Question ID a14dc451

Assessment	Test	Domain	Skill	Difficulty
PSAT 8/9	Math	Advanced Math	Equivalent expressions	Medium

ID: a14dc451

Which expression is equivalent to $15w^2 + 8w$?

A. $w(15w + 8)$

B. $8w(15w + 1)$

C. $15w^2(8w + 1)$

D. $23(w^2 + w)$

ID: a14dc451 Answer

Correct Answer: A

Rationale

Choice A is correct. Since each term of the given expression has a common factor of w, it may be rewritten as $w(15w + 8)$. Therefore, the expression $w(15w + 8)$ is equivalent to $15w^2 + 8w$.

Choice B is incorrect. This expression is equivalent to $120w^2 + 8w$, not $15w^2 + 8w$.

Choice C is incorrect. This expression is equivalent to $120w^3 + 15w^2$, not $15w^2 + 8w$.

Choice D is incorrect. This expression is equivalent to $23w^2 + 23w$, not $15w^2 + 8w$.

Question Difficulty: Medium

Question ID fa992084

Assessment	Test	Domain	Skill	Difficulty
PSAT 8/9	Math	Advanced Math	Equivalent expressions	Medium

ID: fa992084

Which expression is equivalent to $12x^3 - 5x^3$?

A. $7x^6$

B. $17x^3$

C. $7x^3$

D. $17x^6$

ID: fa992084 Answer

Correct Answer: C

Rationale

Choice C is correct. The given expression shows subtraction of two like terms. The two terms can be subtracted as follows: $12x^3 - 5x^3 = (12 - 5)x^3$, or $7x^3$.

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

Choice B is incorrect. This is the result of adding, not subtracting, the two like terms.

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

Question Difficulty: Medium

Question ID 7076152e

Assessment	Test	Domain	Skill	Difficulty
PSAT 8/9	Math	Advanced Math	Equivalent expressions	Medium

ID: 7076152e

Which expression is a factor of $2x^2 + 38x + 10$?

A. 2

B. $5x$

C. $38x$

D. $2x^2$

ID: 7076152e Answer

Correct Answer: A

Rationale

Choice A is correct. Since 2 is a common factor of each of the terms in the given expression, the expression can be rewritten as $2(x^2 + 19x + 5)$. Therefore, the factors of the given expression are 2 and $x^2 + 19x + 5$. Of these two factors, only 2 is listed as a choice.

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

Choice C is incorrect. This is a term of the given expression, not a factor of the given expression.

Choice D is incorrect. This is a term of the given expression, not a factor of the given expression.

Question Difficulty: Medium

Question ID bbcc6c98

Assessment	Test	Domain	Skill	Difficulty
PSAT 8/9	Math	Advanced Math	Equivalent expressions	Medium

ID: bbcc6c98

Which expression is equivalent to $16x^3y^2 + 14xy$?

A. $2xy(8xy + 7)$

B. $2xy(8x^2y + 7)$

C. $14xy(2x^2y + 1)$

D. $14xy(8x^2y + 1)$

ID: bbcc6c98 Answer

Correct Answer: B

Rationale

Choice B is correct. Since $2xy$ is a common factor of each term in the given expression, the expression can be rewritten as $2xy(8x^2y + 7)$.

Choice A is incorrect. This expression is equivalent to $16x^2y^2 + 14xy$.

Choice C is incorrect. This expression is equivalent to $28x^3y^2 + 14xy$.

Choice D is incorrect. This expression is equivalent to $112x^3y^2 + 14xy$.

Question Difficulty: Medium

Question ID 3fb6a03f

Assessment	Test	Domain	Skill	Difficulty
PSAT 8/9	Math	Advanced Math	Equivalent expressions	Medium

ID: 3fb6a03f

Which expression is equivalent to $9x^2 + 7x^2 + 9x$?

A. $63x^4 + 9x$

B. $9x^2 + 16x$

C. $25x^5$

D. $16x^2 + 9x$

ID: 3fb6a03f Answer

Correct Answer: D

Rationale

Choice D is correct. In the given expression, the first two terms, $9x^2$ and $7x^2$, are like terms. Combining these like terms yields $9x^2 + 7x^2$, or $16x^2$. It follows that the expression $9x^2 + 7x^2 + 9x$ is equivalent to $16x^2 + 9x$.

