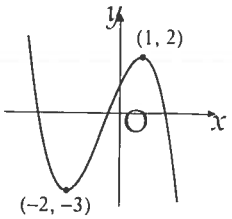
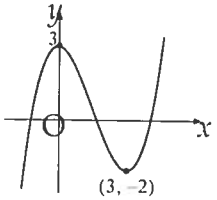
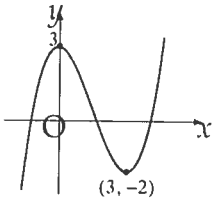
Cfe Higher Maths Homework (10)

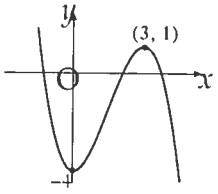
(1) The diagram shows the graph of $y = f(x)$.

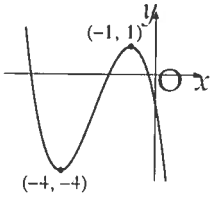


Which of the following shows the graph of $y = f(x+2) - 1$?

A.


B.


C.


D.


(2) Given that the points $S(-4, 5, 1)$, $T(-16, -4, 16)$ and $U(-24, -10, 26)$ are collinear, calculate the ratio in which T divides SU.

A. 2 : 3

B. 3 : 2

C. 2 : 5

D. 3 : 5

(3) Differentiate $2\sqrt[3]{x}$ with respect to x.

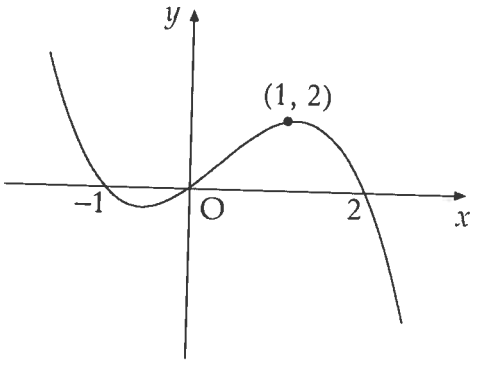
A. $6\sqrt{x}$

B. $\frac{3}{2}\sqrt[3]{x^4}$

C. $-\frac{4}{3\sqrt[3]{x^2}}$

D. $\frac{2}{3\sqrt[3]{x^2}}$

(4) The diagram shows the graph of a cubic.



What is the equation of this cubic?

A. $y = -x(x+1)(x-2)$

B. $y = -x(x-1)(x+2)$

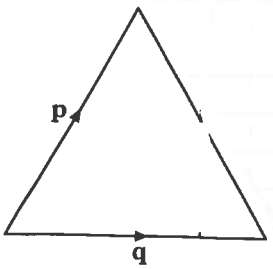
C. $y = x(x+1)(x-2)$

D. $y = x(x-1)(x+2)$

(5) An equilateral triangle of side 3 units is shown.

The vectors p and q are as represented in the diagram.

What is the value of $p.q$?



A. 9

B. $\frac{9}{2}$

C. $\frac{9}{\sqrt{2}}$

D. 0

PTO

(6) at value of k does the equation $x^2 - 5x + (k+6) = 0$ have equal roots? **3**

(7) If $f(x) = kx^3 + 5x - 1$ and $f'(1) = 14$, find the value of k. **3**

(8) $f(x) = 3 - x$ and $g(x) = \frac{3}{x}, x \neq 0$.

(a) Find $p(x)$ where $p(x) = f(g(x))$. **2**

(b) If $q(x) = \frac{3}{3-x}, x \neq 3$, find $p(q(x))$ in its simplest form. **3**

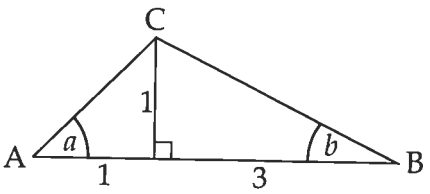
(9) Given $f(x) = 3x^2(2x-1)$, find $f'(-1)$. **3**

(10) Show that the roots of the equation $(k-2)x^2 - (3k-2)x + 2k = 0$ are real. **4**

(11) (a) Given that $x+2$ is a factor of $2x^3 + x^2 + kx + 2$, find the value of k. **3**

(b) Hence solve the equation $2x^3 + x^2 + kx + 2 = 0$ when k takes this value. **2**

(12) In triangle ABC, show that the exact value of $\sin(a+b)$ is $\frac{2}{\sqrt{5}}$. **4**



(13) The diagram shows part of the graph of $y = ke^{0.5x}$.

(a) Find the value of k. **1**

(b) The line with equation $x = 1$ intersects the graph at P.
Find the coordinates of the point P. **2**