

Question ID dd4ab4c4

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Advanced Math	Equivalent expressions	<div><div></div><div></div><div></div></div>

ID: dd4ab4c4

$4a^2 + 20ab + 25b^2$

Which of the following is a factor of the polynomial above?

- A. $a + b$
- B. $2a + 5b$
- C. $4a + 5b$
- D. $4a + 25b$

ID: dd4ab4c4 Answer

Correct Answer: B

Rationale

Choice B is correct. The first and last terms of the polynomial are both squares such that $4a^2 = (2a)^2$ and $25b^2 = (5b)^2$. The second term is twice the product of the square root of the first and last terms: $20ab = 2(2a)(5b)$. Therefore, the polynomial is the square of a binomial such that $4a^2 + 20ab + 25b^2 = (2a + 5b)^2$, and $(2a + 5b)$ is a factor.

Choice A is incorrect and may be the result of incorrectly factoring the polynomial. Choice C is incorrect and may be the result of dividing the second and third terms of the polynomial by their greatest common factor. Choice D is incorrect and may be the result of not factoring the coefficients.

Question Difficulty: Medium

Question ID b8caaf84

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Advanced Math	Equivalent expressions	<div><div></div><div></div><div></div></div>

ID: b8caaf84

If $p = 3x + 4$ and $v = x + 5$, which of the following is equivalent to $pv - 2p + v$?

- A. $3x^2 + 12x + 7$
- B. $3x^2 + 14x + 17$
- C. $3x^2 + 19x + 20$
- D. $3x^2 + 26x + 33$

ID: b8caaf84 Answer

Correct Answer: B

Rationale

Choice B is correct. It's given that $p = 3x + 4$ and $v = x + 5$. Substituting the values for p and v into the expression $pv - 2p + v$ yields $(3x + 4)(x + 5) - 2(3x + 4) + x + 5$. Multiplying the terms $(3x + 4)(x + 5)$ yields $3x^2 + 4x + 15x + 20$. Using the distributive property to rewrite $-2(3x + 4)$ yields $-6x - 8$. Therefore, the entire expression can be represented as $3x^2 + 4x + 15x + 20 - 6x - 8 + x + 5$. Combining like terms yields $3x^2 + 14x + 17$.

Choice A is incorrect and may result from subtracting, instead of adding, the term $x + 5$. Choice C is incorrect. This is the result of multiplying the terms $(3x + 4)(x + 5)$. Choice D is incorrect and may result from distributing 2, instead of -2 , to the term $3x + 4$.

Question Difficulty: Medium

Question ID 52931bfa

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Advanced Math	Equivalent expressions	<div><div></div><div></div><div></div></div>

ID: 52931bfa

Which expression is equivalent to $\frac{8x(x-7)-3(x-7)}{2x-14}$, where $x > 7$?

- A. $\frac{x-7}{5}$
- B. $\frac{8x-3}{2}$
- C. $\frac{8x^2-3x-14}{2x-14}$
- D. $\frac{8x^2-3x-77}{2x-14}$

ID: 52931bfa Answer

Correct Answer: B

Rationale

Choice B is correct. The given expression has a common factor of 2 in the denominator, so the expression can be rewritten as $\frac{8xx-7-3x-7}{2x-7}$. The three terms in this expression have a common factor of $x-7$. Since it's given that $x > 7$, x can't be equal to 7, which means $x-7$ can't be equal to 0. Therefore, each term in the expression, $\frac{8xx-7-3x-7}{2x-7}$, can be divided by $x-7$, which gives $\frac{8x-3}{2}$.

Choice A is incorrect and may result from conceptual or calculation errors.

Choice C is incorrect and may result from conceptual or calculation errors.

Choice D is incorrect and may result from conceptual or calculation errors.

Question Difficulty: Medium

Question ID ad2ec615

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Advanced Math	Equivalent expressions	<div><div></div><div></div><div></div></div>

ID: ad2ec615

Which of the following is equivalent to the expression $x^4 - x^2 - 6$?

