1. Writing (x+4)/((x+1)(x−2)) = A/(x+1) + B/(x−2), substitute x = 2 to find B.

   _____

2. Using $\sec^2\theta \equiv 1 + \tan^2\theta$, if $\tan\theta = 3$, what is $\sec^2\theta$?

   _____

3. The derivative of $\tan^{-1}x$ is $1/(1+x^2)$. What is its value at x = 1?

   _____

4. What is $\int 2x/(x^2+1)\,dx$?

   ☐ $\ln(x^2+1) + C$

   ☐ $2\ln(x) + C$

   ☐ $x^2+1 + C$

   ☐ $\tan^{-1}x + C$

5. What is the magnitude of the vector i + 2j + 2k?

   _____

6. To solve a separable first-order differential equation, you:

   ☐ differentiate both sides with respect to x

   ☐ square both sides, then take the root

   ☐ use partial fractions and nothing else

   ☐ separate the variables, then integrate both sides

7. What is the modulus of the complex number 3 + 4i?

   _____

8. The binomial expansion $(1+x)^n$ for a fractional or negative n is valid only when:

   ☐ n is positive

   ☐ $x > 1$

   ☐ $|x| < 1$

   ☐ $x = 0$

9. A numerical root is found by a sign change, then repeatedly applying:

   ☐ x = a + b

   ☐ x_{n+1} = F(x_n)

   ☐ the quadratic formula

10. Pure 3 differentiation still uses the product, quotient and chain rules from Pure 2.

    ☐ True ☐ False

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1. **2**

   At x = 2: 2 + 4 = B(2 + 1), so 6 = 3B, giving B = 2.

2. **10**

   $\sec^2\theta = 1 + 3^2 = 1 + 9 = 10$.

3. **0.5**

   $1/(1 + 1^2) = 1/2 = 0.5$.

4. **ln(x²+1) + C**

   The top is the derivative of the bottom (k f′/f form), so the integral is ln(x²+1) + C.

5. **3**

   $|v| = \sqrt{(1^2 + 2^2 + 2^2)} = \sqrt{(1+4+4)} = \sqrt{9} = 3$.

6. **separate the variables, then integrate both sides**

   Separate the variables, then integrate each side.

7. **5**

   $|z| = \sqrt{(3^2 + 4^2)} = \sqrt{(9 + 16)} = \sqrt{25} = 5$.

8. **|x| < 1**

   For non-positive-integer powers the series converges only for |x| < 1.

9. **x_{n+1} = F(x_n)**

   Iteration applies x_{n+1} = F(x_n) until the values converge to the root.

10. **True**

    Those rules carry over; only the inverse-tangent derivative is new.

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