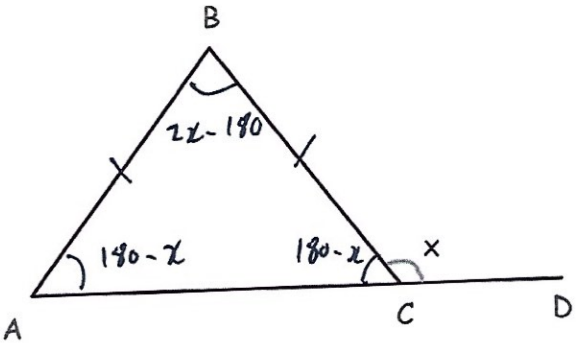
Corbettmaths

15th January



ABC is an isosceles triangle.
AB = BC
ACD is a straight line.

Angle BCD $= x°$

Prove angle ABC $= (2x - 180)°$

$\angle BCD = x$
$\angle ACB = 180 - x$ (angles in a straight line add to 180°)
$\angle ACB = \angle BAC = 180 - x$ (isosceles triangle)
$(180 - x) + (180 - x) = 360 - 2x$
$\angle ABC + (360 - 2x) = 180$
$\therefore \angle ABC = 2x - 180$

Use the factor theorem to show that $(x - 2)$ and $(x + 5)$ are factors of

$f(x) = x^3 + 2x^2 - 13x + 10$

$f(2) = 2^3 + 2\times 2^2 - 13\times 2 + 10$
$= 0 \quad \therefore (x-2)$ is a factor

$f(-5) = -125 + 50 - 65 + 10$
$= 0 \quad \therefore (x+5)$ is a factor

Use the factor theorem to show that $(x - 2)$ and $(x + 5)$ are also factors of

$g(x) = x^3 + 11x^2 + 14x - 80$

$g(2) = 2^3 + 11\times 2^2 + 14\times 2 - 80$
$= 0 \quad \therefore (x-2)$ is a factor

$g(-5) = (-5)^3 + 11(-5)^2 + 14(-5) - 80$
$= 0 \quad \therefore (x+5)$ is a factor

Hence, simplify fully

$10 = -2\times 5\times \boxed{-1}$

$$\frac{x^3 + 2x^2 - 13x + 10}{x^3 + 11x^2 + 14x - 80} = \frac{(x-2)(x+5)(x-1)}{(x-2)(x+5)(x+8)}$$

$-80 = -2\times 5\times \boxed{8}$

$$\frac{x-1}{x+8}$$