- A. $(x^2 + 1)(x^2 - 6)$
- B. $(x^2 + 2)(x^2 - 3)$
- C. $(x^2 + 3)(x^2 - 2)$
- D. $(x^2 + 6)(x^2 - 1)$

ID: ad2ec615 Answer

Correct Answer: B

Rationale

Choice B is correct. The term x^4 can be factored as $(x^2)(x^2)$. Factoring -6 as $(2)(-3)$ yields values that add to -1 , the coefficient of x^2 in the expression.

Choices A, C, and D are incorrect and may result from finding factors of -6 that don't add to the coefficient of x^2 in the original expression.

Question Difficulty: Medium

Question ID 42c71eb5

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Advanced Math	Equivalent expressions	<div><div></div><div></div><div></div></div>

ID: 42c71eb5

$(2x + 5)^2 - (x - 2) + 2(x + 3)$

Which of the following is equivalent to the expression above?

- A. $4x^2 + 21x + 33$
- B. $4x^2 + 21x + 29$
- C. $4x^2 + x + 29$
- D. $4x^2 + x + 33$

ID: 42c71eb5 Answer

Correct Answer: A

Rationale

Choice A is correct. The given expression can be rewritten as $(2x + 5)^2 + (-1)(x - 2) + 2(x + 3)$. Applying the distributive property, the expression $(-1)(x - 2) + 2(x + 3)$ can be rewritten as $-1(x) + (-1)(-2) + 2(x) + 2(3)$, or $-x + 2 + 2x + 6$. Adding like terms yields $x + 8$. Substituting $x + 8$ for $(-1)(x - 2) + 2(x + 3)$ in the given expression yields $(2x + 5)^2 + x + 8$. By the rules of exponents, the expression $(2x + 5)^2$ is equivalent to $(2x + 5)(2x + 5)$. Applying the distributive property, this expression can be rewritten as $2x(2x) + 2x(5) + 5(2x) + 5(5)$, or $4x^2 + 10x + 10x + 25$. Adding like terms gives $4x^2 + 20x + 25$. Substituting $4x^2 + 20x + 25$ for $(2x + 5)^2$ in the rewritten expression yields $4x^2 + 20x + 25 + x + 8$, and adding like terms yields $4x^2 + 21x + 33$.

Choices B, C, and D are incorrect. Choices C and D may result from rewriting the expression $(2x + 5)^2$ as $4x^2 + 25$, instead of as $4x^2 + 20x + 25$. Choices B and C may result from rewriting the expression $-(x - 2)$ as $-x - 2$, instead of $-x + 2$.

Question Difficulty: Medium

Question ID a05bd3a4

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Advanced Math	Equivalent expressions	<div><div></div><div></div><div></div></div>

ID: a05bd3a4

Which of the following expressions is equivalent to $x^2 - 5$?

- A. $(x + \sqrt{5})^2$
- B. $(x - \sqrt{5})^2$
- C. $(x + \sqrt{5})(x - \sqrt{5})$
- D. $(x + 5)(x - 1)$

ID: a05bd3a4 Answer

Correct Answer: C

Rationale

Choice C is correct. The expression can be written as a difference of squares $x^2 - y^2$, which can be factored as $(x + y)(x - y)$. Here, $y^2 = 5$, so $y = \sqrt{5}$, and the expression therefore factors as $(x + \sqrt{5})(x - \sqrt{5})$.

Choices A and B are incorrect and may result from misunderstanding how to factor a difference of squares. Choice D is incorrect; $(x + 5)(x - 1)$ can be rewritten as $x^2 + 4x - 5$, which is not equivalent to the original expression.

Question Difficulty: Medium

Question ID cc776a04

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Advanced Math	Equivalent expressions	<div><div></div><div></div><div></div></div>

ID: cc776a04

Which of the following is an equivalent form of $(1.5x - 2.4)^2 - (5.2x^2 - 6.4)$?