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 19a9e4ba

Assessment	Test	Domain	Skill	Difficulty
PSAT 8/9	Math	Advanced Math	Equivalent expressions	Medium

ID: 19a9e4ba

Which expression is equivalent to $(8yz)(y)(7z)$?

A. $56y^2z^2$

B. $56y^2z$

C. $56yz$

D. $16yz$

ID: 19a9e4ba Answer

Correct Answer: A

Rationale

Choice A is correct. The given expression can be rewritten as $(8 \cdot 7)(y \cdot y)(z \cdot z)$, which is equivalent to $(56)(y^2)(z^2)$, or $56y^2z^2$.

Choice B is incorrect. This expression is equivalent to $(8yz)(y)(7)$.

Choice C is incorrect. This expression is equivalent to $(8z)(y)(7)$.

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

Question Difficulty: Medium

Question ID 8eece8e4

Assessment	Test	Domain	Skill	Difficulty
PSAT 8/9	Math	Advanced Math	Equivalent expressions	Medium

ID: 8eece8e4

Which expression is equivalent to $(9x^3 + 5x + 7) + (6x^3 + 5x^2 - 5)$?

A. $15x^6 + 5x^2 - 5x - 35$

B. $15x^3 + 10x^2 + 2$

C. $15x^6 + 5x^2 + 5x + 2$

D. $15x^3 + 5x^2 + 5x + 2$

ID: 8eece8e4 Answer

Correct Answer: D

Rationale

Choice D is correct. The given expression can be rewritten as $(9x^3 + 6x^3) + 5x^2 + 5x + (7 - 5)$. Combining like terms in this expression yields $15x^3 + 5x^2 + 5x + 2$.

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 c98f5182

Assessment	Test	Domain	Skill	Difficulty
PSAT 8/9	Math	Advanced Math	Equivalent expressions	Medium

ID: c98f5182

Which expression is equivalent to $256w^2 - 676$?

A. $(16w - 26)(16w - 26)$

B. $(8w - 13)(8w + 13)$

C. $(8w - 13)(8w - 13)$

D. $(16w - 26)(16w + 26)$

ID: c98f5182 Answer

Correct Answer: D

Rationale

Choice D is correct. The given expression follows the difference of two squares pattern, $x^2 - y^2$, which factors as $(x - y)(x + y)$. Therefore, the expression $256w^2 - 676$ can be written as $(16w)^2 - 26^2$, or $(16w)(16w) - (26)(26)$, which factors as $(16w - 26)(16w + 26)$.

Choice A is incorrect. This expression is equivalent to $256w^2 - 832w + 676$.

Choice B is incorrect. This expression is equivalent to $64w^2 - 169$.

Choice C is incorrect. This expression is equivalent to $64w^2 - 208w + 169$.

Question Difficulty: Medium

Question ID 31cbe7d6

Assessment	Test	Domain	Skill	Difficulty
PSAT 8/9	Math	Advanced Math	Equivalent expressions	Medium

ID: 31cbe7d6

Which expression is equivalent to $5x^5 - 6x^4 + 8x^3$?

A. $x^4(5x - 6)$

B. $x^3(5x^2 - 6x + 8)$

C. $8x^3(5x^2 - 6x + 1)$

D. $6x^5(-6x^4 + 8x^3 + 1)$

ID: 31cbe7d6 Answer

Correct Answer: B

Rationale

Choice B is correct. Since x^3 is a common factor of each term in the given expression, the expression can be rewritten as $x^3(5x^2 - 6x + 8)$.

Choice A is incorrect. This expression is equivalent to $5x^5 - 6x^4$.

Choice C is incorrect. This expression is equivalent to $40x^5 - 48x^4 + 8x^3$.

Choice D is incorrect. This expression is equivalent to $-36x^9 + 48x^8 + 6x^5$.

Question Difficulty: Medium

Question ID 4691348d

Assessment	Test	Domain	Skill	Difficulty
PSAT 8/9	Math	Advanced Math	Equivalent expressions	Medium

ID: 4691348d

Which expression is equivalent to $23x^3 + 2x^2 + 9x$?

