Unit 2B Assignment

Work slowly and carefully. If you are having difficulty, go back and review the appropriate *Lesson*.

As your midterm and final exams do not allow calculators, it is best to attempt all questions in this *Assignment* without a calculator.

Be sure to proofread your assignment carefully.

For full marks, show all calculations, steps, and/or explain your answers. Be sure to express all solutions with **positive exponents**.

Total: 44 marks.

(2) 1. Find $f^4(x)$ if $f(x) = x^5 - x^4 - 3x^{-1} + x^2 + x + 8$.

2. The function $h(x) = \dfrac{x}{1-2x}$ is given.

(3) a. Determine $h'''(x)$.

(1) b. Find $h'''(2)$.

(1) 3. Without graphing, predict the shape of the graph of the second derivative function of $y = (3 + x)^4 - x^5 + 2x + 7$.

(2) 4. Find $\frac{dy}{dx}$ using implicit differentiation for $3x^2 + y^3 = 15$.

(3) 5. Find $\frac{dy}{dx}$ if $xy^2 + y^2 = x$.

(4) 6. If $4x^2 + y^4 = 17$, evaluate $\frac{d^2y}{dx^2}$ when $x = 2$ and $y = 1$.

(4) 7. Find $\frac{d^2y}{dx^2}$ if $x^6 - y^6 = 12$.

(2) 8. Determine the slope of the curve $f(x) = \frac{1}{\sqrt{x^2 + 1}}$ at $x = -2$. Express the answer in simplest radical form.

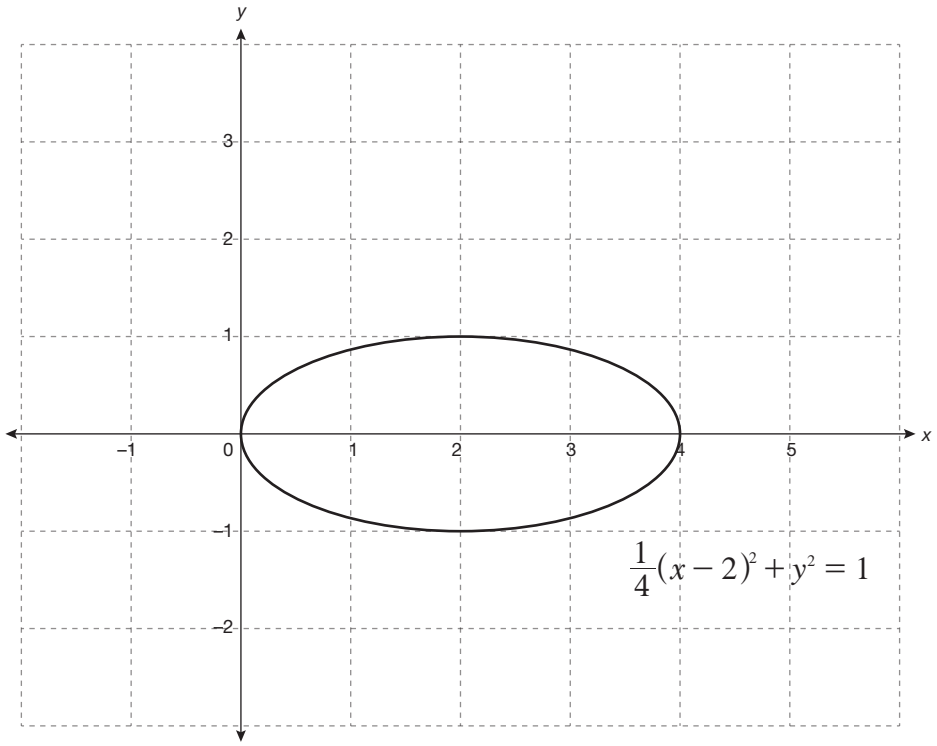
(3) 9. Find the equation of the tangent line, in general form, to the graph of the function $g(x) = (2x - 1)(4 - 3x)$ at $x = -1$.

(3) 10. Find the equation of the normal line to the graph of $f(x) = 3x^4 - \frac{1}{x}$ at $x = 1$. Express the equation of the normal line in general form.

(3) 11. At what points on the curve $y = x^3 - 2x^2$ are the slopes of the lines tangent to the curve -1?

(4) 12. Find the point on the curve $y = \sqrt{3x - 5}$ where the tangent line is parallel to the line $3x - 8y + 11 = 0$.

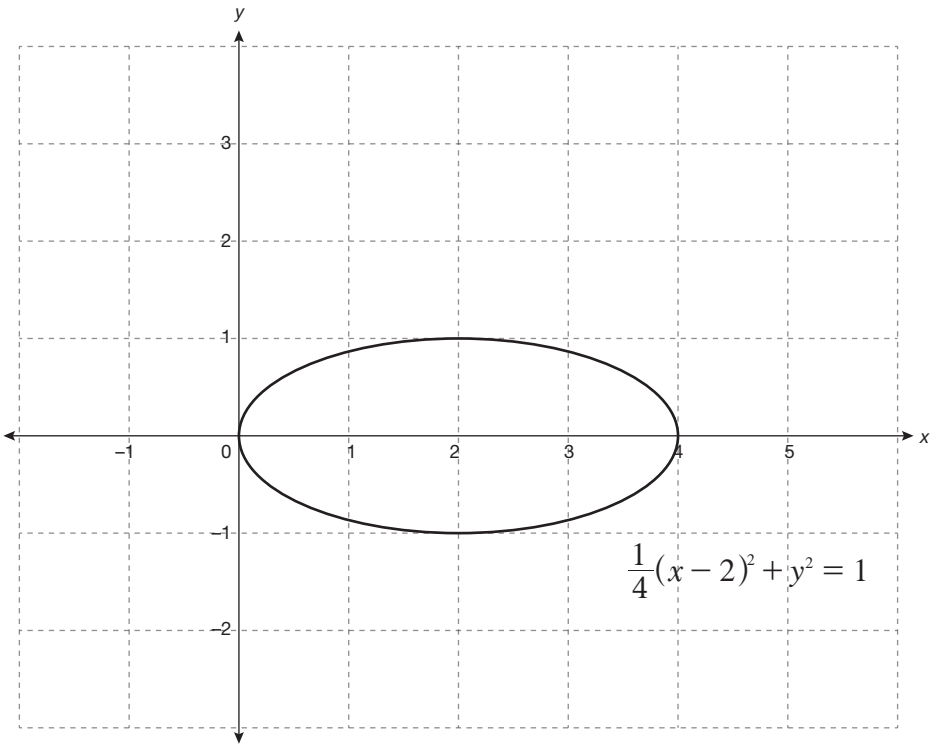
13. The graph of the ellipse $\frac{1}{4}(x-2)^2+y^2=1$ is shown.



(2) a. Determine the coordinates of the two points through which tangent lines meet the ellipse at $x=1$.

(2) b. Find the derivative of the relation.

(1) c. Sketch both tangent lines at $x = 1$.



(4) d. Find the equation, in slope-intercept form, of each tangent line at $x = 1$.