- A. $-2.2x^2 + 1.6$
- B. $-2.2x^2 + 11.2$
- C. $-2.95x^2 - 7.2x + 12.16$
- D. $-2.95x^2 - 7.2x + 0.64$

ID: cc776a04 Answer

Correct Answer: C

Rationale

Choice C is correct. The first expression $(1.5x - 2.4)^2$ can be rewritten as $(1.5x - 2.4)(1.5x - 2.4)$. Applying the distributive property to this product yields $(2.25x^2 - 3.6x - 3.6x + 5.76) - (5.2x^2 - 6.4)$. This difference can be rewritten as $(2.25x^2 - 3.6x - 3.6x + 5.76) + (-1)(5.2x^2 - 6.4)$. Distributing the factor of -1 through the second expression yields $2.25x^2 - 3.6x - 3.6x + 5.76 - 5.2x^2 + 6.4$. Regrouping like terms, the expression becomes $(2.25x^2 - 5.2x^2) + (-3.6x - 3.6x) + (5.76 + 6.4)$. Combining like terms yields $-2.95x^2 - 7.2x + 12.16$.

Choices A, B, and D are incorrect and likely result from errors made when applying the distributive property or combining the resulting like terms.

Question Difficulty: Medium

Question ID a520ba07

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Advanced Math	Equivalent expressions	<div><div></div><div></div><div></div></div>

ID: a520ba07

$\sqrt[3]{x^3y^6}$

Which of the following expressions is equivalent to the expression above?

- A. y^2
- B. xy^2
- C. y^3
- D. xy^3

ID: a520ba07 Answer

Correct Answer: B

Rationale

Choice B is correct. One of the properties of radicals is $\sqrt[n]{ab} = \sqrt[n]{a} \cdot \sqrt[n]{b}$. Thus, the given expression can be rewritten as $\sqrt[3]{x^3} \cdot \sqrt[3]{y^6}$. Simplifying by taking the cube root of each part gives $x^1 \cdot y^2$, or xy^2 .

Choices A, C, and D are incorrect and may be the result of incorrect application of the properties of exponents and radicals.

Question Difficulty: Medium

Question ID 5b6af6b1

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Advanced Math	Equivalent expressions	<div><div></div><div></div><div></div></div>

ID: 5b6af6b1

Which expression is equivalent to $(d - 6)(8d^2 - 3)$?

- A. $8d^3 - 14d^2 - 3d + 18$
- B. $8d^3 - 17d^2 + 48$
- C. $8d^3 - 48d^2 - 3d + 18$
- D. $8d^3 - 51d^2 + 48$

ID: 5b6af6b1 Answer

Correct Answer: C

Rationale

Choice C is correct. Applying the distributive property to the given expression yields $d8d^2 - 3 - 68d^2 - 3$. Applying the distributive property once again to this expression yields $d8d^2 + d-3 + -68d^2 + -6-3$, or $8d^3 + -3d + -48d^2 + 18$. This expression can be rewritten as $8d^3 - 48d^2 - 3d + 18$. Thus, $d - 68d^2 - 3$ is equivalent to $8d^3 - 48d^2 - 3d + 18$.

Choice A is incorrect and may result from conceptual or calculation errors.

Choice B is incorrect and may result from conceptual or calculation errors.

Choice D is incorrect and may result from conceptual or calculation errors.

Question Difficulty: Medium

Question ID a255ae72

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Advanced Math	Equivalent expressions	<div><div></div><div></div><div></div></div>

ID: a255ae72

If $x^2 = a + b$ and $y^2 = a + c$, which of the following is equal to $(x^2 - y^2)^2$?

- A. $a^2 - 2ac + c^2$
- B. $b^2 - 2bc + c^2$
- C. $4a^2 - 4abc + c^2$
- D. $4a^2 - 2abc + b^2c^2$

ID: a255ae72 Answer

Correct Answer: B

Rationale

Choice B is correct. It's given that $x^2 = a + b$ and $y^2 = a + c$. Using the distributive property, the expression $(x^2 - y^2)^2$ can be rewritten as $(x^2)^2 - 2x^2y^2 + (y^2)^2$. Substituting $a + b$ and $a + c$ for x^2 and y^2 , respectively, in this expression yields $(a + b)^2 - 2((a + b)(a + c)) + (a + c)^2$. Expanding this expression yields $(a^2 + 2ab + b^2) - (2a^2 + 2bc + 2ac + 2ab) + (a^2 + 2ac + c^2)$. Combining like terms, this expression can be rewritten as $b^2 - 2bc + c^2$.

