\$1 = 6.45$ rands. How many **extra** rands did he receive?

Answer (a)(ii) rands [1]

- (b) Omar's brother invested 800 rands for three months at a simple interest rate of 12% per year. How much interest did he receive?

Answer (b) rands [2]