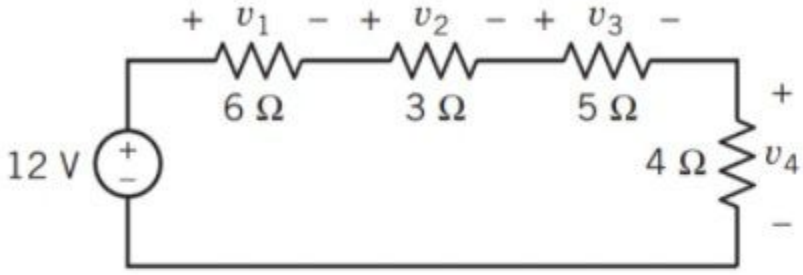
Question 1

3 / 3 pts

Determine the voltages v_1 , v_2 , v_3 , and v_4 in the following circuit.

Determine the voltages v_1, v_2, v_3, and v_4 in the following circuit.



Note: Two versions will be given to avoid misunderstandings, the text version (black) and the image version (blue). If the two contents conflict, please refer to the image version first.

$v_1 = -9\,V,\ v_2 = -\frac{9}{2}\,V,\ v_3 = -\frac{15}{2}\,V,\ v_4 = -6\,V.$

○ $v_1 = -9\,\mathrm{V}, v_2 = -\frac{9}{2}\,V, v_3 = -\frac{15}{2}\,\mathrm{V}, v_4 = -6\,V.$

$v_1 = 9\,V,\ v_2 = \frac{9}{2}\,V,\ v_3 = \frac{15}{2}\,V,\ v_4 = 6\,V.$

○ $v_1 = 9\,\mathrm{V}, v_2 = \frac{9}{2}\,V, v_3 = \frac{15}{2}\,\mathrm{V}, v_4 = 6\,V.$

$v_1 = -4\,V,\ v_2 = -2\,V,\ v_3 = -\frac{10}{3}\,V,\ v_4 = -\frac{8}{3}\,V.$

○ $v_1 = -4\,\mathrm{V}, v_2 = -2\,V, v_3 = -\frac{10}{3}\,\mathrm{V}, v_4 = -\frac{8}{3}\,V.$

$v_1 = 4\,V,\ v_2 = 2\,V,\ v_3 = \frac{10}{3}\,V,\ v_4 = \frac{8}{3}\,V.$

◉ $v_1 = 4\,\mathrm{V}, v_2 = 2\,V, v_3 = \frac{10}{3}\,\mathrm{V}, v_4 = \frac{8}{3}\,V.$

Question 2

3 / 3 pts

If $y = \sqrt{3 - \cos^2 x}$, then find the derivative of y.

If $y = \sqrt{3 - \cos^2 x}$, then find the derivative of y.

Note: Two versions will be given to avoid misunderstandings, the text version (black) and the image version (blue). If the two contents conflict, please refer to the image version first.

$-\frac{\cos(x)\sin(x)}{\sqrt{3-\cos^2 x}}$

- $-\frac{\cos x \sin x}{\sqrt{3-\cos^2 x}}$

$\frac{\cos(x)\sin(x)}{\sqrt{3-\cos^2 x}}$

- $\frac{\cos x \sin x}{\sqrt{3-\cos^2 x}}$

$\frac{\cos x}{2\sqrt{3-\cos^2 x}}$

- $\frac{\cos x}{2\sqrt{3-\cos^2 x}}$

$\frac{2\cos x}{\sqrt{3-\cos^2 x}}$

- $\frac{2\cos x}{\sqrt{3-\cos^2 x}}$

Question 3

3 / 3 pts

If $z = \frac{a+4j}{2-3j}$ is a real number, where $a \in R$, find a.

If $z = \frac{a+4j}{2-3j}$ is a real number, where $a \in R$, find a.

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a = -8/3

- $a = -8/3$

a = 6

- $a = 6$

a = 8/3

- $a = 8/3$

a = -6

- $a = -6$

Question 4

0 / 3 pts

If $\sin(\alpha)+\sin(\beta)=1,\ \cos(\alpha)-\cos(\beta)=\frac{1}{2}$,find $\cos(\alpha+\beta)$

If $\sin(\alpha)+\sin(\beta)=1, \cos(\alpha)-\cos(\beta)=\frac{1}{2}$, find $\cos(\alpha+\beta)$

Note: Two versions will be given to avoid misunderstandings, the text version (black) and the image version (blue). If the two contents conflict, please refer to the image version first.

