TB(2B) Ch. 8 Laws of integral indices
Conventional Questions

1. [11-12 S. Test 2]

Solve $5^x - 3 = \dfrac{16}{5^x + 3}$. (3 marks)

2. [11-12 S. Test 2]

Simplify the followings and express your answers with positive indices.

(a) $\dfrac{(a^{10}b^8)^0}{(a^2b^3)^{-1} \times (ab)^2}$ (3 marks)

(b) $\dfrac{1^n}{2n} \div \left(\dfrac{2n^2m^{-5}}{m^2}\right)^{-2}$ (3 marks)

3. [11-12 Final exam #3]

Simplify $4a^0 \times \left(\dfrac{a^{-3}}{b}\right)^2$. Express your answer with positive indices. (3 marks)

4. [11-12 Final exam #9]

(a) Show that $2\sqrt{6}\left(3+\sqrt{6}\right)^2 = 30\sqrt{6} + 72$. (1 mark)

(b) Hence, or otherwise, solve $\left(3+\sqrt{6}\right)^{n+1} = \dfrac{2\sqrt{6}}{30\sqrt{6}+72}$ for n. (3 marks)

5. [12-13 S6 Mid-year Exam, 1]

Simplify $\dfrac{a^3b^{-4}}{(2a^{-2}b)^3}$ and express your answer with positive indices. **(3 marks)**

6. [12-13 S2 S. Test 2, 2]

Express 13.1_{16} as a denary number with working steps. **(2 marks)**

7. [12-13 S2 S. Test 2, 3]

How many seconds are there in 10 weeks? Express your answer in scientific notation and correct it to 3 significant figures. **(2 marks)**

8. [12-13 S2 S. Test 2, 6]

Simplify the following expressions and express your answers with positive indices.

(a) $\dfrac{\left(a^2b^5\right)^{-3}}{-a^{-4}b^{-1}} \div \left(\dfrac{a^3b^{-2}}{3}\right)^2$ **(3 marks)**

(b) $\left(\dfrac{2^{3n+1}}{8^{-n} \cdot 4^{2+n}}\right)^{-2}$, where n is a negative integer. **(3 marks)**

9. [12-13 S2 S. Test 2, 8]

Solve $\begin{cases} 3^{2y-x} - \frac{1}{3} = 0 \\ 5^{2x-y+3} = \sqrt{5} \end{cases}$ for x and y. **(3 marks)**

10. [12-13 S.2 Final Exam, 2]

(a) Solve $8^{x-3} = \frac{1}{2}$. **(3 marks)**

(b) Simplify $\frac{\left(ab^2\right)^{-5}}{\left(a^3b^{-5}\right)^2}$ and express the answer with positive indices. **(2 marks)**

11. [13-14 S.2 S.Test, 2]

Without using a calculator, find the value of $60\times10^{-2014} - 2\times10^{-2013}$ and express your answer in scientific notation. **(2 marks)**

12. [13-14 S.2 S.Test, 5]

Simplify $\frac{(-5x^{-2}y^3)^{-2}}{(x-y)^0(2x^2y^{-3})^3}$ and express the answer with positive indices. **(3 marks)**

13. [13-14 S.2 S.Test, 7]

Solve $(3^{2^{n-1}}+1)(3^{2^{n-1}}-1) = 80$ for n. **(3 marks)**

14. [13-14 Final Exam, #3]

(a) Simplify $\frac{\left(a^2b^{-3}\right)^2}{\left(2a^{-2}b^2\right)^{-3}}$ and express the answer with positive indices. **(2 marks)**

(b) Solve $5^{n+1}\cdot5^{3n} = 1$ for n. **(2 marks)**

15. [14-15 Standardized Test #4]

It is given that the storage of the harddisk is 2 TB and a digital song occupies 4 MB. Assume that 1 TB = 2^{20} MB, how many digital songs can the harddisk store? Round off your answer to 3 significant figures and express it in scientific notations. **(2 marks)**

16. [14-15 Standardized Test #8]

Solve $\left(-3^{2n-3}\right)^{-1} + \frac{21}{9^{n-1}} = 2$. **(3 marks)**

17. [14-15 S.6 Mock Exam #1]

Simplify $b^{12}\left(\frac{3a^{-4}}{b^5}\right)^{-2}$ and express your answer with positive indices. **(3 marks)**

18. [14-15 Final Exam #12]

(a) Simplify $\left(\frac{-2a^3b}{3ab^3}\right)^{-4}$ and express the answer with positive indices. **(2 marks)**

(b) Solve $9\cdot 2^{2x}+4^x=40$. **(2 marks)**

19. [15-16 Final Exam #9]

Simplify $\left(\frac{4x^{-2}y}{-7x^0y^{-5}}\right)^{-4}$ and express the answer with positive indices. **(2 marks)**

20. [15-16 S.6 Mock Exam #1]

Simplify $\frac{b^{-4}}{(a^{-3}b^4)^2}$ and express your answer with positive indices. **(3 marks)**

21. [15-16 Standardized Test #2]

Simplify $\frac{a^{-3}b^{-1}\times\left(-2a^2b^{-3}\right)^2}{\left(3a^{-1}b^2\right)^{-1}}$ and express the answer with positive indices. **(3 marks)**

22. [15-16 Standardized Test #3]

Find the value of $3\times10^{2013}+6\times10^{2015}$ without using a calculator, and express the answer in scientific notation. **(2 marks)**

23. [15-16 Standardized Test #6]

Solve the equation $9^x+26\times9^{-1}=3^{2x+3}$. **(2 marks)**

24. [16-17 S.6 Mock Exam #1]

Simplify $\frac{\left(a^{-4}b^3\right)^5}{a^3b^{-4}}$ and express your answer with positive indices. **(3 marks)**

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