MATHEMATICS -CORE

TOPIC- NUMBER & ALGEBRA

Basic

1 (a) Write down

  (i) a square number between 30 and 40,

  .... [1]

  (ii) the number three million, three hundred and thirty in figures,

  .... [1]

  (iii) the next cube number after 64,

  .... [1]

  (iv) the five factors of 16,

  ...., ..., ..., ..., ... [2]

  (v) a common multiple of 6 and 8,

  .... [1]

  (vi) a prime number between 20 and 30.

  .... [1]

(b) Write 567.4892 correct to

  (i) the nearest ten,

  .... [1]

  (ii) 2 decimal places.

  .... [1]

(c) Complete these calculations.

  (i) $4 + 6 \div 2 =$ ....

  [1]

  (ii) $(8 - 20) \div$ .... $= 4$

  [1]

  (iii) $6432 \times$ .... $= 64.32$

  [1]
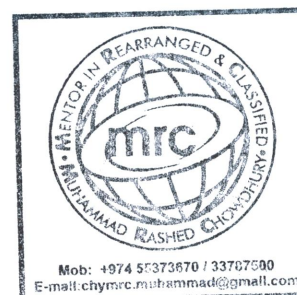
(d) Simplify.
$$5a + 4b - 2a - b + 3a - 2b$$

.... [2]

(e) Multiply out the brackets.

(i) $5(x-4)$

.... [1]

(ii) $x(x^2 + 3)$

.... [2]

(f) Factorise completely.
$$8x^2 - 4x$$

.. [2]
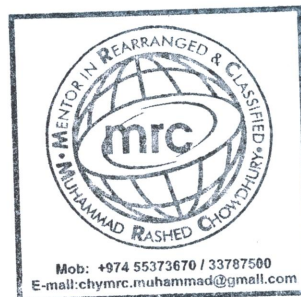
2 (a) Here are five number cards.

| 1 | 2 | 6 | 7 | 8 |
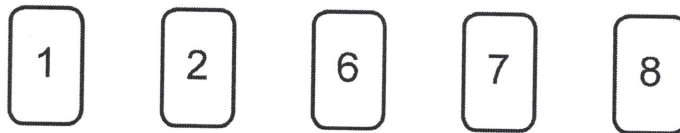
Place two cards side-by-side to show

(i) a two-digit multiple of 7,

[1]

(ii) a two-digit square number,

[1]

(iii) a two-digit cube number,

[1]

(iv) a two-digit prime number.

[1]

(b) $\sqrt{2}$ 5.85 4.1^2 π

Write down all the numbers in this list that are irrational.

.... [1]

(c) Put one pair of brackets into this calculation to make it correct.

$$7 \times 5 - 2 + 3 = 42$$

[1]

3 **(a)** $$x = 3m - k$$

Find the value of

(i) x when $m = 2$ and $k = -4$,

Answer(a)(i) .... [2]

(ii) m when $x = 19$ and $k = 5$.

Answer(a)(ii) .... [3]

(b) Expand the brackets.

$$g(7f - g^2)$$

Answer(b) .... [2]

(c) Factorise completely.

$$18h^2 - 12hj$$

Answer(c) .... [2]

(d) Make m the subject of the formula.

$$t = 8m + 15$$

Answer(d) m = ... [2]

(e) Solve the equation.

$$p + 3 = 3(p - 5)$$

Answer(e) p = ... [3]

4   **(a)** Solve the following equations.

   (i) $6x - 2 = 2x + 8$

Answer(a)(i) $x =$ .... [2]

   (ii) $4(2y - 3) = 24$

Answer(a)(ii) $y =$ .... [3]

(b) Solve the simultaneous equations.

$$5x + 9y = -21$$
$$12x - 2y = 44$$

Answer(b) $x =$ ....

$y =$ .... [4]

5 **(a)** $A = \frac{1}{2}(a+b)h$

Work out the value of A when $a = 9.6$, $b = 12.4$ and $h = 7.5$.

Answer(a) .... [2]

(b) **(i)** Expand $x(x^2 - 3y)$.

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

(ii) Expand and simplify $4(2w - 3) + 5(w - 2)$.

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

(c) A quadrilateral has sides x, $2x$, y and $3y$.

(i) Write down and simplify a formula for the perimeter, p, of the quadrilateral.

Answer(c)(i) $p =$ .... [2]

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(ii) Make y the subject of the formula in **part (c)(i)**.

Answer(c)(ii) $y =$ .... [2]

(d) Joseph is 3 times as old as Amy.
In 5 years time Joseph will be 2 times as old as Amy.

(i) Amy is now n years old.

Write down an equation in n connecting the ages of Joseph and Amy in 5 years time.

Answer(d)(i) .... [2]

(ii) Solve the equation to find n.

Answer(d)(ii) $n =$ .... [3]

6 (a) Write down a factor of 24 that is a square number.

.... [2]

(b) Write down the cube number between 100 and 200.

.... [1]

(c) Find

(i) $\sqrt{12.25}$,

.... [1]

(ii) 17^3 ,

.... [1]

(iii) 4^{-2}.