3/4

○ 3/4

3/8

○ 3/8

5/8

◉ 5/8

5/4

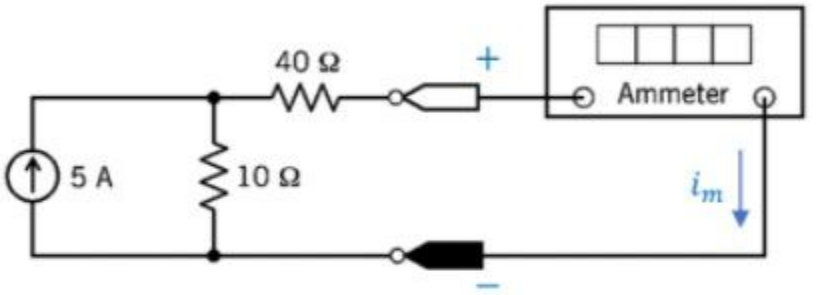
○ 5/4

Question 5

3 / 3 pts

Determine the current i_m measured by the actual ammeter (**Not ideal**) in the following circuit.

Determine the current i_m measured by the actual ammeter (**Not ideal**) in the following circuit.



Note: Two versions will be given to avoid misunderstandings, the text version (black) and the image version (blue). If the two contents conflict, please refer to the image version first.

$i_m = \infty\ A$

$i_m = \infty\ A$

$i_m < 1\ A$

$i_m < 1\ A$

$i_m > 1\ A$

$i_m > 1\ A$

$i_m = 1\ A$

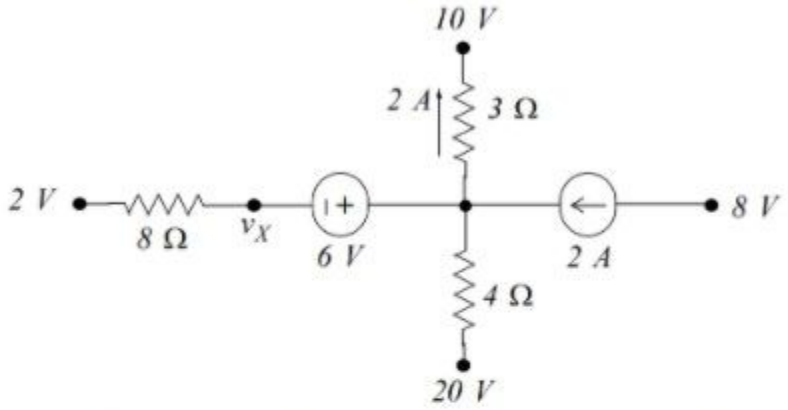
$i_m = 1\ A$

Question 6

3 / 3 pts

Find the node voltage v_x of the following circuit.

Find the node voltage v_x of the following circuit.



Note: Two versions will be given to avoid misunderstandings, the text version (black) and the image version (blue). If the two contents conflict, please refer to the image version first.

-6 V

$-6\ V$

10 V

$10\ V$

16 V

$16\ V$

0 V

$0\ V$

Question 7

0 / 3 pts

If $\sin(x)+\cos(x)=\frac{1}{5}\left(-\frac{\pi}{4}\le x<0\right)$, find $z=\cos^2(x)$.

$$\text{If } \sin(x)+\cos(x)=\frac{1}{5}\left(-\frac{\pi}{4}\le x<0\right), \text{find } z=\cos^2(x).$$

Note: Two versions will be given to avoid misunderstandings, the text version (black) and the image version (blue). If the two contents conflict, please refer to the image version first.

7/50

○ 7/50

16/25

○ 16/25

9/25

◉ 9/25

7/25

○ 7/25

Question 8

3 / 3 pts

Evaluate $\int \left(1 - \sin^2\left(\frac{x}{2}\right)\right) dx$

Evaluate $\int (1 - \sin^2 \frac{x}{2}) dx$

Note: Two versions will be given to avoid misunderstandings, the text version (black) and the image version (blue). If the two contents conflict, please refer to the image version first.

