Edexcel A-Level Mathematics Warmup - Paper 2 2026

Given that the coefficient of x^3 in the expansion of $(2+ax)^6 = 20$ is 20. Find a.	Given that $(x+4)$ is a factor of $p(x) = 2x^3 + 7x^2 + ax - 24$ find the value of a.	An arithmetic sequence has tenth term 35 and fifteenth term 50. Find the sum of the first 50 terms.	Show that the derivative of $y = \tan(x)$ is $\frac{\mathrm{d}y}{\mathrm{d}x} = \sec^2(x)$. Hence, find $\frac{\mathrm{d}}{\mathrm{d}x}\left[\tan(3x+2)\right]$	Find the equation of the tangent to $y = x\cos(x)$ at the point where $x = \frac{\pi}{2}$
Solve $2\sin^2(x) + 5\cos(x) - 4 = 0$ for $0^\circ \leq x \leq 360^\circ$	Find the values of k for which the quadratic $x^2 + (k+1)x + 3k$ has a repeated root.	Prove that the product of two consecutive odd numbers is one less than a multiple of 4.	For the relationship $y = ab^x$ find the linearised form.	Find the centre and radius of the circle $x^2 + y^2 - 6x + 10y - 2 = 0$
Find the equation of the circle which has $A(3,6)$ and $B(8,-4)$ as the ends of a diameter.	Solve $4^{2+x} = 5^{x-1}$ giving your answer in terms of logarithms.	How many solutions has the equation $\cos(3\theta) = \frac{1}{2}$ got in the range $0^\circ \leq \theta \leq 360^\circ$	It is given that $\theta = \arcsin(2x)$. Writing $\sin(\theta) = 2x$, use implicit differentiation to show that $\frac{\mathrm{d}\theta}{\mathrm{d}x} = \frac{A}{\sqrt{1-Bx^2}}$ where A and B are integers to be found.	Find $\frac{\mathrm{d}y}{\mathrm{d}x}$ for $3y^2 + 4xy + 5x^2 = 2 + 3x$
Differentiate $y = x^2$ from first principles.	Sketch on the same axes $y = \tan(x)$, $-2\pi \leq x \leq 2\pi$ and $y = \arctan(x)$	Sketch the curve with parametric equations $x(t) = t^2$ $y(t) = \sin(2t) + 2$ for $0 \leq t \leq \pi$	Find the area between the curve with parametric equations $x = t^2$ and $y = \sin(2t) + 2$ and the lines $x = 0$ and $x = 4$.	Show that $\int_1^4 x\sqrt{3x+1}\ \mathrm{d}x = \frac{4}{135}\left(221\sqrt{13} - 18\right)$

Edexcel A-Level Mathematics Warmup - Paper 2 2026

$$\binom{6}{3}2^3a^3 = 20$$
$$\Rightarrow \quad 20 \times 8 \times a^3 = 20$$
$$\Rightarrow \quad a^3 = \frac{1}{8}$$
$$\Rightarrow \quad a = \frac{1}{2}$$

By the factor theorem $p(-4) = 0$. Hence,
$2(-4)^3 + 7(-4)^2 - 4a - 24 = 0$
and so we have
$-4a = 40$ and
$a = -10$

$u_{10} = a + 9d = 35$
$u_{15} = a + 14d = 50$

Solving these we obtain $a = 8$ and $d = 3$. Hence,
$$S_{50} = \frac{50}{2}\left[2 \times 8 + 49 \times 3\right]$$
$$= 4050$$

If $y = \tan(x) = \dfrac{\sin(x)}{\cos(x)}$ we can use the quotient rule to find
$$\frac{dy}{dx} = \frac{\cos(x)\cos(x) - \sin(x)(-\sin(x))}{\cos^2(x)}$$
$$= \frac{\cos^2(x) + \sin^2(x)}{\cos^2(x)}$$
$$= \sec^2(x)$$
Hence, $\dfrac{d}{dx}\left[\tan(3x+2)\right] = 3\sec^2(3x+2)$

$$\frac{dy}{dx} = \cos(x) - x\sin(x)$$
When $x = \dfrac{\pi}{2}$, $\dfrac{dy}{dx} = -\dfrac{\pi}{2}$. Since $y = 0$ at $x = \dfrac{\pi}{2}$ the equation of the tangent is $y = -\dfrac{\pi}{2}x + \dfrac{\pi^2}{4}$