Choices A, C, and D are incorrect and may result from an error in using the distributive property, substituting, or combining like terms.

Question Difficulty: Medium

Question ID 463eec13

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Advanced Math	Equivalent expressions	<div><div></div><div></div><div></div></div>

ID: 463eec13

If $x \neq 0$, which of the following expressions is

equivalent to $\frac{\sqrt{16x^4y^8}}{x^3}$?

- A. $8x^2y^4$
- B. $4xy^4$
- C. $4x^{-2}y^2$
- D. $4x^{-1}y^4$

ID: 463eec13 Answer

Correct Answer: D

Rationale

Choice D is correct. Taking the square root of an exponential expression halves the exponent, so $\frac{\sqrt{16x^4y^8}}{x^3} = \frac{4x^2y^4}{x^3}$, which further reduces to $\frac{4y^4}{x}$. This can be rewritten as $4x^{-1}y^4$.

Choice A is incorrect and may result from neglecting the denominator of the given expression and from incorrectly calculating the square root of 16. Choice B is incorrect and may result from rewriting $\frac{1}{x}$ as x^1 rather than x^{-1} . Choice C is incorrect and may result from taking the square root of the variables in the numerator twice instead of once.

Question Difficulty: Medium

Question ID a1bf1c4e

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Advanced Math	Equivalent expressions	<div><div></div><div></div><div></div></div>

ID: a1bf1c4e

$x^2 + 6x + 4$

Which of the following is equivalent to the expression above?

- A. $(x + 3)^2 + 5$
- B. $(x + 3)^2 - 5$
- C. $(x - 3)^2 + 5$
- D. $(x - 3)^2 - 5$

ID: a1bf1c4e Answer

Correct Answer: B

Rationale

Choice B is correct. The given quadratic expression is in standard form, and each answer choice is in vertex form. Completing the square converts the expression from standard form to vertex form. The first step is to rewrite the expression as follows: $x^2 + 6x + 4 = x^2 + 6x + 9 + 4 - 9$. The first three terms of the revised expression can be rewritten as a perfect square as follows: $x^2 + 6x + 9 + 4 - 9 = (x + 3)^2 + 4 - 9$. Combining the constant terms gives $(x + 3)^2 - 5$.

Choice A is incorrect. Squaring the binomial and simplifying the expression in choice A gives $x^2 + 6x + 9 + 5$. Combining like terms gives $x^2 + 6x + 14$, not $x^2 + 6x + 4$. Choice C is incorrect. Squaring the binomial and simplifying the expression in choice C gives $x^2 - 6x + 9 + 5$. Combining like terms gives $x^2 - 6x + 14$, not $x^2 + 6x + 4$. Choice D is incorrect. Squaring the binomial and simplifying the expression in choice D gives $x^2 - 6x + 9 - 5$. Combining like terms gives $x^2 - 6x + 4$, not $x^2 + 6x + 4$.

Question Difficulty: Medium

Question ID 5805e747

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Advanced Math	Equivalent expressions	<div><div></div><div></div><div></div></div>

ID: 5805e747

Which expression is equivalent to $(7x^3 + 7x) - (6x^3 - 3x)$?

- A. $x^3 + 10x$
- B. $-13x^3 + 10x$
- C. $-13x^3 + 4x$
- D. $x^3 + 4x$

ID: 5805e747 Answer

Correct Answer: A

Rationale

Choice A is correct. Applying the distributive property, the given expression can be written as $7x^3 + 7x - 6x^3 + 3x$. Grouping like terms in this expression yields $7x^3 - 6x^3 + 7x + 3x$. Combining like terms in this expression yields $x^3 + 10x$.

Choice B is incorrect and may result from conceptual or calculation errors.

Choice C is incorrect and may result from conceptual or calculation errors.

Choice D is incorrect and may result from conceptual or calculation errors.

Question Difficulty: Medium

Question ID 26eb61c1

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Advanced Math	Equivalent expressions	<div><div></div><div></div><div></div></div>

ID: 26eb61c1

Which expression is equivalent to $6x^8y^2 + 12x^2y^2$?

