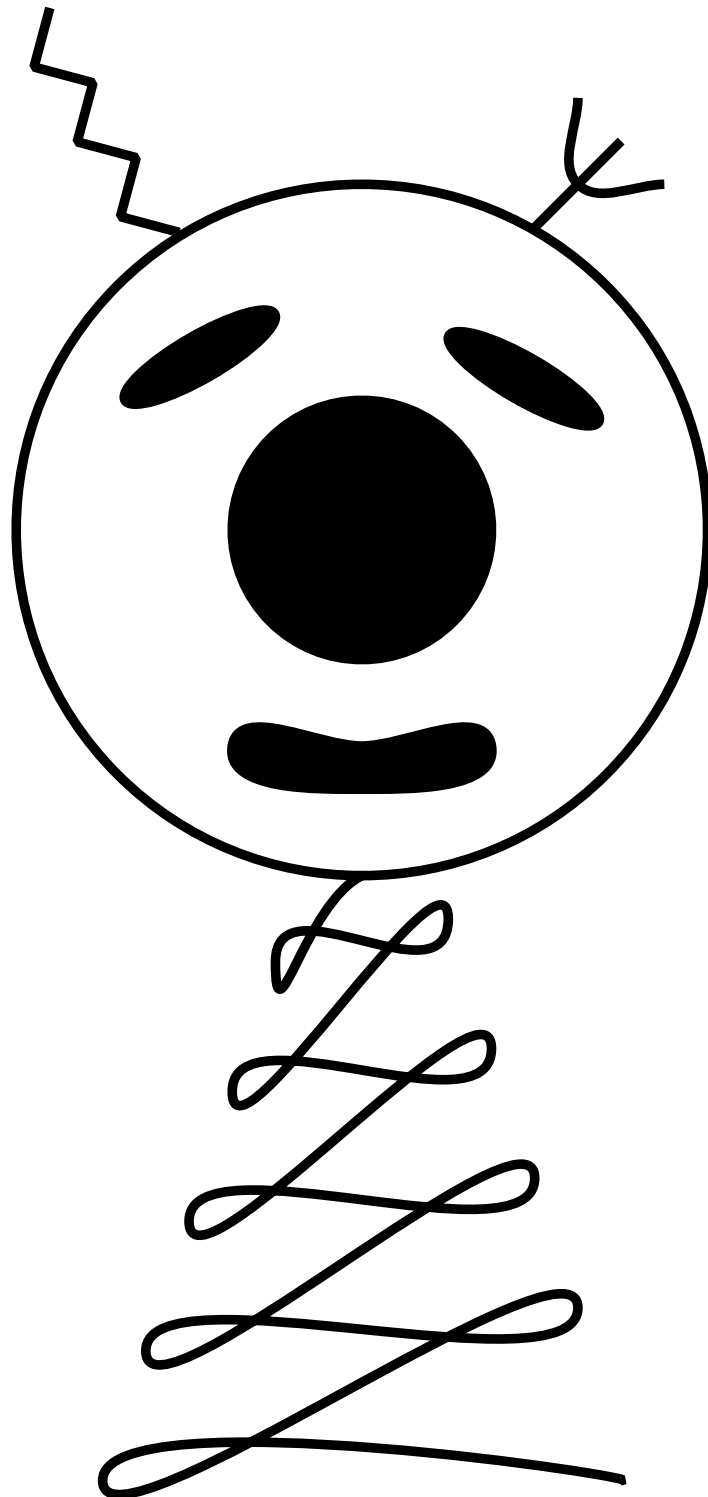


Grade Grabber

REVISION 2023



Grade Grabber 1

40 Mark Paper

Question 1

Ben Nevis, Scotland's highest mountain, is 4418 feet high

- (i) What “percentage of a mile high” is Ben Nevis ?
Use the fact that 1 mile = 5280 feet

[2 marks]

- (ii) Determine the height of Ben Nevis in metres
Use the facts that 1 foot = 12 inches, and 2.54 cm = 1 inch

[1 marks]**Question 2**The function f is such that

$$f(x) = \frac{18}{x - 5}$$

- (i) Find $f(8)$

[1 mark]

- (ii) State which value of x must be excluded from any domain of f

[1 mark]The function g is such that

$$g(x) = x - 4$$

- (iii) Calculate $fg(18)$

[2 marks]**Question 3**

- (i) Solve the following inequality

$$-5 < 3x + 1 \leq 13$$

[2 marks]

