

**HIGHER TIER
MINI PRACTICE EXAM 10**

**NON-CALCULATOR
20 MINUTES ALLOWED**

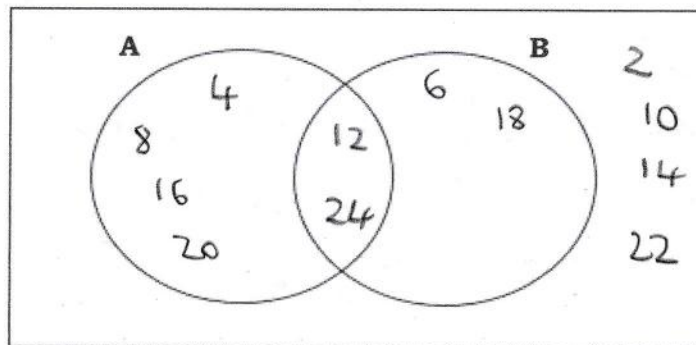
1.

ξ = all even numbers between 1 and 25 = {2, 4, 6, 8, 10, 12, 14, 16, 18, 20, 22, 24}

A = all multiples of 4 between 1 and 25 = {4, 8, 12, 16, 20, 24}

B = all multiples of 6 between 1 and 25 = {6, 12, 18, 24}

(a) Complete the Venn diagram below.



(b) Find $P(A \cap B)$

$$\frac{2}{12} = \left(\frac{1}{6}\right)$$

(3)

(c) Find $P(A)$

$$\frac{6}{12} = \left(\frac{1}{2}\right)$$

(1)

(1)

2.

Work out $64^{2/3} + 9^{3/2}$

$$(\sqrt[3]{64})^2 = 4^2 = 16$$

$$(\sqrt{9})^3 = 3^3 = 27$$

$$16 + 27 = \underline{43}$$

(2)

3.

Twelve apples were weighed, giving an average weight of 82 grams.

One apple is removed and the remaining apples reweighed, giving an average weight of 80 grams.

Find the weight of the apple that was removed.

$$82 \times 12 = 984 \text{ g}$$

$$80 \times 11 = 880 \text{ g}$$

$$984 - 880 = \underline{104 \text{ g}}$$

$$\begin{array}{r} 82 \\ \times 12 \\ \hline 164 \\ 820 \\ \hline 984 \end{array}$$

(3)

4.

Pictured below is the curve $y = f(x)$.

The point P, with co-ordinates (1, -5) is the vertex of the curve.

Find the co-ordinates of point P when the curve is transformed into:

(a) $y = f(-x)$

$(-1, -5)$

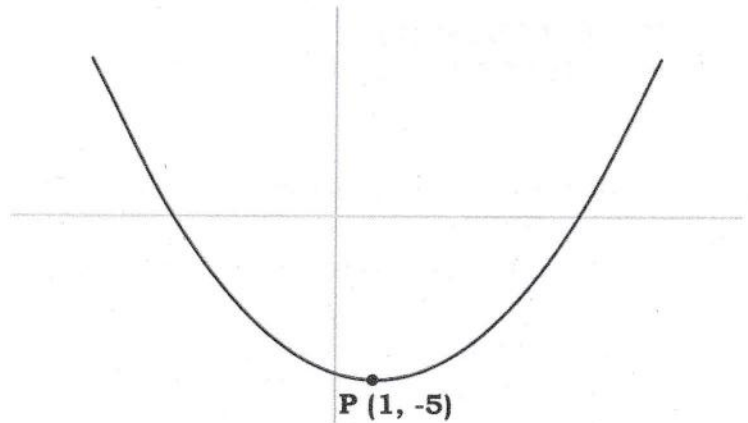
(b) $y = f(x - 4)$

$(5, -5)$

(c) $y = f(x) + 3$

$(1, -2)$

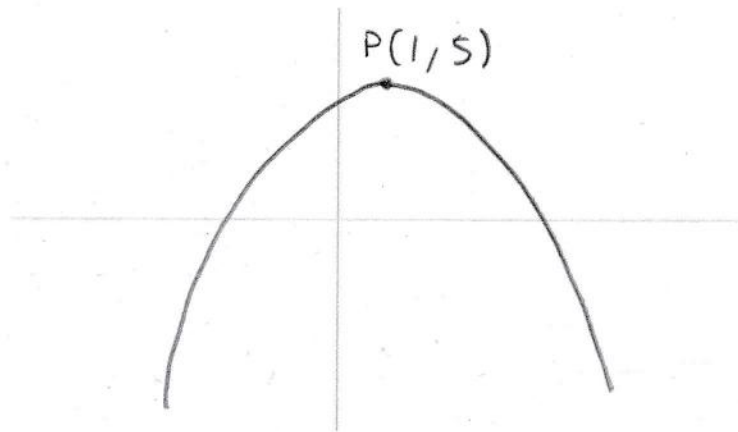
(d) On the axis below, sketch the curve $y = -f(x)$, clearly labelling the position of point P.



(1)

(1)

(1)



(2)

5.

The first three terms of a quadratic sequence are 15, 28 and 45.

Prove that this sequence will never generate a prime number.

$$\begin{array}{c} 15, 28, 45 \\ \underbrace{\quad} \quad \underbrace{\quad} \\ 13 \quad 17 \\ \underbrace{\quad} \\ 4 \end{array}$$

seq	15	28	45
$2n^2$	2	8	18
diff	13	20	27
	$\underbrace{\quad}$	$\underbrace{\quad}$	
	+7	+7	

$7n + 6$

n th term = $2n^2 + 7n + 6$

$\times 12$
 $+ 7$

$2n^2 + 4n + 3n + 6$

$2n(n+2) + 3(n+2)$

$= (2n+3)(n+2)$

Because the n th term can be factorised, the sequence will never produce a prime number. (5)