Factoring quadratic equations Worksheet

Algebra

Grades 9 to 12

Name: ………………………………………….

Date: ………………………………………….

1   Factor the expression completely:

$2x^3 + 16x^2 + 30x$

Answer

2   Factor the expression completely:

$ab^2 + 7ab - 60a$

Answer

3   Factor the expression completely:

$xy^3 + 17xy^2 + 72xy$

Answer

4   Factor the expression completely:

$2mn^2 - 50mn$

Answer

5   Factor the expression completely:

$a^3 + 7a^2 + 2ab + 14b$

Answer

6 Factor the expression completely:

$$3f^3 + f^2 - 12f - 4$$

Answer

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7 Factor the expression completely:

$$5x^2z - 9x^2 - 5y^2z + 9y^2$$

Answer

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8 Factor the expression completely:

$$x^4y - 7x^2y - 18y$$

Answer

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9 Factor the expression completely:

$$abc^2 - 2abc + ab$$

Answer

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10 Factor the expression completely:

$$5xy^4 - 80x$$

Answer

Applied Questions

11 Explain the error in the factoring problem below and make the correction.

$$7yz^4 - 28yz^2 + 21y$$

$$7y(z^4 - 4z^2 + 3)$$

$$7y(z^2 + 3)(z^2 + 1)$$

Answer

12 Explain the error in the factoring problem below and make the corrections.
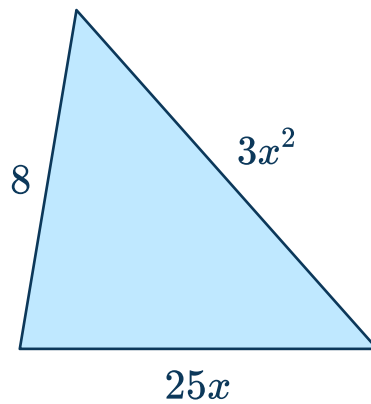$$5x^5 - 5xy^4z^4$$

$$5x^5(1 - y^4z^4)$$

$$5x^5(1 - y^2z^2)(1 + y^2z^2)$$

$$5x^5(1 - yz)(1 + yz)(1 + y^2z^2)$$

Answer

13 Write an expression for the perimeter of the triangle and then factor the expression completely.

Answer

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14 Jordan says that the equation can be solved for the unknown variable using factoring by grouping. Bennett disagrees and says that the equation cannot be solved by factoring. Who is correct? Explain your thinking.

$$x^5 - 10x^3 + 9x = 0$$

Answer

15 Solve the equation by factoring.

$3x^3 = 48x$

Answer
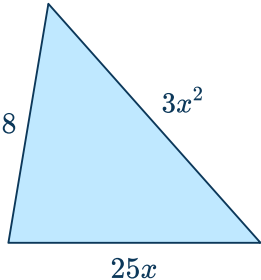
Answers

Question number	Question	Answers	Standard
1	Factor the expression completely: $2x^3 + 16x^2 + 30x$	$2x^3 + 16x^2 + 30x$ $2x(x^2 + 8x + 15)$ $2x(x + 3)(x + 5)$	HSA-SSE.B.3a
2	Factor the expression completely: $ab + 7ab - 60a$	$ab + 7ab - 60a$ $a(b^2 + 7b - 60)$ $a(b + 12)(b - 5)$	HSA-SSE.B.3a
3	Factor the expression completely: $xy^3 + 17xy^2 + 72xy$	$xy^3 + 17xy^2 + 72xy$ $xy(y^2 + 17y + 72)$ $xy(y + 8)(y + 9)$	HSA-SSE.B.3a
4	Factor the expression completely: $2mn^2 - 50mn$	$2mn^2 - 50mn$ $2m(n^2 - 25)$ $2m(n - 5)(n + 5)$	HSA-SSE.B.3a
5	Factor the expression completely: $a^3 + 7a^2 + 2ab + 14b$	$a^3 + 7a^2 + 2ab + 14b$ $a^2(a + 7) + 2b(a + 7)$ $(a + 7)(a^2 + 2b)$	HSA-SSE.B.3a
6	Factor the expression completely: $3f^3 + f^2 - 12f - 4$	$3f^3 + f^2 - 12f - 4$ $f^2(3f + 1) - 4(3f + 1)$ $(f^2 - 4)(3f + 1)$ $(f - 2)(f + 2)(3f + 1)$	HSA-SSE.B.3a
7	Factor the expression completely: $5x^2z - 9x^2 - 5y^2z + 9y^2$	$5x^2z - 9x^2 - 5y^2z + 9y^2$ $x^2(5z - 9) - y^2(5z - 9)$ $(x^2 - y^2)(5z - 9)$ $(x - y)(x + y)(5z - 9)$	HSA-SSE.B.3a
8	Factor the expression completely: $x^4y - 7x^2y - 18y$	$x^4y - 7x^2y - 18y$ $y(x^4 - 7x^2 - 18)$ $y(x^2 - 9)(x^2 + 2)$ $y(x - 3)(x + 3)(x^2 + 2)$	HSA-SSE.B.3a

