29 May 2019 Name:

Classwork: Regents self-assessment

Rational exponents and radicals

1. Simplify $\sqrt[3]{x} \cdot \sqrt[3]{x} \cdot \sqrt[3]{x}$

2. Write $\sqrt[6]{x} \cdot \sqrt{x}$ as a single term with a rational exponent.

3. True of false: $\left(27^{\frac{2}{9}}\right)$ can be written as the equivalent radical expression $\sqrt[3]{9}$

4. For $x \neq 0$, which expressions are equivalent to one divided by the sixth root of x?

I. $\dfrac{\sqrt[6]{x}}{\sqrt[3]{x}}$ II. $\dfrac{x^{\frac{1}{6}}}{x^{\frac{1}{3}}}$ III. $x^{-\frac{1}{6}}$

Polynomial algebra procedures

5. Expand $(x-3)(x+3)$

6. Expand $(x-3)(-2x^2+5x+1)$, leaving in *standard form.*

7. Evaluate $f(x)=x^2-2$ when $x=3$

8. Is 3 a zero of the function $f(x)=x^3-2x-20$?

9. Given $r(x)=x^3-4x^2+4x-6$, find the value of $r(2)$.
   What does your answer tell you about $x-2$ as a factor of $r(x)$? Explain.

10. A manufacturing company has developed a cost model, $C(x) = 0.15x^3 + 0.01x^2 + 2x + 120$, where x is the number of items sold, in thousands. The sales price can be modeled by $S(x) = 30 - 0.01x$. Therefore, revenue is modeled by $R(x) = x \cdot S(x)$.

    The company's profit, $P(x) = R(x) - C(x)$, could be modeled by what polynomial?

Graphing calculator solutions

11. Given $f(x) = 3|x| - 1$ and $g(x) = 5$. Graph the two functions and make a quick sketch. Find the two solutions for the equation $f(x) = g(x)$, stating them as ordered pairs.

Logarithms

12. What is the $\log_3 27$?

13. Simplify $\ln 18 - \ln 2$

Imaginary numbers

14. Simplify $9i + (2i)^3$, leaving in the form $a + bi$ with $a, b \in \mathbf{R}$.

15. Use the quadratic formula to find the solution to the equation $4x^2 + 98 = 0$.

16. The expression $6xi^3(-4xi + 5)$ is equivalent to...

Exponential functions

17. Given the exponential function $f(x) = 8.2e^{(0.47x)}$.
    (a) Write down $f(0)$.

    (b) Find $f(2)$.

    (c) Solve for x such that $f(x) = 19$. (show the sketch)