A. $23x(x^2 + 2x + 9)$

B. $9x(23x^3 + 2x^2 + 1)$

C. $x(23x^2 + 2x + 9)$

D. $34(x^3 + x^2 + x)$

ID: 4691348d Answer

Correct Answer: C

Rationale

Choice C is correct. Since x is a common factor of each term in the given expression, the given expression can be rewritten as $x(23x^2 + 2x + 9)$.

Choice A is incorrect. This expression is equivalent to $23x^3 + 46x^2 + 207x$.

Choice B is incorrect. This expression is equivalent to $207x^4 + 18x^3 + 9x$.

Choice D is incorrect. This expression is equivalent to $34x^3 + 34x^2 + 34x$.

Question Difficulty: Medium

Question ID 81c912f5

Assessment	Test	Domain	Skill	Difficulty
PSAT 8/9	Math	Advanced Math	Equivalent expressions	Medium

ID: 81c912f5

Which expression is equivalent to $9x^2 + 5x$?

A. $x(9x + 5)$

B. $5x(9x + 1)$

C. $9x(x + 5)$

D. $x^2(9x + 5)$

ID: 81c912f5 Answer

Correct Answer: A

Rationale

Choice A is correct. Since x is a factor of each term in the given expression, the expression is equivalent to $x(9x) + x(5)$, or $x(9x + 5)$.

Choice B is incorrect. This expression is equivalent to $45x^2 + 5x$, not $9x^2 + 5x$.

Choice C is incorrect. This expression is equivalent to $9x^2 + 45x$, not $9x^2 + 5x$.

Choice D is incorrect. This expression is equivalent to $9x^3 + 5x^2$, not $9x^2 + 5x$.

Question Difficulty: Medium

Question ID 30d0bd54

Assessment	Test	Domain	Skill	Difficulty
PSAT 8/9	Math	Advanced Math	Equivalent expressions	Medium

ID: 30d0bd54

Which expression is equivalent to $x^2 + 3x - 40$?

A. $(x - 4)(x + 10)$

B. $(x - 5)(x + 8)$

C. $(x - 8)(x + 5)$

D. $(x - 10)(x + 4)$

ID: 30d0bd54 Answer

Correct Answer: B

Rationale

Choice B is correct. The given expression may be rewritten as $x^2 + 8x - 5x - 40$. Since the first two terms of this expression have a common factor of x and the last two terms of this expression have a common factor of -5, this expression may be rewritten as $x(x) + x(8) - 5(x) - 5(8)$, or $x(x + 8) - 5(x + 8)$. Since each term of this expression has a common factor of $(x + 8)$, it may be rewritten as $(x - 5)(x + 8)$.

Alternate approach: An expression of the form $x^2 + bx + c$, where b and c are constants, can be factored if there are two values that add to give b and multiply to give c. In the given expression, $b = 3$ and $c = -40$. The values of -5 and 8 add to give 3 and multiply to give -40, so the expression can be factored as $(x - 5)(x + 8)$.

Choice A is incorrect. This expression is equivalent to $x^2 + 6x - 40$, not $x^2 + 3x - 40$.

Choice C is incorrect. This expression is equivalent to $x^2 - 3x - 40$, not $x^2 + 3x - 40$.

Choice D is incorrect. This expression is equivalent to $x^2 - 6x - 40$, not $x^2 + 3x - 40$.

Question Difficulty: Medium

Question ID 58aeae77

Assessment	Test	Domain	Skill	Difficulty
PSAT 8/9	Math	Advanced Math	Equivalent expressions	Medium

ID: 58aeae77

Which expression is equivalent to $11x^3 - 5x^3$?

A. $16x^3$

B. $6x^3$

C. $6x^6$

D. $16x^6$

ID: 58aeae77 Answer

Correct Answer: B

Rationale

Choice B is correct. The given expression can be rewritten as $11x^3 + (-5)x^3$. Since the two terms of this expression are both constant multiples of x^3, they are like terms and can, therefore, be combined through addition. Adding like terms in the expression $11x^3 + (-5)x^3$ yields $6x^3$.

Choice A is incorrect. This is equivalent to $11x^3 + 5x^3$, not $11x^3 - 5x^3$.

Choice C is incorrect. This is equivalent to $11x^6 - 5x^6$, not $11x^3 - 5x^3$.