- A. $6x^2y^2(2x^6)$
- B. $6x^2y^2(x^4)$
- C. $6x^2y^2(x^6 + 2)$
- D. $6x^2y^2(x^4 + 2)$

ID: 26eb61c1 Answer

Correct Answer: C

Rationale

Choice C is correct. Since each term of the given expression has a common factor of $6x^2y^2$, it may be rewritten as $6x^2y^2(x^6) + 6x^2y^2(2)$, or $6x^2y^2(x^6 + 2)$.

Choice A is incorrect. This expression is equivalent to $12x^8y^2$, not $6x^8y^2 + 12x^2y^2$.

Choice B is incorrect. This expression is equivalent to $6x^6y^2$, not $6x^8y^2 + 12x^2y^2$.

Choice D is incorrect. This expression is equivalent to $6x^6y^2 + 12x^2y^2$, not $6x^8y^2 + 12x^2y^2$.

Question Difficulty: Medium

Question ID 42f19012

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Advanced Math	Equivalent expressions	<div><div></div><div></div><div></div></div>

ID: 42f19012

Which expression is equivalent to $a^{\frac{11}{12}}$, where $a > 0$?

- A. $\sqrt[12]{a^{132}}$
- B. $\sqrt[144]{a^{132}}$
- C. $\sqrt[121]{a^{132}}$
- D. $\sqrt[11]{a^{132}}$

ID: 42f19012 Answer

Correct Answer: B

Rationale

Choice B is correct. Since $\frac{12}{12} = 1$, multiplying the exponent of the given expression by $\frac{12}{12}$ yields an equivalent expression: $a^{\frac{11}{12} \cdot \frac{12}{12}} = a^{\frac{132}{144}}$. Since $\frac{132}{144} = 132 \cdot \frac{1}{144}$, the expression $a^{\frac{132}{144}}$ can be rewritten as $a^{132 \cdot \frac{1}{144}}$. Applying properties of exponents, this expression can be rewritten as $a^{132 \cdot \frac{1}{144}}$. An expression of the form $m^{\frac{1}{k}}$, where $m > 0$ and $k > 0$, is equivalent to $\sqrt[k]{m}$. Therefore, $a^{132 \cdot \frac{1}{144}}$ is equivalent to $\sqrt[144]{a^{132}}$.

Choice A is incorrect and may result from conceptual or calculation errors.

Choice C is incorrect and may result from conceptual or calculation errors.

Choice D is incorrect and may result from conceptual or calculation errors.

Question Difficulty: Medium

Question ID f237ccfc

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Advanced Math	Equivalent expressions	<div><div></div><div></div><div></div></div>

ID: f237ccfc

The sum of $-2x^2+x+31$ and $3x^2+7x-8$ can be written in the form ax^2+bx+c , where a , b , and c are constants. What is the value of $a+b+c$?

ID: f237ccfc Answer

Rationale

The correct answer is 32. The sum of the given expressions is $(-2x^2+x+31)+(3x^2+7x-8)$. Combining like terms yields $x^2+8x+23$. Based on the form of the given equation, $a=1$, $b=8$, and $c=23$. Therefore, $a+b+c=32$.

Alternate approach: Because $a+b+c$ is the value of ax^2+bx+c when $x=1$, it is possible to first make that substitution into each polynomial before adding them. When $x=1$, the first polynomial is equal to $-2+1+31=30$ and the second polynomial is equal to $3+7-8=2$. The sum of 30 and 2 is 32.

Question Difficulty: Medium

Question ID a391ed22

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Advanced Math	Equivalent expressions	<div><div></div><div></div><div></div></div>

ID: a391ed22

$$\left(\frac{1}{2}x + \frac{3}{2}\right)\left(\frac{3}{2}x + \frac{1}{2}\right)$$

The expression above is equivalent to $ax^2 + bx + c$, where a , b , and c are constants. What is the value of b ?

