

1. Find the quotient and remainder by synthetic division where  $x^3 + 2x^2 - 7x + 1$  is divided by  $x - 1$

2. Using graphing software, fill in the table below for this function  $f(x) = 12x^3 - 5x^2 - 11x + 6$

x-intercepts	
degree of the polynomial	
y-intercept	
domain	
range	
end behaviour	

3. Fill in the following table.

<p><b>Function:</b> <math>y = -(x + 2)^5(x - 4)^4</math></p> <p><b>Degree:</b></p> <p><b>Sign:</b></p> <p><b>Roots:</b></p> <p><b>y-intercept:</b></p> <p><b>domain:</b></p> <p><b>range:</b></p> <p><b>end behaviours:</b>  as <math>x \rightarrow -\infty</math>,  as <math>x \rightarrow \infty</math>,</p>	<p><b>Function:</b> <math>y = x^2(x + 1)^3(x - 3)</math></p> <p><b>Degree:</b></p> <p><b>Sign:</b></p> <p><b>Roots:</b></p> <p><b>y-intercept:</b></p> <p><b>domain:</b></p> <p><b>range:</b></p> <p><b>end behaviours:</b>  as <math>x \rightarrow -\infty</math>,  as <math>x \rightarrow \infty</math>,</p>
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4. Solve for  $x$ ,  $x \in R$  ...

a)  $(x + 1)(x - 2)(x - 4)^2 \geq 0$

b)  $-x^3 + 25x < 0$

5. Determine the remainder when  $x^3 + 3x^2 - x - 2$  is divided by  $(x + 3)(x + 5)$

6. If  $f(x) = x^3 - (a+b)x^2 + abx$ , find the value of  $f(a)$  and explain the significance of  $x - a$

7. When  $2x^3 + kx^2 - 5x + 1$  is divided by  $(x-2)$ , the remainder is 19. Find the value of  $k$

8. Connect the application with the most appropriate function:

<b>Application</b>	<b>Type of function(choices: linear, quadratic, cubic, exponential, sinusoidal)</b>
Compound interest: Amount = Principal $\times (1 + i)^n$	
A periodic sound wave that has a fixed amplitude.	
The flight of a ball in the air.	
The total payment for a cellular phone plan with a fixed initial cost plus a rate per minute of use.	

9. When  $2x^3 + x^2 - 2kx + f$  is divided by  $x-1$ , the remainder is  $-4$ , and when it is divided by  $x+2$ , the remainder is  $11$ . Determine the values of  $k$  and  $f$ .

10. Determine an expression for  $f(x)$  in which  $f(x)$  is cubic,  $f(x) \geq 0$  when  $x \leq 2$ ,  $f(x) < 0$  when  $x > 2$ , and  $f(0) = 4$ . You must show your reasoning behind the function.