1. When simplified $3^{5m} \times 3^{2m}$ equals

   A. 3^{7m}

   B. 3^{3m}

   C. 9^{3m}

   D. 9^{7m} (1 mark)

2. $\log xy + \log z$ is equal to

   A. $\log \dfrac{xy}{z}$

   B. $\log \dfrac{z}{xy}$

   C. $\log xyz$

   D. $\log xy + z$ (1 mark)

4. Solve the equation $3^{x+1} = 9$ (1 mark)

5. Simplify $\dfrac{7}{3-\sqrt{2}}$ by **rationalizing** the denominator.   (2 marks)

6. Simplify $\dfrac{4^{5x}}{2^{x}}$ (2 marks)

7. The table given below shows the set $\{0, 1, 2, 3, 4\}$ under the operation **addition modulo** 5. Use the table to answer parts (i) − (iv).

+	0	1	2	3	4
0	0	1	2	3	4
1	1	2	3	4	0
2	2	3	4	0	1
3	3	4	0	1	2
4	4	0	1	2	p

   (i)   Find the value of **p**.   (1 mark)
   (ii)   What is the **identity element**?   (1 mark)
   (iii)   Give the **inverse** of 2.   (1 mark)
   (iv)   Evaluate $(1 + 2) + 3$.   (1 mark)

1.   The table shows the results for $S = \{2, 4, 6\}$ under an operation $\bullet$

If $2 \bullet y = 4$ then y is

A.   2

B.   4

C.   6

D.   8

$\bullet$	2	4	6
2	6	4	2
4	4	2	4
6	2	4	6

2.   When simplified $8 + \sqrt{7} + 6\sqrt{7}$ is equal to

A. $8 + 7\sqrt{7}$

B. $14 + 2\sqrt{7}$

C. $\sqrt{57}$

D. $\sqrt{28}$

3   If a polynomial $f(x)$ is divided by $x + 2$, the **remainder** is

A. $f(x + 2)$

B. $f(x - 2)$

C. $f(-2)$

D. $f(2)$

4.   When simplified $\dfrac{-1}{4 + \sqrt{15}}$ is equivalent to

A. $\sqrt{15} - 4$

B. $\sqrt{15} + 4$

C. $4 - \sqrt{15}$

D. $-4 - \sqrt{15}$

5.   The value of $log_2 8$ is

A.   2

B.   3

C.   4

D.   8

1. If $f(x) = |x - 3|$, then $f(0)$ is equal to

    A. -3

    B.   0

    C.   2

    D.   3

The exact value of $\left(\dfrac{16}{25}\right)^{\frac{1}{2}}$ is

2.

    A. $\dfrac{4}{5}$

    B. $\dfrac{2}{5}$

    C. $\dfrac{4}{25}$

    D. $\dfrac{8}{25}$

3. Use the **quadratic formula** to solve the equation $2x^2 + 1 = 5x$ **(2 marks)**

4. If $x = \log 3$ and $y = \log 21$, write an expression for $\log \sqrt{7}$ in terms of x and y.   **(2 marks)**

5. Simplify $\dfrac{4^{5m+1}}{2^{9m}}$ **(2 marks)**

1.   Simplify $\dfrac{x^2 + 2x}{8} \div \dfrac{x+2}{16}$ **(2 marks)**

2.   A polynomial function is given by $f(x) = x^3 - 5x^2 - 2x + 24$.
        Given that $x + 2$ is one of the factors of $f(x)$, find the other two factors.   **(2 marks)**

3.   A quadratic equation is given as $4x^2 + 3x + p = 0$. Find the values of p

        such that $4x^2 + 3x + p = 0$ has **2 distinct real roots**.   **(2 marks)**

4.   The value of $\displaystyle\sum_{n=1}^{n=3} (n + 1)$ is

        A.   2

        B.   3

        C.   4

5.   The solution set for $-2x + 2 \geq 4$ is given by

        A. $x < -1$

        B. $x \leq -1$

   C. $x \geq -1$

   D. $x > -1$

1.   When simplified $\dfrac{x^2 - 9}{x + 3}$ equals

    A. $x - 3$

    B. $x + 3$

    C. $\dfrac{1}{x + 3}$

    D. $\dfrac{1}{x - 3}$

2.   The first term of a **geometric** sequence is 96 and the ratio is $\dfrac{1}{4}$. The **sum to infinity** of this sequence is equal to

