

Quiz #6

1. $a^2 - b^2$

$(a+b)(a-b)$

6. $x^2 - 7x + 12$

$(x-4)(x-3)$

2. $a^3 - b^3$

$(a-b)(a^2 + ab + b^2)$

7. $x^2 - 3x + 4xy - 12y$

$x(x-3) + 4y(x-3)$

3. $a^3 + b^3$

$(a+b)(a^2 - ab + b^2)$

$(x-3)(x+4y)$

4. $a^2 + 2ab + b^2$

$(a+b)(a+b)$

$(a+b)^2$

8. $2x^2 - 15x + 7$

$2x^2 - 14x - x + 7$

$2x(x-7) - 1(x-7)$

$(x-7)(2x-1)$

5. $a^2 - 2ab + b^2$

$(a-b)(a-b)$

$(a-b)^2$

$2(7) = 14 = (-14)(-1)$

9. Multiply the polynomials. Give your simplified answer in descending order.

Quiz #6

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

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

$= 3x^5 - x^4 + 4x^3 - 6x^4 + 2x^3 - 8x^2 + 3x^3 - x^2 + 4x$

$= 3x^5 - 7x^4 + 9x^3 - 9x^2 + 4x$

10. Divide the polynomials.

State the quotient as a polynomial in descending order and the remainder as a constant.

$(x^3 + 2x^2 - 9x + 1) \div (x - 3)$

$$\begin{array}{r} 3 \overline{) 1 \quad 2 \quad -9 \quad 1} \\ \underline{ 3 \quad 15 \quad 18} \\ 1 \quad 5 \quad 6 \quad 19 \end{array}$$

Quotient:

$x^2 + 5x + 6$

Remainder:

19

11. Factor completely. Circle/box your final answer.

$64x^3 + 8$

$$\begin{aligned} 8(8x^3 + 1) &= 8[(2x)^3 + 1^3] \\ &= 8[(2x+1)(4x^2 - 2x + 1)] \\ &= \boxed{8(2x+1)(4x^2 - 2x + 1)} \end{aligned}$$

12. Factor completely. Circle/box your final answer.

$8x^4 - 74x^2 + 18$

$$\begin{aligned} 2(4x^4 - 37x^2 + 9) & \quad 4(9) = 36 = (-36)(-1) \\ 2[4x^4 - 36x^2 - x^2 + 9] & \\ 2[4x^2(x^2 - 9) - 1(x^2 - 9)] & \\ 2(x^2 - 9)(4x^2 - 1) & \\ 2(x^2 - 3^2)((2x)^2 - 1^2) & \\ \boxed{2(x-3)(x+3)(2x-1)(2x+1)} & \end{aligned}$$

Practice Problems for Test #3

Review:

1. Solve the system of equations. If it exists, give your solution as an ordered pair
- (x, y)
- .

$$\begin{cases} 3x + 2y = 5 \\ 2x - 3y = -14 \end{cases} \cdot \begin{matrix} 3 \\ 2 \end{matrix} \Rightarrow \begin{matrix} 9x + 6y = 15 \\ 4x - 6y = -28 \end{matrix}$$

$$\begin{array}{r} 9x + 6y = 15 \\ 4x - 6y = -28 \\ \hline 13x = -13 \\ x = -1 \end{array}$$

$$\begin{aligned} 3(-1) + 2y &= 5 \\ -3 + 2y &= 5 \\ 2y &= 8 \\ y &= 4 \end{aligned}$$

$$\boxed{(-1, 4)}$$

2. Find the equation of the line that is parallel to the line
- $2x - 3y = 2$
- and passes through the point
- $(6, -4)$
- .

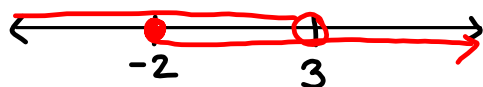
$$\begin{aligned} m &= \frac{2}{3}; (x_1, y_1) = (6, -4) & -3y &= -2x + 2 \\ y - y_1 &= m(x - x_1) & y &= \frac{2}{3}x - \frac{2}{3} \\ y - (-4) &= \frac{2}{3}(x - 6) \\ y + 4 &= \frac{2}{3}x - 4 \\ y &= \frac{2}{3}x - 4 - 4 \end{aligned}$$

$$\boxed{y = \frac{2}{3}x - 8}$$

3. Find the equation of the line that has slope 0 and passes through the point $(-4, 7)$.

$$y = 7$$

4. Solve. Write the solution set in interval notation. $4 - 3x > -5$ or $-3 \leq 2x + 1$



$$(-\infty, \infty)$$

$$\begin{aligned} -3x &> -5 - 4 & -3 - 1 &\leq 2x \\ -3x &> -9 & -4 &\leq 2x \\ x &< 3 & -2 &\leq x \\ & & \text{or} & \\ & & \cup & \\ & & & x \geq -2 \end{aligned}$$

1. Simplify the exponential expression.

Practice Problems for Test #3

$$\begin{aligned} \left(\frac{xy^3z^{-2}}{x^{-2}y^{-1}z^4} \right)^{-3} &= \left(x^{1-(-2)} y^{3-(-1)} z^{-2-4} \right)^{-3} \\ &= \left(x^3 y^4 z^{-6} \right)^{-3} = x^{-9} y^{-12} z^{18} \\ &= \frac{z^{18}}{x^9 y^{12}} \end{aligned}$$

