Alleyn's

Name: .....

Candidate number: .....

ENTRANCE & SCHOLARSHIP EXAMINATION

For 13+ Candidates
MATHEMATICS

Time allowed: 1 hour

Calculators may be used except for the questions on the first two pages. Answer as many questions as you can. If you cannot do a question, leave it and go on to the next. Show your working, as there may be marks given for working out.

Co-educational, academic excellence

Multiple choice (Calculator not allowed)

1 How much larger is the 9 than the 5 in 690753:

a) 8950 b) 90050 c) 8995 d) 89950 e) 89500

2 Which of the following is a leap year

a) 2015 b) 2014 c) 2010 d) 2002 e) 2000

3 $3 + 4 \times 5 - 1 =$

a) 34 b) 28 c) 19 d) 22 e) 24

4 How many sides does a nonagon have?

a) 6 b) 7 c) 8 d) 9 e) 10

5 The probability of drawing a King from an ordinary pack of cards is:

a) $\frac{1}{4}$ b) $\frac{1}{13}$ c) $\frac{3}{52}$ d) $\frac{1}{52}$ e) $\frac{2}{27}$

6 $1.6m : 480cm$ in its simplest form is

a) 1 : 3 b) 1.6 : 480 c) 1 : 300 d) 40 : 12 e) 1600 : 480

7 The most likely unit for the mass of an apple is:

a) *g* b) *mg* c) *kg* d) *m* e) *cm*

8 $\frac{584.3 - 43.27}{5.24x22.64}$ is approximately:

a) 50 b) 25 c) 20 d) 10 e) 5

9 Simplify $6 - 2(x - 1)$

a) $4x - 4$ b) $4 - 2x$ c) $8 - 2x$ d) $5 + 2x$ e) $8 + 2x$

10 Which of the following is the same as $\frac{3}{7}$:

a) $\frac{13}{17}$ b) $\frac{1}{2} + \frac{2}{5}$ c) $\frac{5}{12} - \frac{2}{5}$ d) $\frac{13}{14} - \frac{1}{2}$ e) $\frac{33}{70}$

Non-Calculator – show all working

11 576.02 + 34.523 =

12 36.84 x 20.3 =

13 $5\frac{2}{9} - 2\frac{5}{6} =$

14 $\frac{12}{15} \div \frac{18}{35} =$

15 $782.54 \div 11 =$

16 $^{-}4 \times {}^{-}5.2 =$

17 $5 - 3\left(4 - {}^{-}2\right) =$

18 $\dfrac{{}^{-}3 + 4 \times {}^{-}8}{{}^{-}5} =$

You may now use your Calculator where necessary

19 The following shapes are made out of matchsticks:

a) How many matchsticks are needed to make 4 squares:

b) The rule is $m =$ ☐ $s +$ ☐

(where m is the number of matches and s is the number of squares)

c) How many matches are needed for 15 squares?

d) How many squares can I make with 41 matches?

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20 Find the next two numbers, and the formula:

a) 2, 5, 8, 11, ..., ... *n*th term: .....

b) 93, 86, 79, 72, ..., ... *n*th term: .....

c) 2, 5, 10, 17, 26, ..., ... *n*th term: .....

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21 Solve:

a) $3n - 7 = 20$

b) $3(2n + 1) = 45$

c) $6n - 5 = 4n + 3$

d) $\frac{2n}{3} + 1 = 11$

22 Here are the handspans of 13 girls in Year 11:

18, 22, 17, 19, 19, 22, 22, 23, 18, 19, 21, 21, 19 (measured in cm)

a) What is the mean span?

b) What is the median span?

c) What is the range of the handspans?

The boys in the same year had their hands measured as well.
Their mean span was 22*cm* and the range 5*cm*.

d) Write a sentence to compare the handspans of the boys and girls.

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23 The circumference of a circle is given by $C = \pi d$ where $\pi = 3.14$ and d is the diameter of the circle.

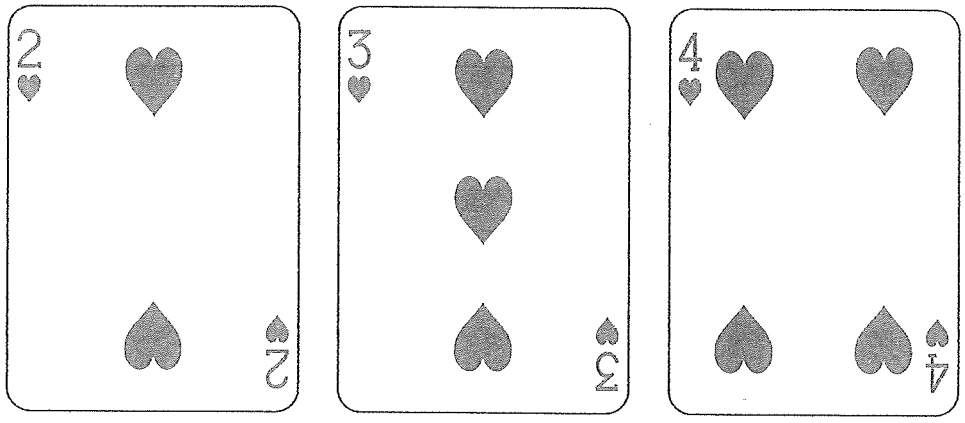
a) What is the circumference of my bicycle wheel if the radius is 32*cm*?

