



Indices questions



49 minutes



45 marks

Q1. (a) Simplify $m^3 \times m^5$

Answer

(1)

(b) Simplify $\frac{m^4}{m^6}$

Answer

(1)

(c) Simplify fully $\sqrt{\frac{\pi a^3}{4\pi a}}$

.....
.....

Answer

(2)

(Total 4 marks)

Q2. (a) Work out $7^4 \times 7^4$

Give your answer as a power of 7.

.....

Answer

(1)

(b) Work out $6^4 \div 6^4$

Give your answer as a whole number.

.....

Answer

(1)

(Total 2 marks)

Q3. (a) Simplify

(i) $y^7 \times y^2$

.....

Answer

(1)

(ii) $y^7 \div y^2$

.....

Answer

(1)

(iii) $(y^7)^2$

.....

Answer

(1)

(b) (i) If $y = -1$ which answer in part (a) is positive?

.....

Answer

(1)

(ii) If $y = 0.5$ which answer in part (a) has the greatest value?

.....

Answer

(1)

(Total 5 marks)

Q4. (a) Find the value of $64^{\frac{1}{3}}$

.....

Answer

(1)

(b) Find the value of $8x^0$

.....

Answer

(1)

(Total 2 marks)

Q5. (a) Work out $4^{\frac{1}{2}} \div 6^{-2}$

.....
.....

Answer

(3)

(b) Write $1.\dot{3}\dot{8}$ as an improper fraction.

.....
.....
.....
.....

Answer

(2)

(Total 5 marks)

Q6. Evaluate

(a) $36^{\frac{1}{2}} \times 4^{-1}$

.....

Answer

(3)

(b) $1000^{-\frac{2}{3}}$

.....
.....
.....

Answer

(2)

(Total 5 marks)

Q7. Evaluate $25^{\frac{1}{2}} \times 10^{-2}$

Give your answer as a fraction in its simplest form.

.....
.....
.....

Answer

(Total 3 marks)

Q8. (a) (i) Evaluate $13z^0$

Answer

(1)

(ii) Evaluate $(13z)^0$

Answer

(1)

(b) If $3^x = \frac{1}{27}$, find the value of x .

.....
.....

Answer $x =$

(2)

(c) If $4^y = 64^{\frac{1}{3}}$, find the value of y .

.....
.....
.....

Answer $y =$

(2)

(Total 6 marks)

Q9.

$$x^a \times x^b = x^7$$

$$(x^a)^b = x^{10}$$

Work out the values of a and b .

.....
.....
.....
.....

Answer $a =$, $b =$

(Total 3 marks)

Q10.

(a) Write down the value of 11^0

.....

Answer

(1)

(b) Find the value of $8^{\frac{2}{3}}$

.....
.....

Answer

(2)

(c) Simplify $6^{-2} \times 144^{0.5}$

.....
.....
.....
.....

Answer

(3)

(Total 6 marks)

Q11. (a) Simplify $x^2 \times x^3$

Answer

(1)

(b) Simplify $y^8 \div y^5$

Answer

(1)

(c) Expand $x(x^3 - 3)$

.....
.....

Answer

(2)

(Total 4 marks)

M1. (a) m^8

B1

(b) m^{-2}

or $\frac{1}{m^2}$

B1

(c) $\frac{a}{2}$

B1 $\sqrt{\frac{a^2}{4}}$ *seen or implied by cancelling common factors*

B2

[4]

M2. (a) 7^8

B1

(b) 1

Not 1^8

B1

[2]

M3. (a) (i) y^8

B1

(ii) y^5

B1

(iii) y^{14}

B1

(b) (i) y^{14} or (a)(iii)

ft their answers from Part (a)

B1 ft

(ii) y^5 or a(ii)

ft their answers from Part (a)

B1 ft

[5]

M4. (a) 4

B1

(b) 8

B1

[2]

M5. (a) 72 and / or -72

B1 Sight of 2 (and / or -2) also

B1 Sight of 36 or $\frac{1}{36}$ (but not -36 or $-\frac{1}{36}$)

B3

(b) $\frac{137}{99}$

B1 Sight of $1\frac{38}{99}$ or $\frac{38}{99}$
SC1 $\frac{138}{99}$

B2

[5]

M6. (a) (\pm)6

B1

$\frac{1}{4}$

B1

(\pm)1.5

oe

B1

(b) $\frac{1}{100}$

oe eg, 0.01

B1 for 100 or $\frac{1}{10}$ or $\frac{1}{1000000}$

B2

[5]

M7. 5

or -5 or ±5

B1

$$\frac{1}{100}$$

oe

B1

$$\frac{1}{20}$$

SC2 0.05 or equivalent fraction

B1

[3]

M8. (a) (i) 13

B1

(ii) 1

B1

(b) $3^x = 3^{-3}$

M1

$$x = -3$$

*M1 for writing 1/27 as a power of 3, correctly
allow embedded answer*

A1

(c) $4y = 4^{1\frac{1}{2}}$

M1

$$y = 1\frac{1}{2}$$

*M1 for $4^{\frac{3}{2}} = 8$
allow embedded answer*

A1

[6]

M9. $a + b = 7$

M1

$ab = 10$

M1

$a = 2, b = 5$

$a = 5, b = 2$

B1

[3]

M10. (a) 1

B1

(b) $(\sqrt[3]{8})^2$ or $\sqrt[3]{(8^2)}$

Cube root and square attempted

M1

4

A1

(c) $6^2 = 1/6^2 =$ or $1/36$

M1

$144^{0.5} = \sqrt{144}$ or 12

M1

or 0.33 ...

*Allow 12/36 or equivalent
1/36 \times 12 is not fully simplified
... A0*

A1

[6]

M11. (a) x^5

B1

(b) y^3

B1

(c) $x^4 - 3x$

*B1 x^4 or $3x$
Penalise fw*

B2

[4]