2. Simplify the exponential expression.

$$\begin{aligned} (x^{-1}y^2)^2 (x^2y^{-4})^{-3} \\ &= x^{-2} y^4 x^{-6} y^{12} \\ &= x^{-8} y^{16} = \frac{y^{16}}{x^8} \end{aligned}$$

3. If the function is a polynomial, identify the lead term, leading coefficient, degree, and constant term.

$$f(x) = -5x^3 + 2x^4 - 4x^6 + 7 - 6x + 9x^2$$

$$= -4x^6 + 2x^4 - 5x^3 + 9x^2 - 6x + 7$$

lead term: $-4x^6$

leading coefficient: -4

degree: 6

constant term: 7

4. Evaluate the polynomial for the given value.

$$P(x) = -2x^2 - x + 10, \quad \text{evaluate } P(-3).$$

$$\begin{array}{r} \underline{-3} \mid -2 \quad -1 \quad 10 \\ \quad \quad 6 \quad -15 \\ \hline -2 \quad 5 \quad \boxed{-5} \end{array} \quad \begin{aligned} P(-3) &= -2(-3)^2 - (-3) + 10 \\ &= -2(9) + 3 + 10 \\ &= -18 + 13 = \boxed{-5} \end{aligned}$$

5. Subtract the polynomials and simplify. Give your answer in descending order.

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

$$\begin{aligned} &= 4x^3 - (-2x^3) + 2x^2 - x^2 - 3x - 5 \\ &= \boxed{6x^3 + x^2 - 3x - 5} \end{aligned}$$

6. Multiply the polynomials and simplify. Give your answer in descending order.

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

$$\begin{aligned} &= 2x^2(x^2) + 2x^2(3x) + 2x^2(-2) + (-4x)(x^2) + (-4x)(3x) + (-4x)(-2) \\ &= 2x^4 + 6x^3 - 4x^2 - 4x^3 - 12x^2 + 8x \\ &= \boxed{2x^4 + 2x^3 - 16x^2 + 8x} \end{aligned}$$

7. Divide the polynomials. Give the quotient and the remainder.

$$(3x^3 + 10x^2 + 6x - 3) \div (x + 2)$$

$$\begin{array}{r} -2 \overline{) 3 \ 10 \ 6 \ -3} \\ \underline{-6 \ -8 \ 4} \\ 3 \ 4 \ -2 \ 1 \end{array}$$

quotient:

$$3x^2 + 4x - 2$$

remainder:

$$1$$

8. Completely factor the polynomial.

$$3x^6 - 15x^4 - 18x^2$$

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

$$= 3x^2(x^2 - 6)(x^2 + 1)$$

Practice Problems for Test #3

9. Completely factor the polynomial.

$$27x^3 + 8$$

$$= (3x)^3 + 2^3 = (3x+2)(9x^2 - 6x + 4)$$

10. Solve the equation for x.

$$(x - 3)^2 = 24 - 4x$$

$$x^2 - 6x + 9 = 24 - 4x$$

$$x^2 - 2x - 15 = 0$$

$$(x - 5)(x + 3) = 0$$

$$x - 5 = 0 \quad x + 3 = 0$$

$$x = 5, \quad x = -3$$

12. Simplify the exponential expression.

$$\left(\frac{x^{-3}y^{-4}}{x^{-2}y}\right)^{-2}$$

$$= \left(x^{-3 - (-2)} y^{-4 - (-1)}\right)^{-2}$$

$$= \left(x^{-1} y^{-5}\right)^{-2}$$

$$= x^2 y^{10}$$

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$$\frac{x^6 y^8}{x^4 y^{-2}} = x^{6-4} y^{8-(-2)}$$

$$= x^2 y^{10}$$

13. Write in scientific notation.

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$$= 9.8 \times 10^9$$

16. Multiply the polynomials and simplify.

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Test #3

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$$(2b^2 - 3)(3b^2 - 3b + 6)$$

$$= (2b^2)(3b^2) + 2b^2(-3b) + 2b^2(6) + (-3)(3b^2) + (-3)(-3b) + (-3)(6)$$

$$= 6b^4 - 6b^3 + 12b^2 - 9b^2 + 9b - 18$$

$$= \boxed{6b^4 - 6b^3 + 3b^2 + 9b - 18}$$

17. Divide the polynomials. Give the quotient and the remainder.

$$(x^3 - 6x^2 + 11x - 6) \div (x - 3)$$

$$\begin{array}{r|rrrr} 3 & 1 & -6 & 11 & -6 \\ & & 3 & -9 & 6 \\ \hline & 1 & -3 & 2 & 0 \end{array}$$

$$\begin{array}{l} \text{Quotient:} \\ x^2 - 3x + 2 \\ \text{R: } 0 \end{array}$$

18. Completely factor the polynomial.

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Test #3

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$$6x^4 - 10x^3 - 4x^2$$

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

$$= 2x^2[3x^2 - 6x + x - 2] =$$

$$= 2x^2[3x(x-2) + 1(x-2)] =$$

$$= \boxed{2x^2(x-2)(3x+1)}$$

19. Completely factor the polynomial.

$$3b^5 - 24b^2$$

$$3b^2(b^3 - 8) = \boxed{3b^2(b-2)(b^2 + 2b + 4)}$$

20. Solve the equation for x.

$$(x + 5)(x - 7) = -20$$

$$(x + 5)(x - 7) + 20 = 0$$

$$x^2 - 7x + 5x - 35 + 20 = 0$$

$$x^2 - 2x - 15 = 0$$

$$(x + 3)(x - 5) = 0$$

$$x + 3 = 0 \quad x - 5 = 0$$

$$x = -3, \quad x = 5$$