



MATHS

BOOKS - KAPLAN INC MATHS

(ENGLISH)

**EXPONENTS, RADICALS,
POLYNOMIALS, AND RATIONAL
EXPRESSIONS**

Multiple Choice Question

1. Which of the following is equivalent to the expression $(2x^4 - 5x^4)^2$?

A. $-21x^8$

B. $-6x^8$

C. $9x^8$

D. $9x^{16}$

Answer: C



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2. Which of the following is equivalent to

$$(2b^3c^2 + b^2c) - (b^3c^2 - b^2c - 4bc)?$$

A. 0

B. b^3c^2

C. $b^3c^2 + 2b^2c$

D. $b^3c^2 + 2b^2c - 8bc$

Answer: C



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3. When completely simplified, $\frac{25^4 \times 5^2}{25^5}$ has value of:

A. 0

B. 1

C. 5

D. 25

Answer: B



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4. Which of the following is equivalent to $x^{\frac{5}{7}}$,
for all values of x ?

A. $\frac{5}{x^7}$

B. $\frac{1}{x^2}$

C. $\sqrt{5}(x^7)$

D. $\sqrt{7}(x^5)$

Answer: D



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5. Which of the following is the expanded form of $4(5x + 3)(2x - 1)$?

A. $40x^2 + 12$

B. $40x^2 - 12$

C. $40x^2 - 4x + 12$

D. $40x^2 + 4x - 12$

Answer: C



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6. If $\frac{a^{x^2}}{a^{x^2-y^2}} = a^4$ and $y > 0$, what is the value of y ?

A. 0

B. 1

C. 2

D. 4

Answer: D



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7. Which sequence of steps correctly gives the value of $4^{\frac{3}{2}}$ and algebraically justifies the values?

A. $4^{\frac{3}{2}} = (4^2)^{\frac{1}{3}} = \sqrt{3}(4^2) = \sqrt{3}(16)$

B. $4^{\frac{3}{2}} = (4^2) \div 3 = 16 \div 3 = \frac{16}{3}$

C. $4^{\frac{3}{2}} = (4^2) \div 2 = 64 \div 2 = 32$

D. $4^{\frac{3}{2}} = (4^3)^{\frac{1}{2}} = \sqrt{4^3} = \sqrt{64} = 8$

Answer: C



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8. What is the factored form of

$$16x^6 - 8x^3y^3 + y^6?$$

A. $(4x^3 - y^3)^2$

B. $(4x^3 + y^3)^2$

C. $(4x^3 - y)^6$

D. $(16x^2 + y)^3$

Answer: A



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9. $xy\left(\frac{x}{y} - y\right)$

Which of the following is equivalent to the expression above?

A. $x^2 - y^2$

B. $1 - xy^2$

C. $x^2 - xy^2$

D. $2x - 2xy$

Answer: C



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10. The area of a sector of a circle given by the formula above, where S is the angle measure in degree of the sector and r is the radius of the circle. Which of the following gives r in terms of A and S ?

A. $r = \frac{360A\pi}{S}$

B. $r = \frac{360Z}{S\pi}$

C. $r = \sqrt{\frac{360A\pi}{S}}$

D. $r = \sqrt{\frac{360A}{S\pi}}$

Answer: D



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11. If $x^2 = a^{\frac{1}{3}}$, where $x > 0$ and $a > 0$, which of the following gives a in terms of x ?

A. $a = \frac{1}{x^6}$

B. $a = \frac{2}{x^3}$

C. $a = x^{\frac{3}{2}}$

D. $a = -x^6$

Answer: A



$$12. \frac{20u^3v6(2) - 15u^2v}{10u^4v + 30u^3v^3}$$

Which of the following is the reduced form of the expression above?

A. $\frac{5uv}{40u^7v^4}$

B. $\frac{2v - 1}{u + 2uv^2}$

C. $\frac{4uv - 3}{2u^2 + 2uv^2}$

D. $\frac{2uv - 3uv^2}{u^2 + 6}$

Answer: C



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13. If $x=5$ and $\sqrt{2x + 11} - x = 0$, what is the value of m ?



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14. If $x = 8\sqrt{3}$ and $3x = \sqrt{3y}$, what is the value of y ?



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15. Given an account with interest compounded annually, the formula $A = P(1 + r)^t$ can be used to calculate the total amount of money, A , in the account after t years, where P is the principal (the amount originally invested) and r is the interest rate (expressed as a decimal). Suppose valeera invests \$5,000 in a savings account that pays 2% interest compounded annually. How much money will she have in four years? Express your answer to the nearest whole dollar.



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16. Which of the following gives

$$\frac{(x^2y)^3}{x^7y^2} \times \sqrt{sy} \text{ written in simplest form?}$$

A. $\frac{y\sqrt{y}}{\sqrt{x}}$

B. $\frac{3\sqrt{y}}{\sqrt{x}}$

C. $\sqrt{\frac{3y}{y}}$

D. $\frac{y}{\sqrt{xy}}$

Answer: A



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17. $y - b = a - 2^{-x}$

For the equation given, if $a > 0$ and $b < 0$.
then which of the following statements is
always true?

A. $y < a + b$

B. $y > a + b$

C. $y = a + b$

D. $y = -2(a + b)$

Answer: A



18. $\frac{2x + 6}{x^2 + 3x} - \frac{x + 3}{x^2 + x}$

Which of the following equivalent to the rational expression given above?

A. $\frac{-1}{x}$

B. $\frac{x + 3}{2x}$

C. $\frac{x - 1}{x(x + 1)}$

D. $\frac{x + 9}{2x^2 + 4x}$

Answer: C



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$$19. E_n = - (2, 18 \times 10^{-18}) \frac{Z^2}{n^2}$$

Electrons follow paths, called orbits around the nucleus of an atom. According to the Bohr model, the energy in joules of an atom's n th orbit containing a single electron is given by the formula shown above, where Z is the atomic number of the atom and n is the orbit number. Which of the following equations gives the atomic number of an atom given the

energy of its n th orbit (assuming there is a single electron in that orbit)?

$$\text{A. } Z = 10^9 \sqrt{\frac{-n^2 E_n}{2.18}}$$

$$\text{B. } Z = \frac{1}{10^9} \sqrt{\frac{-n^2 E_n}{2.18}}$$

$$\text{C. } Z = 10^9 \sqrt{\frac{-2.18 E_n}{n^2}}$$

$$\text{D. } Z = \frac{1}{10^9} \sqrt{\frac{-2.18 E_n}{n^2}}$$

Answer: A



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$$20. T = \frac{R^2}{r^2} \sqrt{\frac{2h}{g}}$$

Suppose an open cylindrical tank has a round drain with radius t in the bottom of the tank. When the tank is filled with water to a depth of h centimeters, the time it takes for all the water to drain from the tank is given by the formula above, where R is the radius of the tank (in centimeters) and $g = 980\text{cm}/s^2$ is the acceleration due to gravity. Suppose such a tank has a radius of 2 meters and is filled to a depth of 4 meters. About how many minutes does it take to empty the tank if the drain has

a radius of 5 centimeters? (1 meter=100 centimeter).



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