ID: a391ed22 Answer

Rationale

The correct answer is $\frac{5}{2}$. The expression $\left(\frac{1}{2}x + \frac{3}{2}\right)\left(\frac{3}{2}x + \frac{1}{2}\right)$ can be written in the form $ax^2 + bx + c$, where a , b , and c are constants, by multiplying out the expression using the distributive property of multiplication over addition. The result is $\left(\frac{1}{2}x\right)\left(\frac{3}{2}x\right) + \left(\frac{1}{2}x\right)\left(\frac{1}{2}\right) + \left(\frac{3}{2}\right)\left(\frac{3}{2}x\right) + \left(\frac{3}{2}\right)\left(\frac{1}{2}\right)$. This expression can be rewritten by multiplying as indicated to give $\frac{3}{4}x^2 + \frac{1}{4}x + \frac{9}{4}x + \frac{3}{4}$, which can be simplified to $\frac{3}{4}x^2 + \frac{10}{4}x + \frac{3}{4}$, or $\frac{3}{4}x^2 + \frac{5}{2}x + \frac{3}{4}$. This is in the form $ax^2 + bx + c$, where the value of b is $\frac{5}{2}$. Note that 5/2 and 2.5 are examples of ways to enter a correct answer.

Question Difficulty: Medium

Question ID c3a72da5

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Advanced Math	Equivalent expressions	<div><div></div><div></div><div></div></div>

ID: c3a72da5

Which of the following is equivalent to the sum of $3x^4 + 2x^3$ and $4x^4 + 7x^3$?

- A. $16x^{14}$
- B. $7x^8 + 9x^6$
- C. $12x^4 + 14x^3$
- D. $7x^4 + 9x^3$

ID: c3a72da5 Answer

Correct Answer: D

Rationale

Choice D is correct. Adding the two expressions yields $3x^4 + 2x^3 + 4x^4 + 7x^3$. Because the pair of terms $3x^4$ and $4x^4$ and the pair of terms $2x^3$ and $7x^3$ each contain the same variable raised to the same power, they are like terms and can be combined as $7x^4$ and $9x^3$, respectively. The sum of the given expressions therefore simplifies to $7x^4 + 9x^3$.

Choice A is incorrect and may result from adding the coefficients and the exponents in the given expressions. Choice B is incorrect and may result from adding the exponents as well as the coefficients of the like terms in the given expressions. Choice C is incorrect and may result from multiplying, rather than adding, the coefficients of the like terms in the given expressions.

Question Difficulty: Medium

Question ID 16de54c7

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Advanced Math	Equivalent expressions	<div><div></div><div></div><div></div></div>

ID: 16de54c7

$2x^2 + 5x - 12$

If the given expression is rewritten in the form $(2x - 3)(x + k)$, where k is a constant, what is the value of k ?

ID: 16de54c7 Answer

Rationale

The correct answer is 4. It's given that $2x^2 + 5x - 12$ can be rewritten as $(2x - 3)(x + k)$; it follows that $(2x - 3)(x + k) = 2x^2 + 5x - 12$. Expanding the left-hand side of this equation yields $2x^2 + 2kx - 3x - 3k = 2x^2 + 5x - 12$. Subtracting $2x^2$ from both sides of this equation yields $2kx - 3x - 3k = 5x - 12$. Using properties of equality, $2kx - 3x = 5x$ and $-3k = -12$. Either equation can be solved for k . Dividing both sides of $-3k = -12$ by -3 yields $k = 4$. The equation $2kx - 3x = 5x$ can be rewritten as $x(2k - 3) = 5x$. It follows that $2k - 3 = 5$. Solving this equation for k also yields $k = 4$. Therefore, the value of k is 4.

Question Difficulty: Medium

Question ID d9137a84

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Advanced Math	Equivalent expressions	<div><div></div><div></div><div></div></div>

ID: d9137a84

Which expression represents the product of $(x^{-6}y^3z^5)$ and $(x^4z^5 + y^8z^{-7})$?