$\cos x + c$

- $\cos x + c$

$\sin x + c$

- $\sin x + c$

$\frac{1}{2}(x + \sin x) + c$

- $\frac{1}{2}(x + \sin x) + c$

$\frac{1}{2}(3x - \sin x) + c$

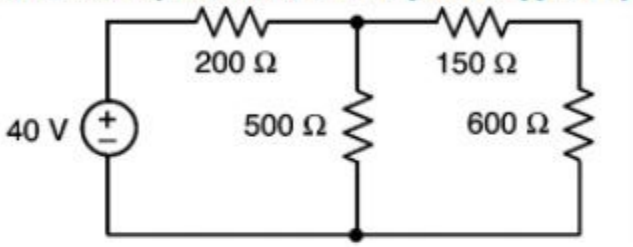
- $\frac{1}{2}(3x - \sin x) + c$

Question 9

3 / 3 pts

Find the equivalent resistance seen by the source and the power supplied by the source.

Find the equivalent resistance seen by the source and the power supplied by the source.



Note: Two versions will be given to avoid misunderstandings, the text version (black) and the image version (blue). If the two contents conflict, please refer to the image version first.

$R_{eq} = 120\ \Omega,\ P = 133\ W.$

$R_{eq} = 120\ \Omega, P = 133\ W.$

$R_{eq} = 500\ \Omega,\ P = 3.2\ W.$

$R_{eq} = 500\ \Omega, P = 3.2\ W.$

$R_{eq} = 120\ \Omega,\ P = 13.3\ W.$

$R_{eq} = 120\ \Omega, P = 13.3\ W.$

$R_{eq} = 500\ \Omega,\ P = 32\ W.$

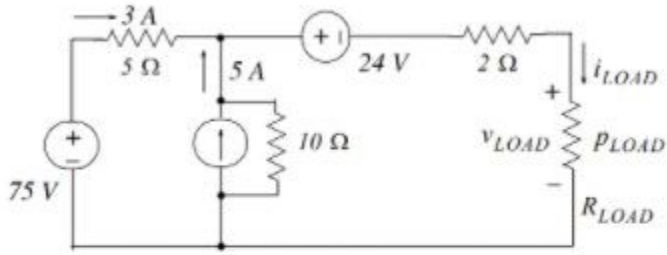
$R_{eq} = 500\ \Omega, P = 32\ W.$

Question 10

0 / 3 pts

In the following circuit, R_{LOAD} is the load. Find the current i_{LOAD}, voltage v_{LOAD}, and power P_{LOAD} of R_{LOAD}.

In the following circuit, R_{LOAD} is the load. Find the current i_{LOAD}, voltage v_{LOAD}, and power p_{LOAD} of R_{LOAD}.



Note: Two versions will be given to avoid misunderstandings, the text version (black) and the image version (blue). If the two contents conflict, please refer to the image version first.

$i_{LOAD} = 8\ A,\ v_{LOAD} = 20\ V,\ P_{LOAD} = 160\ W.$

$i_{LOAD} = 8\ A, v_{LOAD} = 20\ V,\ p_{LOAD} = 160\ W.$

$i_{LOAD} = 8\ A,\ v_{LOAD} = -20\ V,\ P_{LOAD} = 160\ W.$

$i_{LOAD} = 8\ A, v_{LOAD} = -20\ V,\ p_{LOAD} = 160\ W.$

$i_{LOAD} = -8\ A,\ v_{LOAD} = 52\ V,\ P_{LOAD} = 416\ W.$

$i_{LOAD} = -8\ A, v_{LOAD} = 52\ V,\ p_{LOAD} = 416\ W.$

$i_{LOAD} = 8\ A,\ v_{LOAD} = 52\ V,\ P_{LOAD} = 416\ W.$

$i_{LOAD} = 8\ A, v_{LOAD} = 52\ V,\ p_{LOAD} = 416\ W.$

Question 11

3 / 3 pts

Find the general solution of $\frac{d^2y}{dx^2} + \frac{dy}{dx} - 12y = 0$

Find the general solution of $\frac{d^2y}{dx^2} + \frac{dy}{dx} - 12y = 0$

Note: Two versions will be given to avoid misunderstandings, the text version (black) and the image version (blue). If the two contents conflict, please refer to the image version first.

