

Cfe Higher Maths Homework (8)

① When $2ax^3 + (a+1)x - 6$ is divided by $x+2$, the remainder is 2.

What is the value of a ?

- A. $\frac{5}{3}$
- B. $-\frac{4}{9}$
- C. $-\frac{5}{9}$
- D. $-\frac{5}{7}$

② Solve $\log_b x - \log_b 7 = \log_b 3$ for $x > 0$.

- A. $x = 21$
- B. $x = 10$
- C. $x = \frac{7}{3}$
- D. $x = \frac{3}{7}$

③ (a) Show that $(x-3)$ is a factor of $f(x)$ where $f(x) = 2x^3 + 3x^2 - 23x - 12$.

2

(b) Hence express $f(x)$ in its fully factorised form.

2

④ (a) Express $f(x) = x^2 - 4x + 5$ in the form $f(x) = (x-a)^2 + b$.

2

(b) On the same diagram sketch:

- (i) the graph of $y = f(x)$;
- (ii) the graph of $y = 10 - f(x)$.

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(c) Find the range of values of x for which $10 - f(x)$ is positive.

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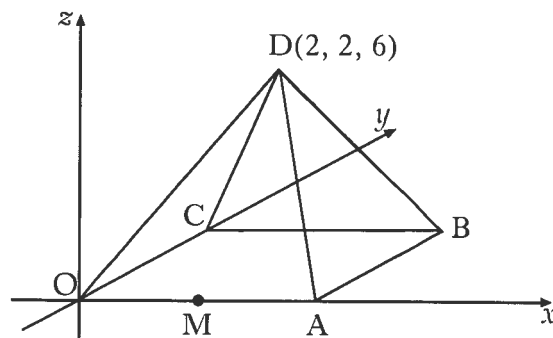
⑤ When $f(x) = 2x^4 - x^3 + px^2 + qx + 12$ is divided by $(x-2)$, the remainder is 114.

One factor of $f(x)$ is $(x+1)$.

Find the values of p and q .

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⑥ D,OABC is a square based pyramid as shown in the diagram below.



O is the origin, D is the point $(2, 2, 6)$ and $OA = 4$ units.

M is the mid-point of OA.

(a) State the coordinates of B.

1

(b) Express \vec{DB} and \vec{DM} in component form.

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(c) Find the size of angle BDM.

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⑦ $f(x) = 2x - 1$, $g(x) = 3 - 2x$ and $h(x) = \frac{1}{4}(5 - x)$.

(a) Find a formula for $k(x)$ where $k(x) = f(g(x))$.

2

(b) Find a formula for $h(k(x))$.

2

(c) What is the connection between the functions h and k ?

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