    A.   127

    B.   128

    C.   129

    D.   130

    (**Hint** : $S_\infty = \dfrac{a}{1 - r}$)

3.   The first four terms of an arithmetic sequence are given as $\langle 2,\ 6,\ 10,\ 14....\rangle$.

    Calculate:

    (a)   the 6th term.   **(1 mark)**

    (b)   the sum of the first 10 terms.   **(1 mark)**

4.   **A geometric sequence** is given as $\langle 2,\ 4,\ 8,\ 16,\ .....\rangle$

    (i)   Find the common ratio.   **(1 mark)**

    (ii)   Find the 5th term.   **(1 mark)**

    (iii) Calculate the sum of the first 15 terms.   **(1 mark)**

5.   Make k the subject of the formula $r = \dfrac{2k + w}{3}$.   **(2 marks)**

1. The table below shows the result of an operation * on a set S = {w, x, y, z}.

*	w	x	y	z
w	z	w	x	y
x	w	x	y	z
y	x	y	z	w
z	y	z	w	x

The identity element for the operation is

A. w
B. x
C. y
D. z

2. The expression $7\sqrt{3} + 3\sqrt{5} - 2\sqrt{3} - 6\sqrt{5}$, when simplified, is equal to
   A. $10\sqrt{5} - 8\sqrt{3}$
   B. $10\sqrt{15} - 8\sqrt{15}$
   C. $5\sqrt{3} + 3\sqrt{5}$
   D. $5\sqrt{3} - 3\sqrt{5}$

3. Matrices that have determinant zero are called
   A. combined matrices
   B. singular matrices
   C. Zero matrices
   D. Non singular matrices

4. The function $y = -(x + 2)^2 - 1$ is best represented by which of the following graphs?

A.

B.

C.

D.
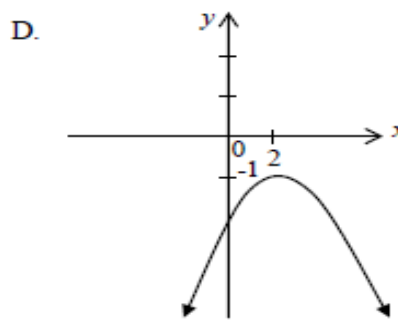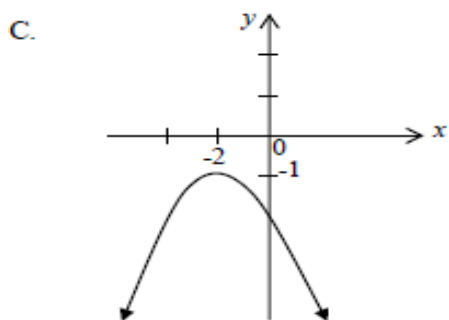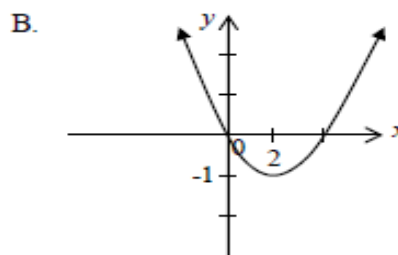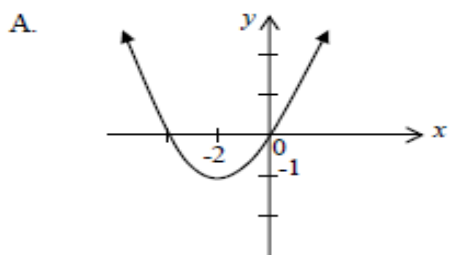
5. Make r the subject of the formula in $M = \frac{1}{3}\pi r^2 h - 4$

1. Solve the equation $\dfrac{x+2}{3} + 4 = \dfrac{x}{2}$

2. Use the quadratic formula to solve the equation: $2x^2 + 6x - 1 = 0$.

   Give your answers correct to **two** decimal places.

3. Simplify $\qquad \dfrac{2x}{5} - \dfrac{x}{4} \div \dfrac{x^2}{8}$

4. Solve the inequation $\qquad \dfrac{x+4}{2} - \dfrac{2x}{3} < 4$

5.   Simplify $\qquad \dfrac{\sqrt{2}+1}{3-\sqrt{2}}$ by rationalizing the denominator

6. $\dfrac{\log x^8 - \log x^5}{\log x}$ in its simplest form is equal to

   A. $\log x^3$
   B. $\log x^2$
   C. 3
   D. 2