Using $\sin^2(x) + \cos^2(x) = 1$ we obtain
$$2\cos^2(x) - 5\cos(x) + 2 = 0$$
. Hence $\cos(x) = 2$ or $\cos(x) = \dfrac{1}{2}$. So $x = 60°, 300°$

$5 - 2\sqrt{6}$ and
$5 + 2\sqrt{6}$

---

et the two odd numbers be $2n + 1$ and $2n + 3$ as they are consecutive.
Then,
$$(2n+1)(2n+3) = 4n^2 + 8n + 3$$
$$= 4(n^2 + 2n) - 1$$
which is one less than a multiple of 4.

$$y = ab^x$$
$$\Rightarrow \ln(y) = \ln(ab^x)$$
$$= \ln(a) + \ln(b^x)$$
$$= \ln(a) + x\ln(b)$$

$(x-3)^2 + (y+5)^2 = 36$
Centre: $(3, -5)$
Radius: 6

Midpoint $= \left(\dfrac{3+8}{2}, \dfrac{6+-4}{2}\right) = \left(\dfrac{11}{2}, 1\right)$

radius $= \sqrt{\left(8 - \dfrac{11}{2}\right)^2 + (3-1)^2}$
$= \sqrt{\dfrac{41}{4}}$
$= \dfrac{\sqrt{41}}{2}$

So circle is $\left(x - \dfrac{11}{2}\right)^2 + (y-1)^2 = \dfrac{41}{4}$

$$x = \frac{-\left(4\log(2) + \log(5)\right)}{2\log(2) - \log(5)}$$

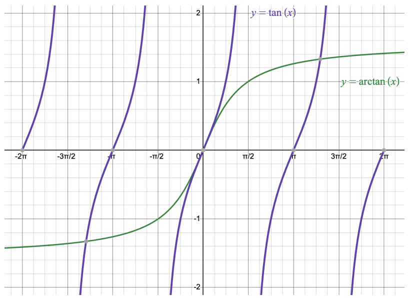
---

6 solutions.

$$\theta = \arcsin(2x)$$
$$\Rightarrow \sin(\theta) = 2x$$
$$\cos(\theta)\frac{d\theta}{dx} = x$$
$$\Rightarrow \frac{d\theta}{dx} = \frac{2}{\cos(\theta)}$$
So, differentiating,
$$= \frac{2}{\sqrt{1 - \sin^2(\theta)}}$$
$$= \frac{2}{\sqrt{1 - 4x^2}}$$

Differentiating implicitly with respect to x we obtain
$$6y\frac{dy}{dx} + 4x\frac{dy}{dx} + 4y + 10x = 3$$
Rearranging,
$$\frac{dy}{dx} = \frac{3 - 10x - 4y}{4x + 6y}$$

$$f'(x) = \lim_{h \to 0} \frac{(x+h)^2 - x^2}{h}$$
$$= \lim_{h \to 0} \frac{x^2 + 2xh + h^2 - x^2}{h}$$
$$= \lim_{h \to 0} 2x + h$$
$$= 2x$$



$\dfrac{dx}{dt} = 2t$ so the area is
$$\int_0^4 2t(\sin(2t) + 2)\,dt = 33.49$$
square units.

Let $u = 3x + 1$, then $\dfrac{du}{dx} = 3$, so $dx = \dfrac{1}{3}du$. Also $x = \dfrac{u-1}{3}$ and when $x = 1$, $u = 4$ and $x = 4$, $u = 7$.
So, the integral becomes
$$\int_4^{13}\left(\frac{u-1}{3}\right)\sqrt{u}\,du$$ from which the result follows.