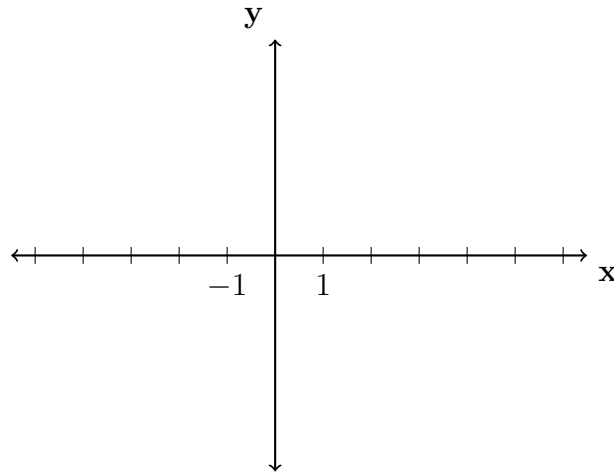


**Exam: Polynomial operations & graphs**

Write your answers in the space provided.

1. Given the function  $f(x) = (x - 2)(x + 5)$ .
  - (a) State the  $x$ -intercepts of the graph of  $f$ .
  
  
  
  
  
  
  
  - (b) Find the  $y$ -intercept of the graph of  $f$ .
  
2. If  $(x - 5)$  is a factor of  $f(x) = (x - 5)(x^2 + 11x + 17)$ , then what is the value of  $f(5)$ ?
  
  
  
  
  
  
  
3. What are the quotient and remainder when  $x^3 + 5x^2 + 8x + 9$  is divided by  $x + 2$ ?

4. Given the polynomial function  $h(x) = (x - 3)(x + 1)(x + 5)$ . Sketch  $y = h(x)$  on the grid below, accurately depicting the  $x$ - and  $y$ -intercepts.



5. Given  $2x(3x^2 - 4x + 6) + 8 = 6x^3 + hx^2 + kx + 8$ . Find  $h$  and  $k$ .

6. Given the function  $f(x) = (x + 1)(x^2 - 4x - 5)$

(a) Express  $f$  in fully factored form.

(b) What are the roots of the function?

