


Question Review

All 



If $(1 + i\sqrt{3})^9 = a + ib$ then b is equal to

☐ 1

☐ 256

☒ 0

☐ 9^3

EXPLANATIONS

[Report](#) 

42 % were correct!

$$1 + i\sqrt{3} = 2 \left(\frac{1}{2} + i\frac{\sqrt{3}}{2} \right) = 2 \left[\cos \frac{\pi}{3} + i \sin \frac{\pi}{3} \right] = 2e^{i\pi/3}$$
$$\therefore (1 + i\sqrt{3})^9 = (2e^{i\pi/3})^9 = 2^9 \cdot e^{i(3\pi)} = 2^9 (\cos 3\pi + i \sin 3\pi) = -2^9$$
$$\therefore a + ib = (1 + i\sqrt{3})^9 = -2^9; \therefore b = 0$$



$$\lim_{x \rightarrow 0} \frac{\sqrt{1+x} - \sqrt{1-x}}{\sin^{-1} x} =$$

☐ 2

☒ 1

☐ -1

☐ -2

EXPLANATIONS

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76 % were correct!

Using L-Hopital's Rule:

$$L = \lim_{x \rightarrow 0} \frac{\sqrt{1+x} - \sqrt{1-x}}{\sin^{-1} x} = \lim_{x \rightarrow 0} \sqrt{1-x} \cdot \sqrt{1+x} \left(\frac{1}{2\sqrt{1+x}} + \frac{1}{2\sqrt{1-x}} \right)$$

On simplification,

$$L = \frac{1}{2} \lim_{x \rightarrow 0} (\sqrt{1+x} + \sqrt{1-x}) = 1$$



A parabola passing through the point $(-4, -2)$ has its vertex at the origin and y -axis as its axis. The latus rectum of the parabola is :

☐ 6

☒ 8

☐ 10

☐ 12

EXPLANATIONS

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77 % were correct!

Let the equation of parabola is $x^2 = 4ay$, but $a = \frac{16}{-2 \times 4} = -2$. Then equation is $x^2 = -8y$ and latus rectum $= 4a = 8$.



The curve $f(x) = \frac{1}{x\sqrt{1-x^2}}$ has:

☒ a local maxima at $x = 1/\sqrt{2}$ and a local minima at $x = -1/\sqrt{2}$
☐ a local maxima at $x = -1/\sqrt{2}$ and a local minima at $x = 1/\sqrt{2}$
☐ neither maxima nor minima because of discontinuity

☐ $f(x)$ is not a function

EXPLANATIONS

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23 % were correct!

$$f(x) = \frac{1}{x\sqrt{1-x^2}}$$

$$f'(x) = \frac{1}{x} \times -\frac{1}{2}(1-x^2)^{-3/2} \times (-2x) + \frac{1}{\sqrt{1-x^2}} \times -\frac{1}{x^2}$$

$$\therefore f'(x) = \frac{1}{(\sqrt{1-x^2})^3} - \frac{1}{x^2\sqrt{1-x^2}}$$

For extreme values, $f'(x) = 0$

$$\Rightarrow \frac{1}{\sqrt{1-x^2}(1-x^2)} = \frac{1}{x^2\sqrt{1-x^2}}$$

$$\Rightarrow x^2 = 1 - x^2$$

$$\Rightarrow x^2 = 1/2$$

$$\Rightarrow x = \pm 1/\sqrt{2}$$

Also, evaluating $f(x)$ at these values of x give, $f(-1/\sqrt{2}) = -2$ $f(1/\sqrt{2}) = 2$.



If $f(x) = 3x - 5$, then $f^{-1}(x)$

☐ is $\frac{1}{3x - 5}$

☒ is $\frac{x + 5}{3}$

☐ Does not exist because f is not one-one

☐ Does not exist because f is not onto

EXPLANATIONS

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86 % were correct!

