

Whodunnit? - Differentiation

One of these 6 people has murdered one of the others. Each has made 3 statements.
The murderer has made 3 errors. The victim has made 0 errors.
The other suspects have made 1 or 2 errors.

Catwoman says:

- If $y = x^5$, then $\frac{dy}{dx} = 5x^4$
- If $y = 2x^3 + 3x^5$, then $\frac{dy}{dx} = 6x + 15x^4$
- If $y = 2x^3$, then the gradient is 6 at (2,16)



Bane said that

- If $A = 4\pi r^2$, then $\frac{dA}{dr} = 8\pi r$
- If $y = 4x^{10}$, then $\frac{dy}{dx} = 40x^{10}$
- If $y = 7x$, then $\frac{dy}{dx} = 7$



The Joker said:

- If $y = x^5$, then $\frac{dy}{dx} = 5x^5$
- If $y = \sqrt{x}$, then $\frac{dy}{dx} = \frac{1}{2}x$
- If $y = 2x^2$,



then the gradient is 6 at (3,18)



Poison Ivy says:

- If $A = 4\pi r^2$, then $\frac{dA}{dr} = 8r$
- If $y = 4x^{10}$, then $\frac{dy}{dx} = 40x^{11}$
- If $y = 7x + 2$, then $\frac{dy}{dx} = 7$



The Scarecrow says:

- If $y = 3x^{11}$, then $\frac{dy}{dx} = 33x^{10}$
- If $y = 3x^2 + 6x + 6$,
then $\frac{dy}{dx} = 6x + 6$
- The gradient of $y = x^2 + 3x + 3$
is 9 when $x = 3$

Harley Quinn says:

- The gradient of $y = x^3 + x^2 + 3x$, is 10 when $x = 2$
- If $y = 2x^3$,
then the gradient is 24 at (2,16)
- If $y = 2x^2$, then the gradient is 12 at (3,18)



Where

Use your powers of deduction to work out where the murder took place. Holy detective skills Batman!



If the gradient of $y = x^2 - 3x + 1$ is 7 at the point (2,-1), the murder took place at Wayne Manor

If the gradient of $y = x^2 - 3x + 1$ is 7 at the point (3,1), the murder took place at City Hall

If the gradient of $y = x^2 - 3x + 1$ is 7 at the point (5,11), the murder took place at Arkham Asylum

If the gradient of $y = x^2 - 3x + 1$ is 7 at the point (-5,41), the murder took place at Gotham Cathedral

When

Calculate the time and date from these (eg hours answer =17 minutes answer =28 gives a time of 17:28)

The hours part of time is the x co-ordinate of the point where $f(x) = 4x^2 - 7x + 3$
has a gradient of 9.

The minute part of the time is the x co-ordinate of the point where $y = x^2 - 3x + 1$ has a gradient of 17.	
The day part of the date is the gradient of the curve $y=(x-1)(x-2)$ where $x=7$	
The month part of the date is the gradient of the curve $y=(x-1)(x-4)$ where $x=7$	

Conclusion

I think that killed
at the time on the dayin the month of.....