Factoring quadratic equations Worksheet | Grades 9 to 12 | Answers

Question number	Question	Answers	Standard
9	Factor the expression completely: $abc^2 - 2abc + ab$	$abc^2 - 2abc + ab$ $ab(c^2 - 2c + 1)$ $ab(c - 1)(c - 1)$	HSA-SSE.B.3a
10	Factor the expression completely: $5xy^4 - 80x$	$5xy^4 - 80x$ $5x(y^4 - 16)$ $5x(y^2 - 4)(y^2 + 4)$ $5x(y - 2)(y + 2)(y^2 + 4)$	HSA-SSE.B.3a
11	Explain the error in the factoring problem below and make the correction. $7yz^4 - 28yz^2 + 21y$ $7y(z^4 - 4z^2 + 3)$ $7y(z^2 + 3)(z^2 + 1)$	$7yz^4 - 28yz^2 + 21y$ $7y(z^4 - 4z^2 + 3)$ $7y(z^2 + 3)(z^2 + 1) \rightarrow$ The error was made in this step. The correction is: $7y(z^2 - 3)(z^2 - 1)$ $7y(z^2 - 3)(z - 1)(z + 1)$	HSA-SSE.B.3a
12	Explain the error in the factoring problem below and make the corrections. $5x^5 - 5xy^4z^4$ $5x^5(1 - y^4z^4)$ $5x^5(1 - y^2z^2)(1 + y^2z^2)$ $5x^5(1 - yz)(1 + yz)(1 + y^2z^2)$	$5x^5 - 5xy^4z^4$ $5x^5(1 - y^4z^4) -$ The error was made in the first step. $5x^5$ is not the GCF to be factored out of the original expression. The GCF is $5x$. The correct way to factor the expression is: $5x(x^4 - y^4z^4)$ $5x(x^2 - y^2z^2)(x^2 + y^2z^2)$ $5x(x - yz)(x + yz)(x^2 + y^2z)$	Standard included

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Question number	Question	Answers	Standard
13	Write an expression for the perimeter of the triangle and then factor the expression completely. (triangle with sides 8, $3x^2$, and $25x$)	Perimeter = $3x^2 + 25x + 8$ Perimeter = $(3x+1)(x+8)$	HSA-SSE.B.3a
14	Jordan says that the equation can be solved for the unknown variable using factoring by grouping. Bennett disagrees and says that the equation cannot be solved by factoring. Who is correct? Explain your thinking. $x^5 - 10x^3 + 9x = 0$	Jordan is correct, the equation can be solved using factoring by grouping. $x^5 - 10x^3 + 9x = 0$ $x(x^4 - 10x^2 + 9) = 0$ $x(x^2 - 9)(x^2 - 1) = 0$ $x(x-3)(x+3)(x-1)(x+1) = 0$ $x = 0 \ \ x = 3 \ x = -3 \ x = 1 \ x = -1$	HSA-SSE.B.3a HSA.REI.B.4
15	Solve the equation by factoring. $3x^3 = 48x$	$3x^3 = 48x$ $3x^3 - 48x = 0$ $3x(x^2 - 16) = 0$ $3x(x-4)(x+4) = 0$ $3x = 0 \ x - 4 = 0 \ x + 4 = 0$ $x = 0 \ x = 4 \ x = -4$	HSA-SSE.B.3a HSA.REI.B.4

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