- (ii) Given that x is an integer, list the possible values of x

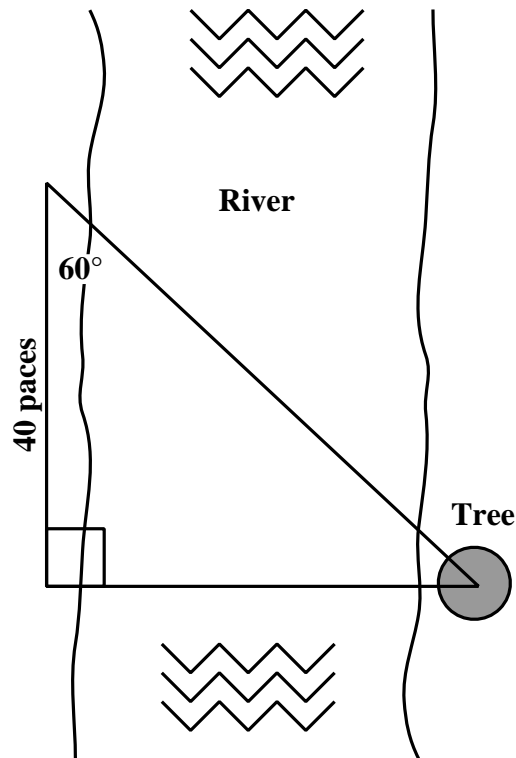
[1 marks]

Question 4

I stand on the bank of a river.

Directly opposite me, on the other river bank is a tree.

I walk 40 paces upstream and the line from me to the tree is at an angle of 60° with my river bank.



- (i) How wide, in paces, is the river ?

[2 marks]

- (ii) If I know that 120 paces is 100 m, how wide is the river, in metres ?

[1 mark]

- (iii) Explain why it would be better to walk until the angle is 45°

[1 mark]

Question 5

- (i) Use the formula $m = \frac{\Delta y}{\Delta x}$ to calculate the gradient of the straight line between the points (5, 4) and (7, 10)

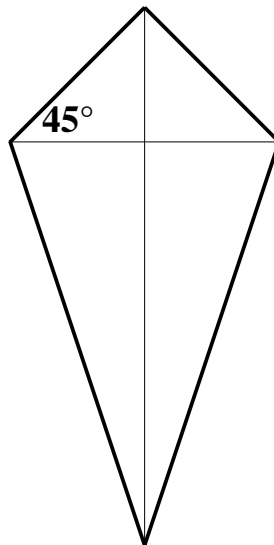
[2 marks]

- (ii) Hence work out the equation of the straight line between the two points.
Write your answer in the form $y = mx + c$

[3 marks]

Question 6

The kite shown below has a width of 4 cm and a height of 8 cm



Use the theorem of Pythagoras to help you find, correct to three significant figures, the perimeter of the kite.

[4 marks]

Question 7

The power loss, P , in an electrical cable is directly proportional to the square of the current, I , flowing in that cable.

In a certain cable I find that 100 watts of power is lost when a current of 5 amps flows.

(i) Write down a formula relating P and I for the cable.

[3 marks]

(ii) Use your formula to determine what power will be lost in the cable when a current of 12 amps flows.

[2 marks]

Question 8

Make sketches of

- (i) A hexagonal prism
- (ii) A pentagonal based pyramid

[4 marks]

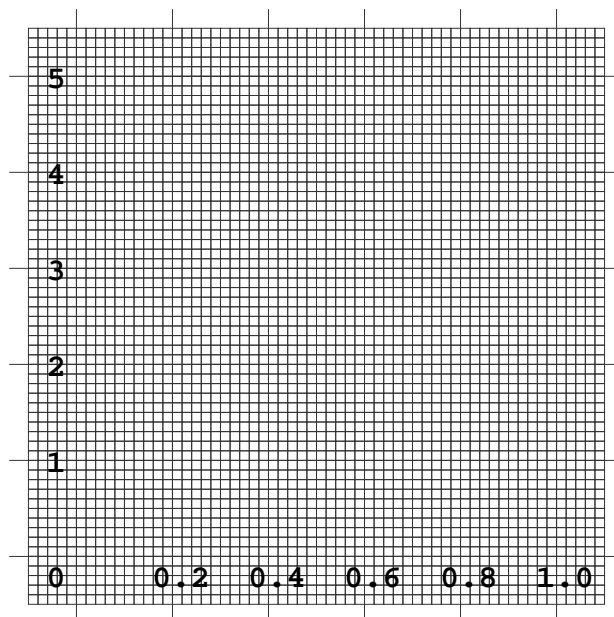
For each solid show that the number of Vertices plus the number of Faces minus the number of Edges is equal to 2.

[2 marks]

For Your Information: $V + F - E = 2$ is known as “Euler's Formula”
Google it to find out more.

Question 9

- (i) Plot the points, $(0.4, 0.2)$, $(0, 0.5)$, $(0.4, 1)$ and $(0.8, 0.5)$



[1 mark]

- (ii) Shade the quadrilateral thus formed.

[1 mark]

- (iii) A mathematical transformation known as “inversion” transforms points according to the rule,

$$(x, y) \rightarrow \left(x, \frac{1}{y}\right)$$

Transform each of the four points according to the rule for the inversion.

[2 marks]

- (iv) Plot the transformed points onto your graph and shade the resulting shape

[2 marks]