Choice D is incorrect. This is equivalent to $11x^6 + 5x^6$, not $11x^3 - 5x^3$.

Question Difficulty: Medium

Question ID 15e28f73

Assessment	Test	Domain	Skill	Difficulty
PSAT 8/9	Math	Advanced Math	Equivalent expressions	Medium

ID: 15e28f73

Which expression is equivalent to $(2x^2 + x - 9) + (x^2 + 6x + 1)$?

A. $2x^2 + 7x + 10$

B. $2x^2 + 6x - 8$

C. $3x^2 + 7x - 10$

D. $3x^2 + 7x - 8$

ID: 15e28f73 Answer

Correct Answer: D

Rationale

Choice D is correct. The given expression is equivalent to $(2x^2 + x + (-9)) + (x^2 + 6x + 1)$, which can be rewritten as $(2x^2 + x^2) + (x + 6x) + (-9 + 1)$. Adding like terms in this expression yields $3x^2 + 7x + (-8)$, or $3x^2 + 7x - 8$.

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 10861a42

Assessment	Test	Domain	Skill	Difficulty
PSAT 8/9	Math	Advanced Math	Equivalent expressions	Medium

ID: 10861a42

Which expression is equivalent to $(x)^{\frac{1}{14}}$, where $x > 0$?

A. $\frac{1}{14} \cdot x$

B. $\sqrt[14]{x}$

C. $14 \cdot x$

D. $(x)^{14}$

ID: 10861a42 Answer

Correct Answer: B

Rationale

Choice B is correct. An expression in the form $x^{\frac{1}{k}}$, where $x > 0$ and $k > 0$, is equivalent to $\sqrt[k]{x}$. It follows that $x^{\frac{1}{14}}$, where $x > 0$, is equivalent to $\sqrt[14]{x}$.

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 6f498efe

Assessment	Test	Domain	Skill	Difficulty
PSAT 8/9	Math	Advanced Math	Equivalent expressions	Medium

ID: 6f498efe

Which expression is equivalent to $5x^2 - 50xy^2$?

A. $5x(x - 10y^2)$

B. $5x(x - 50y^2)$

C. $5x^2(10xy^2)$

D. $5x^2(50xy^2)$

ID: 6f498efe Answer

Correct Answer: A

Rationale

Choice A is correct. Since each term of the given expression has a factor of $5x$, it can be rewritten as $5x(x) - 5x(10y^2)$, or $5x(x - 10y^2)$.

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 a074ee7b

Assessment	Test	Domain	Skill	Difficulty
PSAT 8/9	Math	Advanced Math	Equivalent expressions	Medium

ID: a074ee7b

Which expression is equivalent to $19(x^2 - 7)$?

A. $19x^2 - 133$

B. $19x^2 - 26$

C. $19x^2 - 7$

D. $19x^2 + 12$

ID: a074ee7b Answer

Correct Answer: A

Rationale

Choice A is correct. The expression $19(x^2 - 7)$ can be rewritten as $19(x^2) - 19(7)$, which is equivalent to $19x^2 - 133$.

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 8449a289

Assessment	Test	Domain	Skill	Difficulty
PSAT 8/9	Math	Advanced Math	Equivalent expressions	Medium

ID: 8449a289

Which expression is equivalent to $20w - (4w + 3w)$?

A. $10w$

B. $13w$

C. $19w$

D. $21w$

ID: 8449a289 Answer

Correct Answer: B

Rationale

Choice B is correct. Combining like terms inside the parentheses of the given expression, $20w - (4w + 3w)$, yields $20w - (7w)$. Combining like terms in this resulting expression yields $13w$.

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 f8f450fc

Assessment	Test	Domain	Skill	Difficulty
PSAT 8/9	Math	Advanced Math	Equivalent expressions	Medium

ID: f8f450fc

Which expression is equivalent to $4(x^2 + 6)$?

A. $4x^2 + 24$

B. $4x^2 + 10$

C. $4x^2 + 6$

D. $4x^2 - 2$

ID: f8f450fc Answer

Correct Answer: A

Rationale

Choice A is correct. The expression $4(x^2 + 6)$ can be rewritten as $4(x^2) + 4(6)$, which is equivalent to $4x^2 + 24$.

Choice B is incorrect. This expression is equivalent to $4(x^2 + \frac{5}{2})$, not $4(x^2 + 6)$.