b) How many complete revolutions does the wheel make when I travel 5*km*?

c) If it takes me 20 minutes to cycle 8*km*, what is my speed in $km\ h^{-1}$?

d) What is that speed in $m\ s^{-1}$? (Give you answer to 2 decimal places)

24 These 3 playing cards are taken out of a pack and shuffled. Jenny looks at the top card and remembers its number. She then shuffles the three cards and looks at the top card again.



a) List all the possible pairs of cards:

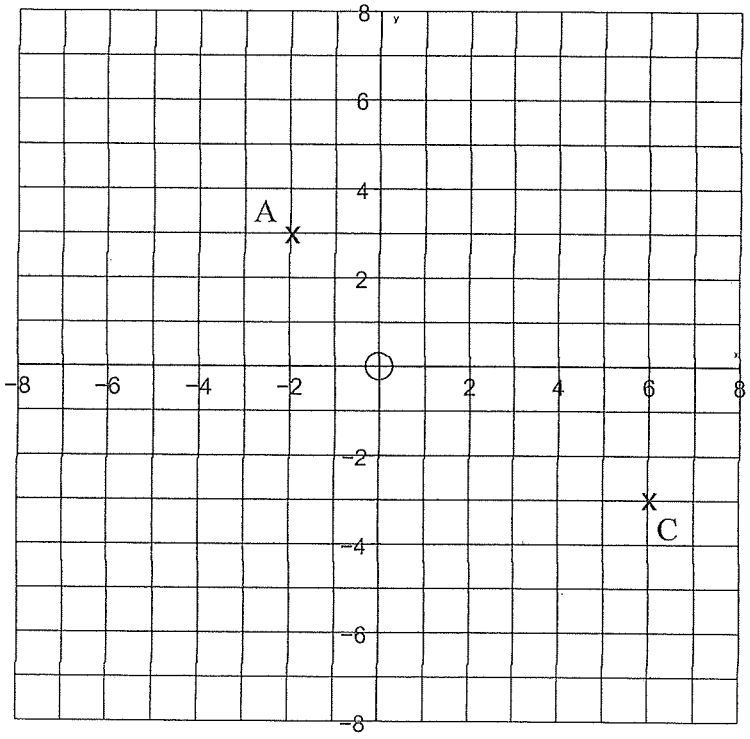
.....

b) What is the probability that they are both the same value card?

c) P(both even)?

c) P(different value cards)?

25



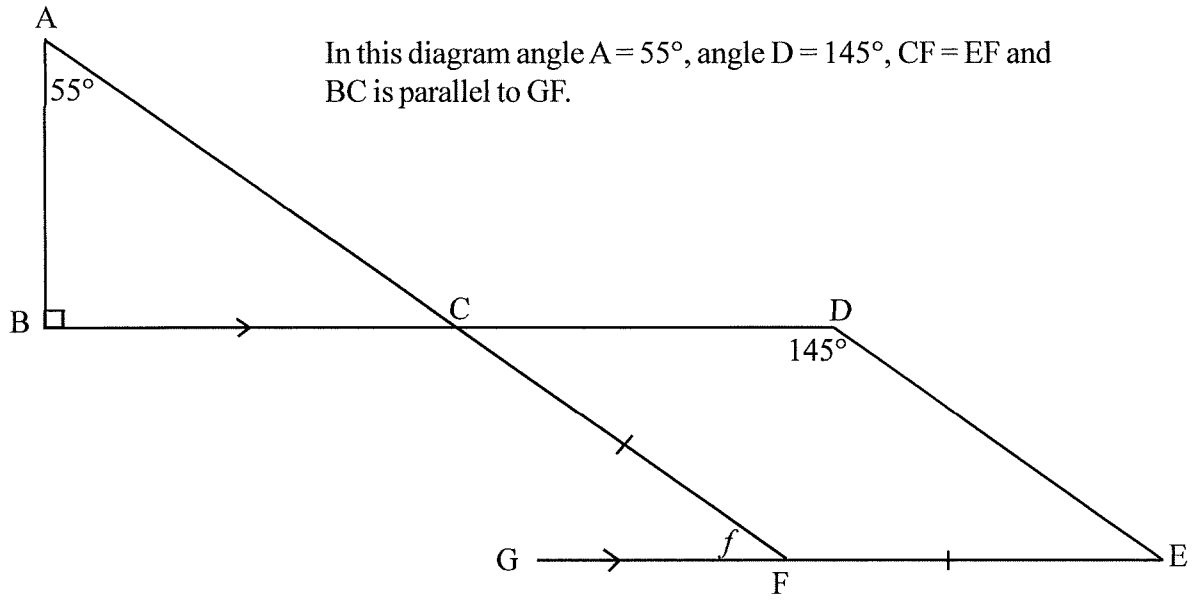
a) A and C are the opposite corners of a square. Plot the points B and D on the grid that are the other two corners of the square.

b) Write down the co-ordinates

B (,)

D (,)

26 In this diagram angle A = 55°, angle D = 145°, CF = EF and BC is parallel to GF.



a) Find the size of angle f

b) Clearly explain how you got your answer

c) What type of quadrilateral is CDEF? Explain your answer.

