## Outcome 1

1. (i) Show that $(x-3)$ is a factor of $f(x)=x^{3}-x^{2}-14 x+24$.
(ii) Hence factorise $f(x)$ fully.

5

2 Determine the nature of the roots of the equation $2 x^{2}+x-2=0$ using the discriminant.

## Outcome 2

3 Find $\int \frac{3}{x^{4}} d x$

4 The curve with equation $y=x^{2}(3-x)$ is shown in Diagram 1.

Calculate the shaded area shown in Diagram 1.


5

5 The line with equation $y=x+6$ and the curve with equation $y=x^{2}-5 x+6$ are shown in Diagram 2 .

The line and curve meet at the points where $x=0$ and $x=6$.

Calculate the shaded area shown in Diagram 2.


Diagram 2

## Outcome 3

6 Solve the equation $4 \sin 2 x=2$ for $0 \leq x \leq \pi$.

7 Diagram 3 shows two right-angled triangles.

(a) Write down the values of $\sin x$ and $\cos y$.
(b) Show that the exact value of $\sin (x+y)$ is $\frac{117}{125}$
(a) Express $\sin x^{\circ} \cos 20^{\circ}+\cos x^{\circ} \sin 20^{\circ}$ in the form $\sin (x+a)$.
(b) Using the result from (a), solve $\sin x^{\circ} \cos 20^{\circ}+\cos x^{\circ} \sin 20^{\circ}=\frac{4}{5}$
for $0<x<180$.

## Outcome 4

9 (a) A circle has radius 5 units and centre (2, -3 ). Write down the equation of the circle.
(b) A circle has equation $x^{2}+y^{2}+10 x-8 y-8=0$. Write down the coordinates of its centre and the length of its radius.

10 Show that the line with equation $y=2 x+5$ is a tangent to the circle with equation $x^{2}+y^{2}-6 x-2 y-10=0$.

11 The point $\mathrm{A}(-1,6)$ lies on the circle with centre $(-4,2)$, as shown in Diagram 4.

Find the equation of the tangent at A .


## End of assessment