Let $f(x) = y \Rightarrow x = f^{-1}(y)$

Hence $f(x) = y = 3x - 5 \Rightarrow x = \frac{y + 5}{3} \Rightarrow f^{-1}(y) = x = \frac{y + 5}{3}$

$\therefore f^{-1}(x) = \frac{x + 5}{3}$

Also f is one-one and onto, so f^{-1} exists and is given by $f^{-1}(x) = \frac{x + 5}{3}$



Consider an infinite G.P. with first term a and common ratio r , its sum is 4 and the second term is $3/4$, then :

☐ $a = \frac{7}{4}, r = \frac{3}{7}$

☐ $a = \frac{3}{2}, r = \frac{1}{2}$

☐ $a = 2, r = \frac{3}{8}$

☒ $a = 3, r = \frac{1}{4}$

EXPLANATIONS

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50 % were correct!

Here $\frac{a}{1 - r} = 4$ and $ar = \frac{3}{4}$.

Dividing these,

$r(1 - r) = \frac{3}{16}$

Or, $16r^2 - 16r + 3 = 0$

Or, $(4r - 3)(4r - 1) = 0$

$r = \frac{1}{4}, \frac{3}{4}$ and $a = 3, 1$

so $(a, r) = \left(3, \frac{1}{4}\right), \left(1, \frac{3}{4}\right)$.

The length of common chord of the circles $x^2 + y^2 = 12$ and $x^2 + y^2 - 4x + 3y - 2 = 0$, is

☒ $4\sqrt{2}$

☐ $5\sqrt{2}$

☐ $2\sqrt{2}$

☐ $6\sqrt{2}$

EXPLANATIONS

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41 % were correct!

The equation of common chord $\equiv S_1 - S_2 = 0$ or $4x - 3y - 10 = 0$ and centre of first circle is $(0, 0)$. Therefore perpendicular from it on line is $p_1 = \frac{10}{5} = 2$ and $R_1 = \sqrt{12}$

Hence, $L = 2\sqrt{(R_1^2 - p_1^2)} = 2\sqrt{(12 - 4)} = 4\sqrt{2}$

If $\vec{a} = \vec{u} + \vec{v}$ and $\vec{b} = \vec{u} - \vec{v}$ and \vec{u} and \vec{v} are unit vectors, then $|\vec{a} \times \vec{b}|$ is:

☐ $2\sqrt{1 + (\vec{u} \cdot \vec{v})^2}$

☐ $\sqrt{1 + (\vec{u} \cdot \vec{v})^2}$

☒ $2\sqrt{1 - (\vec{u} \cdot \vec{v})^2}$

☐ $\sqrt{1 - (\vec{u} \cdot \vec{v})^2}$

EXPLANATIONS

[Report](#) 

55 % were correct!

$$|\vec{a} \times \vec{b}| = |(\vec{u} + \vec{v}) \times (\vec{u} - \vec{v})|$$
$$= 2|\vec{u} \times \vec{v}|$$

(Because the cross product of a vector with itself is a null vector and $|\vec{u} \times \vec{v}| = |\vec{v} \times \vec{u}|$)

So,
$$|\vec{a} \times \vec{b}| = 2|\vec{u}||\vec{v}| \sin \theta$$
$$= 2\sqrt{1 - \cos^2 \theta}$$
$$= 2\sqrt{1 - (\vec{u} \cdot \vec{v})^2}$$

(Because $\vec{u} \cdot \vec{v} = |\vec{u}||\vec{v}| \cos \theta$)

Which of the following is a conjugated acid-base pair ?

☐ HCl,NaOH

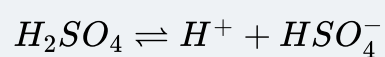
☐ $\text{NH}_4\text{Cl}, \text{NH}_4\text{OH}$

☒ $\text{H}_2\text{SO}_4, \text{HSO}_4^-$

☐ KCN,HCN

EXPLANATIONS

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Note:

A **conjugate acid** contains one more H atom and one more + charge than the base that formed it.

