SAT Maths Sample Paper 4

1. If $x = -2$, then which of the following is in the right order?

   A. $x^{-2} < x^{-1} < x^0 < x^1 < x^2$

   B. $x^{-2} < x^2 < x^0 < x^{-1} < x^1$

   C. $x^1 < x^{-1} < x^{-2} < x^0 < x^2$

   D. $x^2 < x^0 < x^{-2} < x^{-1} < x^1$

2. If $16^x = 13$, what is the value of 2^{2x+1}?

   A. $2\sqrt{13}$

   B. $6\sqrt{13}$

   C. $4\sqrt{13}$

   D. $13\sqrt{2}$

3. If $x^{-\frac{1}{2}} < x^{-\frac{1}{4}} < x^{\frac{1}{2}}$, what is a possible value of x?

   A. -4

   B. 4

   C. 0.4

   D. -0.4

4. If $\sqrt{a} \times \sqrt[3]{a} \times \sqrt[5]{a} \times \sqrt[2k]{a} = a^2$, then what is the value of k?

   A. 1

   B. $\frac{13}{15}$

   C. $\frac{15}{23}$

   D. $\frac{23}{15}$

5. Which of the following is equivalent to $\left(\frac{a^3b^4}{ab^5}\right)^2$?

A. $\frac{b^4}{a}$

B. $\frac{a^2}{b}$

C. $\frac{a^4}{b^2}$

D. $\frac{a^4}{b^3}$

6. Which of the following is equivalent to $\left(\frac{a^3}{ab^2}\right)^2$?

A. $\frac{b^4}{a^4}$

B. $\frac{a^2}{b^2}$

C. 1

D. $-\frac{a^4}{b^4}$

7. Which of the following is equivalent to $\left(\frac{a^3b^7}{a^4b^5}\right)^{\frac{1}{2}}$?

A. $\frac{b^2}{a}$

B. $\frac{a^2}{b}$

C. $\frac{b\sqrt{a}}{a^2}$

D. $\frac{b\sqrt{a}}{a}$

8. Which of the following is equivalent to $a^{-\frac{1}{3}} + \left(\frac{b^2}{a^3}\right)^{-\frac{1}{3}}$?

A. $\left(a + \frac{b^2}{a}\right)^{-\frac{1}{3}}$

B. $\frac{\sqrt[3]{a^2}}{a} + \frac{a\sqrt[3]{b}}{b}$

C. $\frac{\sqrt[3]{a}}{a}$

D. $\frac{\sqrt[3]{a^2}}{a^2} + \frac{a\sqrt[3]{b}}{b}$

9. What is the value of $\sqrt[3]{125} + \sqrt[3]{216}$?

10. If $3x - 4y = 3$, what is the value of $\frac{8^x}{16^y}$?

1. C Since x , then $x^{-2} = \frac{1}{4}$, $x^{-1} = -\frac{1}{2}$, $x^0 = 1$, $x^1 = -2$, $x^2 = 4$.

2. A Note that $16 = 2^4$. Therefore, $16^x = 13$ leads to $(2^{2x})^2 = 13$, then $2^{2x} = \sqrt{13}$. Thus, it can be seen that $2^{2x+1} = 2\sqrt{13}$.

3. B The value of x cannot be negative and if $x = 1$, then $x^{-\frac{1}{2}} = x^{-\frac{1}{4}} = x^{\frac{1}{2}}$. If $0 < x < 1$, then $x^{-\frac{1}{2}} > x^{-\frac{1}{4}} > x^{-\frac{1}{2}}$. Therefore, only $x = 4$, satisfies the order.

4. C $\sqrt{a} \times \sqrt[3]{a} \times \sqrt[5]{a^2} \times \sqrt[24]{a} = a^2$ leads to $\frac{1}{2} + \frac{1}{3} + \frac{2}{5} + \frac{1}{2k} = 2$. Solving this equation, it can be obtained that $k = \frac{15}{23}$.

5. C $\left(\frac{a^3b^4}{ab^5}\right)^2 = \left(\frac{a^2}{b}\right) = \frac{a^4}{b^2}$.

6. A $\left(\frac{a^3}{ab^2}\right)^{-2} = \left(\frac{a^2}{b^2}\right)^{-2} = \frac{b^4}{a^4}$.

7. D $\left(\frac{a^3b^7}{a^4b^5}\right)^{\frac{1}{2}} = \left(\frac{b^2}{a}\right)^{\frac{1}{2}} = \frac{b}{\sqrt{a}} = \frac{b\sqrt{a}}{a}$.

8. B $a^{-\frac{1}{3}} + \left(\frac{b^2}{a^3}\right)^{-\frac{1}{3}} = \frac{1}{\sqrt[3]{a}} + \left(\frac{a^3}{b^2}\right)^{\frac{1}{3}} = \frac{\sqrt[3]{a^2}}{a} + \frac{a}{\sqrt[3]{b^2}} = \frac{\sqrt[3]{a^2}}{a} + a\frac{\sqrt[3]{b}}{b}$.

9. 11. $\sqrt[3]{125} + \sqrt[3]{216} = 5 + 6 = 11$.

10. 8. $\frac{8^x}{16^y} = \frac{2^{3x}}{2^{4y}} = 2^{3x-4y} = 2^3 = 8$.