- A. $x^{-2}z^{10} + y^{11}z^{-2}$
- B. $x^{-2}z^{10} + x^{-6}z^{-2}$
- C. $x^{-2}y^3z^{10} + y^8z^{-7}$
- D. $x^{-2}y^3z^{10} + x^{-6}y^{11}z^{-2}$

ID: d9137a84 Answer

Correct Answer: D

Rationale

Choice D is correct. The product of $x^{-6}y^3z^5$ and $x^4z^5 + y^8z^{-7}$ can be represented by the expression $x^{-6}y^3z^5x^4z^5 + y^8z^{-7}$. Applying the distributive property to this expression yields $x^{-6}y^3z^5x^4z^5 + x^{-6}y^3z^5y^8z^{-7}$, or $x^{-6}x^4y^3z^5z^5 + x^{-6}y^3y^8z^5z^{-7}$. This expression is equivalent to $x^{-6+4}y^3z^{5+5} + x^{-6}y^{3+8}z^{5-7}$, or $x^{-2}y^3z^{10} + x^{-6}y^{11}z^{-2}$.

Choice A is incorrect and may result from conceptual or calculation errors.

Choice B is incorrect and may result from conceptual or calculation errors.

Choice C is incorrect and may result from conceptual or calculation errors.

Question Difficulty: Medium

Question ID 3e9cc0c2

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Advanced Math	Equivalent expressions	<div><div></div><div></div><div></div></div>

ID: 3e9cc0c2

Which of the following is equivalent to $(1 - p)(1 + p + p^2 + p^3 + p^4 + p^5 + p^6)$?

- A. $1 - p^8$
- B. $1 - p^7$
- C. $1 - p^6$
- D. $1 - p^5$

ID: 3e9cc0c2 Answer

Correct Answer: B

Rationale

Choice B is correct. Multiplying $(1 - p)$ by each term of the polynomial within the second pair of parentheses gives $(1 - p)1 = 1 - p$; $(1 - p)p = p - p^2$; $(1 - p)p^2 = p^2 - p^3$; $(1 - p)p^3 = p^3 - p^4$; $(1 - p)p^4 = p^4 - p^5$; $(1 - p)p^5 = p^5 - p^6$; and $(1 - p)p^6 = p^6 - p^7$. Adding these seven expressions together and combining like terms gives $1 + (p - p) + (p^2 - p^2) + (p^3 - p^3) + (p^4 - p^4) + (p^5 - p^5) + (p^6 - p^6) - p^7$, which can be simplified to $1 - p^7$.

Choices A, C, and D are incorrect and may result from incorrectly identifying the highest power of p in the expressions or incorrectly combining like terms.

Question Difficulty: Medium

Question ID 7348f046

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Advanced Math	Equivalent expressions	<div><div></div><div></div><div></div></div>

ID: 7348f046

$(2x + 3) - (x - 7)$

Which of the following is equivalent to the given expression?

- A. $x - 4$
- B. $3x - 4$
- C. $x + 10$
- D. $2x^2 + 21$

ID: 7348f046 Answer

Correct Answer: C

Rationale

Choice C is correct. Distributing the negative sign to the terms in the second parentheses yields $(2x + 3) - x + 7$. This expression can be rewritten as $2x - x + 3 + 7$. Combining like terms results in $x + 10$.

Choice A is incorrect and may result from not distributing the negative sign to the 7. Choice B is incorrect and may result from adding $(x - 7)$ to $2x + 3$ instead of subtracting $(x - 7)$. Choice D is incorrect and may result from adding the product of $2x$ and x to the product of 3 and 7.

Question Difficulty: Medium

Question ID b47419f4

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Advanced Math	Equivalent expressions	<div><div></div><div></div><div></div></div>

ID: b47419f4

$$\left(\frac{1}{2}x+3\right)-\left(\frac{2}{3}x-5\right)$$

Which of the following is equivalent to the expression above?

- A. $-\frac{1}{6}x+8$
- B. $-\frac{1}{6}x-2$
- C. $-\frac{1}{3}x^2+\frac{1}{2}x+15$
- D. $-\frac{1}{3}x^2-\frac{9}{2}x-15$

ID: b47419f4 Answer

Correct Answer: A

Rationale

Choice A is correct. By distributing the minus sign through the expression $\left(\frac{2}{3}x-5\right)$, the given expression can be rewritten as $\left(\frac{1}{2}x+3\right)-\frac{2}{3}x+5$, which is equivalent to $\frac{1}{2}x-\frac{2}{3}x+3+5$. Combining like terms gives $\left(\frac{1}{2}-\frac{2}{3}\right)x+(3+5)$, or $-\frac{1}{6}x+8$.