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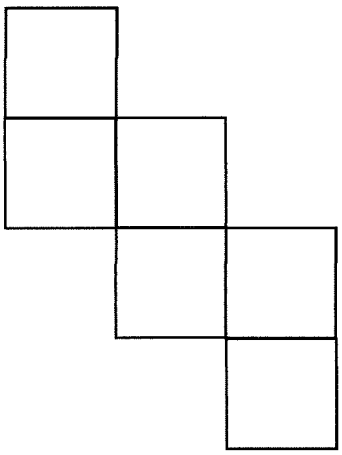
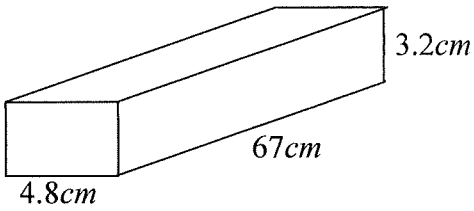
27 Of what shape is this the net?

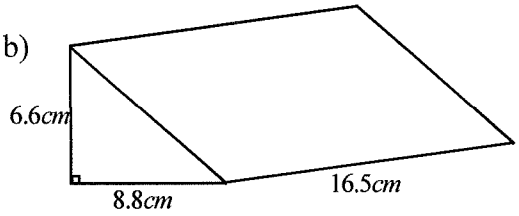


28 Find the volume of these solids:

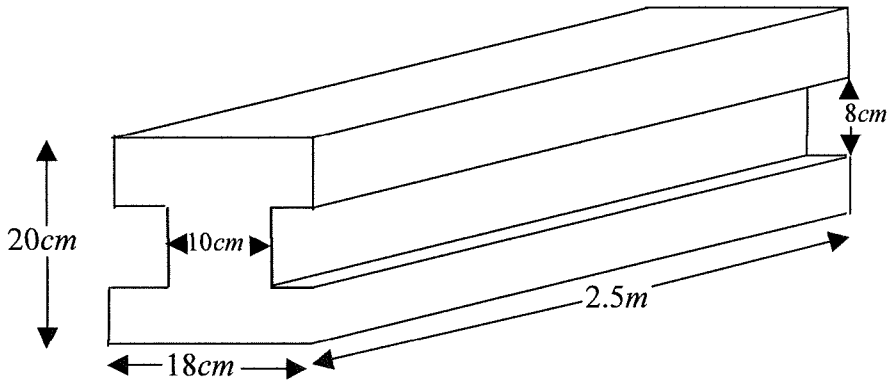
a)



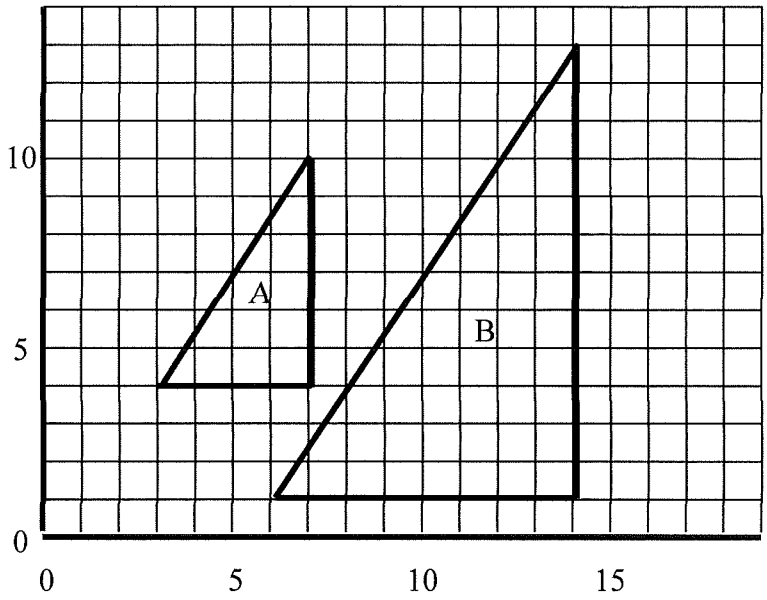
b)



c)



29



a) What is the scale factor of enlargement from triangle A onto triangle B?

b) Reflect shape B in the line $x = 10$ and label it C

c) Rotate shape A 90° clockwise about (7, 10) and label it D

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30 Look back at Question 28(b). What is the surface area of that prism?