.... [1]

(d) $s = \frac{1}{2}at^2$

Find the value of s when $a = 0.7$ and $t = 4.2$.

$s = $ .... [2]

(e) Simplify.

(i) a^0

.... [1]

(ii) $b^3 \times b^2$

.... [1]

(iii) $\dfrac{c^4}{c^8}$

.... [1]

∪ 7   **(a)** Simplify the following expressions.

   (i) $3m - 5m + 6m$

Answer(a)(i) .... [1]

   (ii) $5e - 4f - 3e - 6f$

Answer(a)(ii) .... [2]

   (b) $s = u + at$

   (i) Calculate the value of s when $u = 27$, $a = -2$ and $t = 15$.

Answer(b)(i) $s =$ .... [2]

   (ii) Make t the subject of the formula $s = u + at$.

Answer(b)(ii) $t =$ .... [2]

   (c) Solve the simultaneous equations.

$$5x + 2y = 4$$
$$4x - y = 11$$

Answer(c) $x =$ ....

                              $y =$ .... [3]

8 (a) (i) $A = 4\pi r^2$

Work out the value of A when $r = 5.6$.
Give your answer correct to 1 decimal place.

Answer(a)(i) $A =$ .... [2]

(ii) Simplify the expression.

$$2a - b + 5a - 3b$$

Answer(a)(ii) .... [2]

(iii) Solve the equation.

$$\frac{x}{3} = 6$$

Answer(a)(iii) $x =$ .... [1]

(iv) Solve the equation.

$$x - 2 = 9$$

Answer(a)(iv) $x =$ .... [1]

(b) Solve the simultaneous equations.
You must show all your working.

$$2x + 3y = 4$$
$$3x - 4y = 23$$

Answer(b) $x =$ ....

$y =$ .... [4]
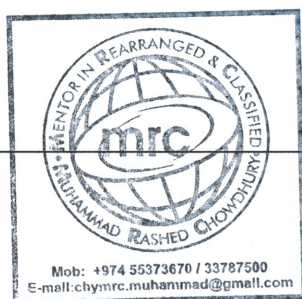
9 (a) $p = 4r - 3t$

(i) Calculate the value of p when $r = 5$ and $t = -6$.

$p =$ .... [2]

(ii) Make r the subject of the formula $p = 4r - 3t$.

$r =$ .... [2]

(b) Expand the brackets and simplify.

$$4(3x - 2) - 3(x - 5)$$

.... [2]

(c) Factorise completely.

$$12ab - 20a^2$$

.... [2]
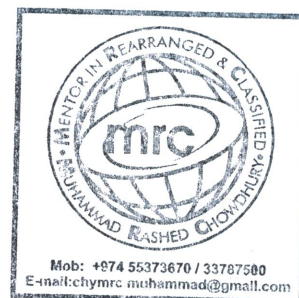
10 (a) Solve.

(i) $29 - x = 18$

Answer(a)(i) $x =$ .... [1]

(ii) $4(2y + 7) = 164$

Answer(a)(ii) $y =$ .... [3]

(b) Simplify.
$$6x^4 \times 8x$$

Answer(b) .... [2]

(c) Find

(i) $\sqrt{81}$,

Answer(c)(i) .... [1]

(ii) 7^3,

Answer(c)(ii) .... [1]

(iii) 8^0.

Answer(c)(iii) .... [1]

(d) (i) Write 6751 correct to the nearest hundred.

Answer(d)(i) .... [1]

(ii) Write 0.25 as a fraction.

Answer(d)(ii) .... [1]

(iii) Write 0.06 as a percentage.

Answer(d)(iii) .... % [1]

(iv) Write 687 000 000 in standard form.

Answer(d)(iv) .... [1]

11 **(a)** Factorise completely.
$$15a^3 - 5ab$$

Answer(a) .... [2]

(b) Simplify.
$$3x^2y^3 \times x^4y$$

Answer(b) .... [2]

(c) Multiply out the brackets and simplify.
$$3(x - 2) - 4(2x - 3)$$

Answer(c) .... [2]

(d) Solve the equation.
$$8x + 9 = 3(x + 8)$$

Answer(d) x = ... [3]
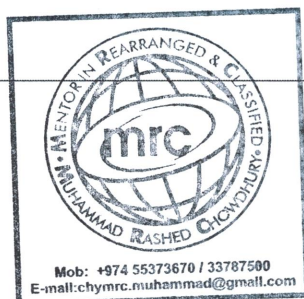
7.2 Solve.

(a) $4x = 10$

$x =$ .... [1]

(b) $5(x + 8) = 75$

$x =$ .... [2]

(c) $3^7 \div 3^x = 9$

$x =$ .... [1]

13 (a) Expand and simplify.

$$2(x - 3) + 3(2x + 4)$$

Answer(a) .... [3]

(b) Factorise completely.

$$3x^2 - 9xy$$

Answer(b) .... [2]

(c) Solve the equation.

$$3x + 5 = x + 12$$

Answer(c) x = ... [2]

(d) If $a = 3$ and $b = -2$ find the value of $2a - 3b$.

Answer(d) .... [2]