7. Simplify  $2i(-4 - 7i)$ . Express the result in the form  $a + bi$  where  $a, b \in R$ .

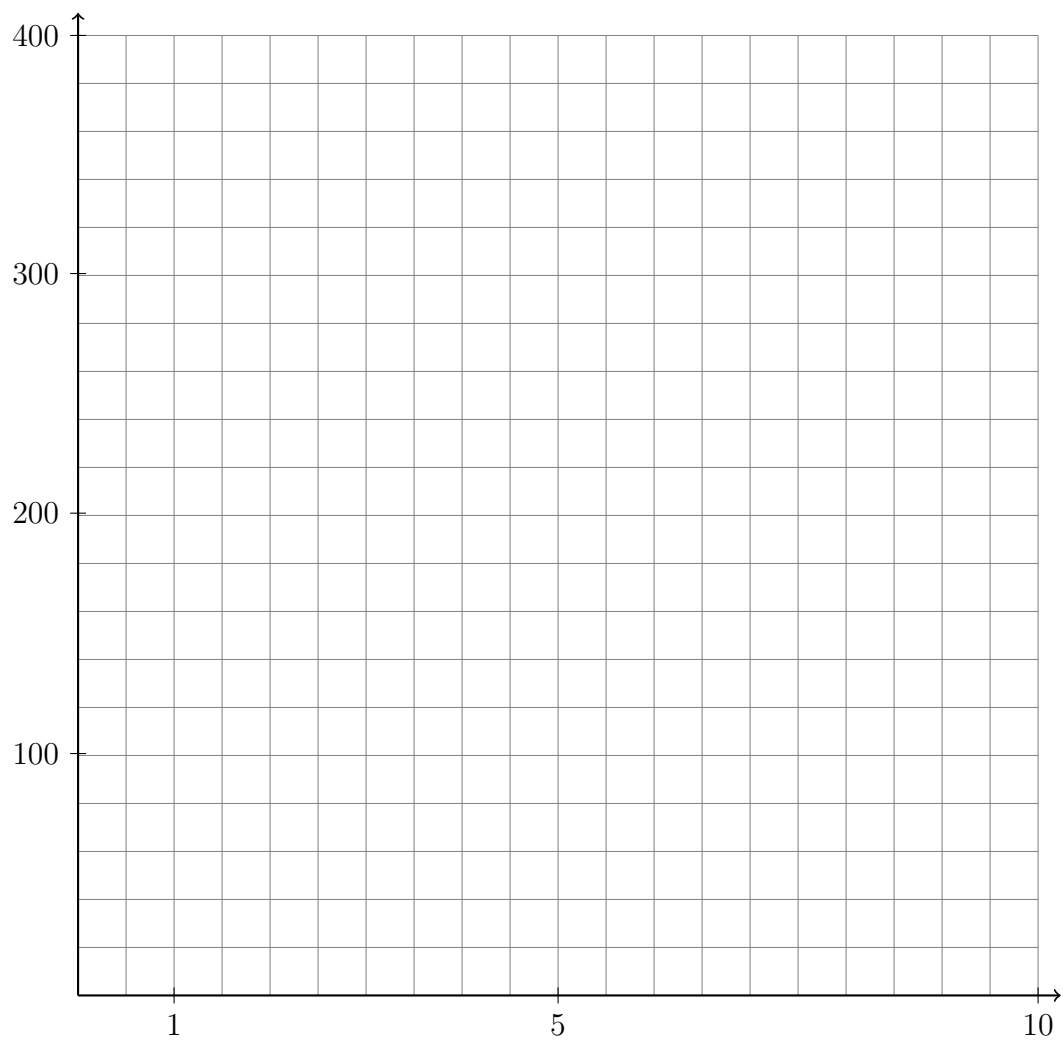
8. Simplify the expression  $5xi(1 - 2i)$ .

9. When  $g(x)$  is divided by  $x+4$ , the remainder is 0. Given  $g(x) = x^4 + 3x^3 - 6x^2 - 6x - 8$ .  
Write down the value of  $g(-4)$ .

10. Simplify the expression  $\sqrt{x^3} \cdot \sqrt{x^5}$

11. Simplify the expression  $\left(\frac{27x^5y^3}{8x^2}\right)^{\frac{2}{3}}$  to one with positive integer exponents and radicals.

12. Graph  $g(x) = 115(1.07)^{\frac{7x}{4}} - 45$  on the set of axes below.



Is the function an example of exponential growth or exponential decay? Justify your answer algebraically.

13. Using the quadratic formula or otherwise, solve  $2x^2 - 3x - 5 = 0$ .

14. Use long division to determine the quotient and remainder of  $f(x) = (x^3 + 4x^2 - 8x - 6)$  divided by  $g(x) = (x + 2)$ . Express your answer as  $q(x) + \frac{r(x)}{g(x)}$

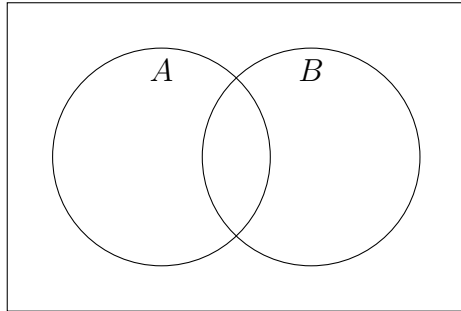
15. What is the quotient when  $x^2 - 3x - 40$  is divided by  $x + 5$ ?

16. Let  $A$  and  $B$  be independent events, where  $P(A) = 0.5$  and  $P(B) = 0.6$ .

(a) Find  $P(A \cap B)$

(b) Find  $P(A \cup B)$

(c) Shade the area representing  $A \cap B'$  in Venn diagram below.



17. What are the quotient and remainder when  $x^3 + 3x^2 - x + 2$  is divided by  $x - 1$ ?

18. Given the function  $f(x) = (x - 1)(x + 3)$ . State the  $x$ -intercepts of the graph of  $f$ .  
Find the  $y$ -intercept of the graph of  $f$ .