Classwork 31

1. Evaluate $f(x + h)$ for each function below.

    a) $f(x) = x + 7$ b) $f(x) = \sqrt{x} + 2x$ c) $f(x) = x^2 - x$

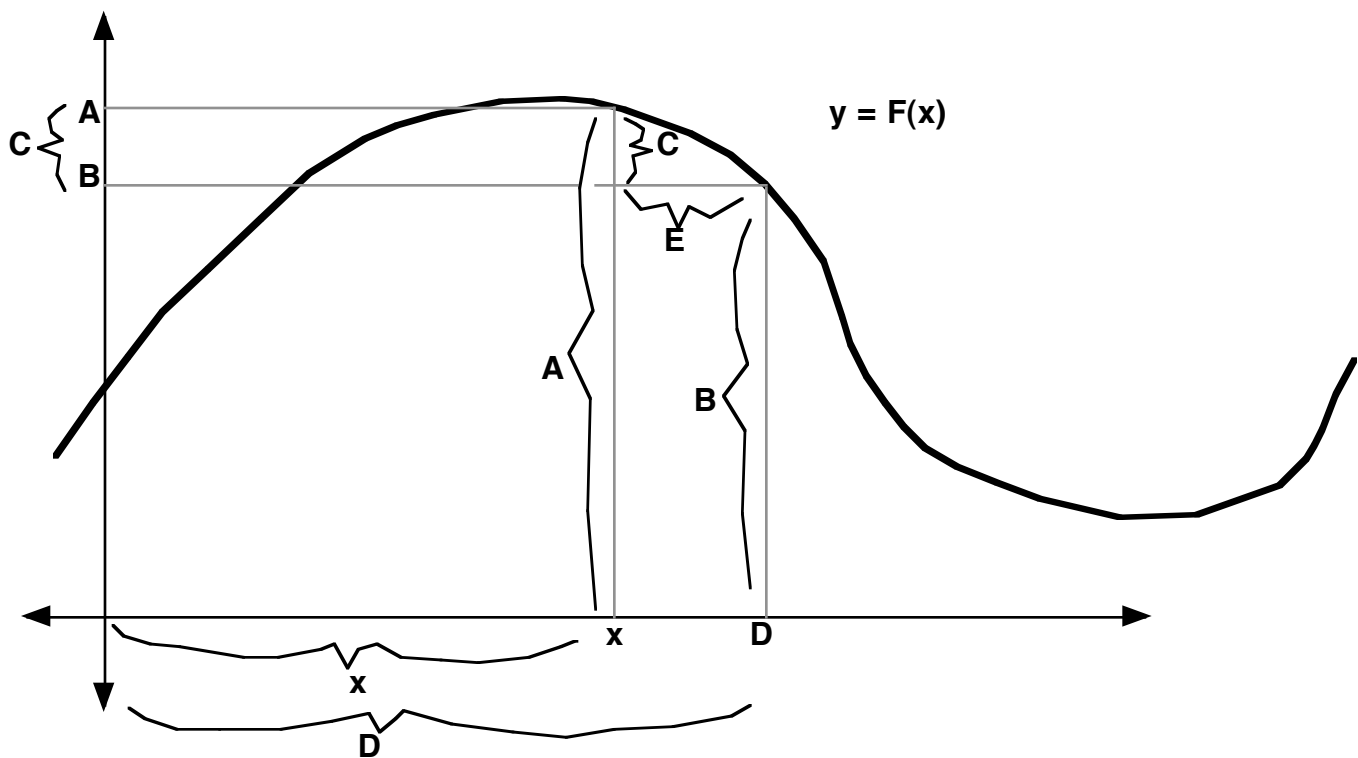Label the drawing to show where each expression below goes (and what it represents).
2. $F(x)$ 3. h 4. $F(x + h)$ 5. $x + h$ 6. $F(x + h) - F(x)$

7. Find the derivative of $y = x$.

Why do we already know the answer to this?

8. Find the derivative of $y = 2x$.

Why do we already know the answer to this?

9. Find the derivative of $y = 3x + 1$.

Why do we already know the answer to this?

10. Find the derivative of $y = x^5$.

11. Find the derivative of $y = x^6$

12. Predict the derivative of $y = x^{100}$

13. What is the rule for any derivative of the form $y = x^n$?

Prove that this rule works.

14. Why does the derivative increase (for positive values of x) as the exponent goes up?

15. Predict the derivative of $y = x^3 + x^2 + x$.

Show that this is the case.

16. In general, for a function $f(x) = g(x) + h(x)$, the derivative $f'(x) =$

1. Find the derivative of $y = x^{10}$

2. Find the derivative of $y = x^{70}$

3. Find the derivative of $y = x^5 + x^3 + 5x$