Choice C is incorrect. This expression is equivalent to $4(x^2 + \frac{3}{2})$, not $4(x^2 + 6)$.

Choice D is incorrect. This expression is equivalent to $4(x^2 - \frac{1}{2})$, not $4(x^2 + 6)$.

Question Difficulty: Medium

Question ID 03451120

Assessment	Test	Domain	Skill	Difficulty
PSAT 8/9	Math	Advanced Math	Equivalent expressions	Medium

ID: 03451120

Which expression is equivalent to $17(x^2 - 100y^2)$?

A. $17(x - 2y)(x - 50y)$

B. $17(x - 2y)(x + 50y)$

C. $17(x - 10y)(x - 10y)$

D. $17(x - 10y)(x + 10y)$

ID: 03451120 Answer

Correct Answer: D

Rationale

Choice D is correct. Expressions in the form $a^2 - b^2$ follow the difference of two squares pattern and can be factored as $(a - b)(a + b)$. In the given expression, $17(x^2 - 100y^2)$, the expression $x^2 - 100y^2$ follows the difference of two squares pattern. It follows that the expression $x^2 - 100y^2$ can be rewritten as $(x - 10y)(x + 10y)$. Therefore, the expression $17(x - 10y)(x + 10y)$ is equivalent to $17(x^2 - 100y^2)$.

Choice A is incorrect. This expression is equivalent to $17(x^2 - 52xy + 100y^2)$, not $17(x^2 - 100y^2)$.

Choice B is incorrect. This expression is equivalent to $17(x^2 + 48xy - 100y^2)$, not $17(x^2 - 100y^2)$.

Choice C is incorrect. This expression is equivalent to $17(x^2 - 20xy + 100y^2)$, not $17(x^2 - 100y^2)$.

Question Difficulty: Medium

Question ID a95896ae

Assessment	Test	Domain	Skill	Difficulty
PSAT 8/9	Math	Advanced Math	Equivalent expressions	Medium

ID: a95896ae

Which expression is equivalent to $\left(m^4q^4z^{-1}\right)\left(mq^5z^3\right)$, where m, q, and z are positive?

A. $m^4q^{20}z^{-3}$

B. $m^5q^9z^2$

C. $m^6q^8z^{-1}$

D. $m^{20}q^{12}z^{-2}$

ID: a95896ae Answer

Correct Answer: B

Rationale

Choice B is correct. Applying the commutative property of multiplication, the expression $\left(m^4q^4z^{-1}\right)\left(mq^5z^3\right)$ can be rewritten as $\left(m^4m\right)\left(q^4q^5\right)\left(z^{-1}z^3\right)$. For positive values of x, $\left(x^a\right)\left(x^b\right) = x^{a+b}$. Therefore, the expression $\left(m^4m\right)\left(q^4q^5\right)\left(z^{-1}z^3\right)$ can be rewritten as $\left(m^{4+1}\right)\left(q^{4+5}\right)\left(z^{-1+3}\right)$, or $m^5q^9z^2$.

Choice A is incorrect and may result from multiplying, not adding, the exponents.

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 673471c6

Assessment	Test	Domain	Skill	Difficulty
PSAT 8/9	Math	Advanced Math	Equivalent expressions	Medium

ID: 673471c6

Which expression is equivalent to $13x^2 - 7x^2$?

A. $-91x^2$

B. $6x^2$

C. $20x^2$

D. $40x^2$

ID: 673471c6 Answer

Correct Answer: B

Rationale

Choice B is correct. Since each term in the given expression has a common factor of x^2, it can be rewritten as $(13 - 7)x^2$, or $6x^2$. Therefore, the expression $6x^2$ is equivalent to $13x^2 - 7x^2$.

Alternate approach: Since the two terms of the given expression are both constant multiples of x^2, they are like terms and can, therefore, be combined through subtraction. Subtracting like terms in the expression $13x^2 - 7x^2$ yields $6x^2$.

Choice A is incorrect. This expression is equivalent to $(13x)(-7x)$, not $13x^2 - 7x^2$.

Choice C is incorrect. This expression is equivalent to $13x^2 + 7x^2$, not $13x^2 - 7x^2$.

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

Question Difficulty: Medium