$y = A\sin 4x + B\cos 3x$

$y = A\sin 4x + B\cos 3x$

$y = Ae^{-4x} + Be^{3x}$

$y = Ae^{-4x} + Be^{3x}$

$y = -A\sin 4x + B\cos 3x$

$y = -A\sin 4x + B\cos 3x$

$y = -Ae^{-4x} + Be^{3x}$

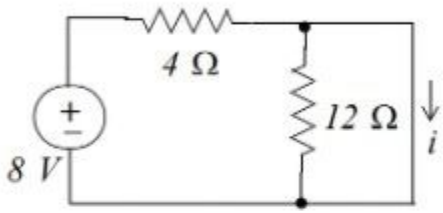
$y = -Ae^{-4x} + Be^{3x}$

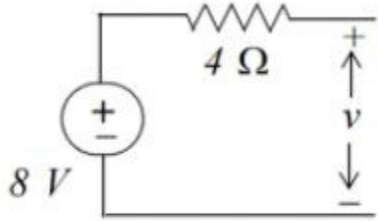
Question 12

3 / 3 pts

For the following circuits, find the value of the current i and the value of the voltage v .

For the following circuits, find the value of the current i and the value of the voltage v.





Note: Two versions will be given to avoid misunderstandings, the text version (black) and the image version (blue). If the two contents conflict, please refer to the image version first.

$i = \infty\ A,\ v = 8\ V$

$i = \infty\ A, v = 8\ V.$

$i = \infty\ A,\ v = 2\ V$

$i = \infty\ A, v = 2\ V.$

$i = 2\ A,\ v = 8\ V$

$i = 2\ A, v = 8\ V.$

$i = 2\ A,\ v = 2\ V$

$i = 2\ A, v = 2\ V.$

Question 13

3 / 3 pts

Evaluate $\int \frac{x}{x^4-1}dx$

[Hint: $\frac{1}{y^2-1} = \frac{1}{2}\left(\frac{1}{y-1} - \frac{1}{y+1}\right)$]

Evaluate $\int \frac{x}{x^4-1}dx$

[Hint: $\frac{1}{y^2-1} = \frac{1}{2}\left(\frac{1}{y-1} - \frac{1}{y+1}\right)$]

Note: Two versions will be given to avoid misunderstandings, the text version (black) and the image version (blue). If the two contents conflict, please refer to the image version first.

$\frac{1}{2}\ln\left|\frac{x^2-1}{x^2+1}\right| + c$

○ $\frac{1}{2}\ln\left|\frac{x^2-1}{x^2+1}\right| + c$

$\frac{1}{4}\ln\left|\frac{x^2+1}{x^2-1}\right| + c$

○ $\frac{1}{4}\ln\left|\frac{x^2+1}{x^2-1}\right| + c$

$\frac{1}{4}\ln\left|\frac{x^2-1}{x^2+1}\right| + c$

◉ $\frac{1}{4}\ln\left|\frac{x^2-1}{x^2+1}\right| + c$

$\frac{1}{2}\ln|x^4-1| + c$

○ $\frac{1}{2}\ln|x^4-1| + c$

Question 14

3 / 3 pts

If $z = \left(\frac{1+j}{1-j}\right)^4$, find z.

If $z = \left(\frac{1+j}{1-j}\right)^4$, find z.

Note: Two versions will be given to avoid misunderstandings, the text version (black) and the image version (blue). If the two contents conflict, please refer to the image version first.

-1

○ -1

1

◉ 1

-j

○ $-j$

j

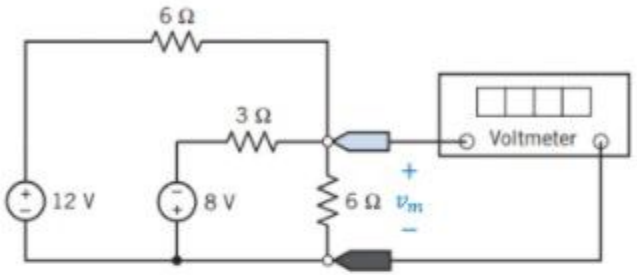
○ j

Question 15

0 / 3 pts

Determine the value of the voltage measured by the ideal voltmeter v_m .

Determine the value of the voltage measured by the ideal voltmeter v_m.



Note: Two versions will be given to avoid misunderstandings, the text version (black) and the image version (blue). If the two contents conflict, please refer to the image version first.

$v_m = 13\ V$

$v_m = 13\ V$

$v_m = -13\ V$

$v_m = -13\ V$

$v_m = -1\ V$

$v_m = -1\ V$

$v_m = 1\ V$

$v_m = 1\ V$