Choice B is incorrect and may be the result of failing to distribute the minus sign appropriately through the second term and simplifying the expression $\frac{1}{2}x+3-\frac{2}{3}x-5$. Choice C is incorrect and may be the result of multiplying the expressions $\left(\frac{1}{2}x+3\right)$ and $\left(-\frac{2}{3}x+5\right)$. Choice D is incorrect and may be the result of multiplying the expressions $\left(\frac{1}{2}x+3\right)$ and $\left(-\frac{2}{3}x-5\right)$.

Question Difficulty: Medium

Question ID 8838a672

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Advanced Math	Equivalent expressions	<div><div></div><div></div><div></div></div>

ID: 8838a672

$(4x^3 - 5x^2 + 3) - (6x^3 + 2x^2 - x)$

Which of the following expressions is equivalent to the expression above?

- A. $-10x^3 - 3x^2 + x + 3$
- B. $-2x^3 - 7x^2 + x + 3$
- C. $-2x^3 - 3x^2 + x + 3$
- D. $10x^3 - 7x^2 - x + 3$

ID: 8838a672 Answer

Correct Answer: B

Rationale

Choice B is correct. Using the distributive property, the given expression can be rewritten as $4x^3 - 5x^2 + 3 - 6x^3 - 2x^2 + x$. Combining like terms, this expression can be rewritten as $(4 - 6)x^3 + (-5 - 2)x^2 + x + 3$, which is equivalent to $-2x^3 - 7x^2 + x + 3$.

Choices A, C, and D are incorrect and may result from an error when applying the distributive property or an error when combining like terms.

Question Difficulty: Medium

Question ID 0b3d25c5

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Advanced Math	Equivalent expressions	<div><div></div><div></div><div></div></div>

ID: 0b3d25c5

Which of the following is equivalent to $\sqrt[4]{x^2+8x+16}$, where $x > 0$?

- A. $(x+4)^4$
- B. $(x+4)^2$
- C. $(x+4)$
- D. $(x+4)^{\frac{1}{2}}$

ID: 0b3d25c5 Answer

Correct Answer: D

Rationale

Choice D is correct. The given expression can also be written as $(x^2+8x+16)^{\frac{1}{4}}$. The trinomial $x^2+8x+16$ can be rewritten in factored form as $(x+4)^2$. Thus, the entire expression can be rewritten as $((x+4)^2)^{\frac{1}{4}}$. Simplifying the exponents yields $(x+4)^{\frac{1}{2}}$.

Choices A, B, and C are incorrect and may result from errors made when simplifying the exponents in the expression $((x+4)^2)^{\frac{1}{4}}$.

Question Difficulty: Medium

Question ID c602140f

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Advanced Math	Equivalent expressions	<div><div></div><div></div><div></div></div>

ID: c602140f

$(x - 11y)(2x - 3y) - 12y(-2x + 3y)$

Which of the following is equivalent to the expression above?

- A. $x - 23y$
- B. $2x^2 - xy - 3y^2$
- C. $2x^2 + 24xy + 36y^2$
- D. $2x^2 - 49xy + 69y^2$

ID: c602140f Answer

Correct Answer: B

Rationale

Choice B is correct. Expanding all terms yields $(x - 11y)(2x - 3y) - 12y(-2x + 3y)$, which is equivalent to $2x^2 - 22xy - 3xy + 33y^2 + 24xy - 36y^2$. Combining like terms gives $2x^2 - xy - 3y^2$.

Choice A is incorrect and may be the result of using the sums of the coefficients of the existing x and y terms as the coefficients of the x and y terms in the new expressions. Choice C is incorrect and may be the result of incorrectly combining like terms. Choice D is incorrect and may be the result of using the incorrect sign in front of the 12y term.

Question Difficulty: Medium