A **conjugate base** contains one less H atom and one more - charge than the acid that formed it.

Which of the following pairs are not isomeric compounds ?

☐ Ethyl ethanoate and methyl propanoate

☐ Butanone and butanal

☒ Ethoxy propane and propoxy ethane

☐ Methoxy methane and ethanol

EXPLANATIONS

[Report](#) 

41 % were correct!

Both are same compounds

Oxidation state of oxygen in F_2O is

☐ +1

☒ +2

☐ -1

☐ -2

EXPLANATIONS

[Report](#) 

58 % were correct!

Oxygen shows + 2 oxidation state in F_2O .

As F is most electronegative element, it always has an O. No. =-1

Cassiterite is concentrated by

☐ Levigation

☒ Electromagnetic separation

☐ Floatation

☐ Liquifaction

EXPLANATIONS

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48 % were correct!

Cassiterite SnO_2 or tinstone - an ore of tin being non-magnetic can be separated from magnetic impurities like Fe and Mn from this method.

0.2 molar solution of formic acid is ionized 3.2%. Its ionization constant is

☐ 9.6×10^{-3}

☒ 2.1×10^{-4}

☐ 1.25×10^{-6}

☐ 4.8×10^{-5}

EXPLANATIONS

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61 % were correct!

$$K_a = C\alpha^2 = 0.2 \times \left(\frac{32}{100}\right)^2 = 2.048 \times 10^{-4}$$

The volume of 0.6 M $NaOH$ required to neutralise 30 cm^3 of 0.4 M HCl is

☐ 40 cm^3

☐ 30 cm^3

☒ 20 cm^3

☐ 10 cm³

EXPLANATIONS

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81 % were correct!

Normality = molarity × basicity or acidity (for *HCl*)

$N_2 = 0.4 \times 1 = 0.4N$ basicity =1 (for *NaOH* acidity =1)

$$N_1 = 0.6 \times 1 = 0.6N$$

$$V_1 = ?$$

$$V_2 = 30\text{ cm}^3$$

From the equation,

$$N_1 V_1 = N_2 V_2$$

$$0.6 \times V_1 = 0.4 \times 30$$

$$V_1 = \frac{0.4 \times 30}{0.6} = 20\text{ cm}^3$$

IUPAC name of $CH_2 = CH - CH(CH_3)_2$ is

☐ 1,1-dimethyl-2-propene

☒ 3-methyl-1-butene

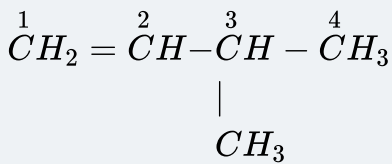
☐ 2-vinyl propane

☐ 1-isopropyl ethylene

EXPLANATIONS

[Report](#)

73 % were correct!



3-methylbut-1-ene

Fluorine with dilute *NaOH* gives

☒ OF₂

☐ O₃

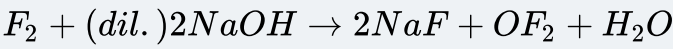
☐ O₂

☐ HF and O₂

EXPLANATIONS

[Report](#)

47 % were correct!



Don't push!

- ☒ a simple sentence
- ☐ a compound sentence
- ☐ a complex sentence
- ☐ a compound-complex sentence

EXPLANATIONS

[Report](#) 

78 % were correct!

Don't push! (independent clause)
A sentence having a single independent clause is a simple sentence.

The word “pleased” takes the prefix

- ☐ un-
- ☐ down-
- ☐ over-
- ☒ dis-

They saw the accident ----- before them.

- ☒ happen
- ☐ happening
- ☐ happens
- ☐ to happen

The opposite of 'silly' is:

☐ generous

☐ lazy

☐ nervous

☒ sensible

EXPLANATIONS

[Report](#) 

65 % were correct!