

1. Simplify the expression below.

$$(4 - 5i)(2 + i)$$

- 13
- $-6i$
- $8 - 5i$
- $13 - 6i$

2. Subtract:

$$(7 - 6i) - (4 + 2i)$$

- $3 - 4i$
- $11 - 4i$
- $3 - 8i$
- $40 - 10i$

3. Simplify.

$$(3 + 8i) + (7 - 2i) - (6 - 5i)$$

- $16 + i$
- $4 + i$
- $4 + 11i^3$
- $4 + 11i$

4. Divide and simplify:

$$\frac{3 + 2i}{4 - i}$$

- $\frac{5}{4}$
- $\frac{2 - i}{3}$
- $\frac{10 + 11i}{17}$
- $\frac{10 + 11i}{15}$

5. What are the solutions to the equation  $2x^2 + 12x = 26$ ?

$x = -3 + \sqrt{22}$ ;  $x = -3 - \sqrt{22}$

$x = -3 + \sqrt{35}$ ;  $x = -3 - \sqrt{35}$

$x = -6 + 2\sqrt{13}$ ;  $x = -6 - 2\sqrt{13}$

$x = -6 + 7\sqrt{2}$ ;  $x = -6 - 7\sqrt{2}$

6. Simplify the expression.

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

$27x^2 - x + 15$

$5x^2 + 7x + 15$

$8x^2 + 10$

$5x^2 - x + 20$

7. Find one factor of:

$$2x^2 - 5x - 12$$

$(x + 4)$

$(x - 3)$

$(x - 4)$

$(x + 3)$

8. Which of the following shows  $15x^2 + 17x - 4$  factored completely?

$(15x - 4)(x + 1)$

$(15x - 2)(x + 2)$

$(5x + 4)(3x + 1)$

$(5x - 1)(3x + 4)$

9. Which of the following quadratics has  $2x - 3$  as a factor?

$9x^2 - 4$

$4x^2 + 14x - 30$

$2x^2 - 7x + 3$

$2x^2 - 9$

10. **Subtract:**

$$(-6x^2 - 5x - 4) - (-5x^2 + x - 7)$$

$-x^2 - 6x - 11$

$-x^2 - 4x - 11$

$-x^2 - 4x + 3$

$-x^2 - 6x + 3$

11. **Simplify.**

$$(2x^3 + 3x^2 - x - 5) - (x^3 - 2x^2 + 5x - 1)$$

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

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

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

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

12. **Perform the operation.**

$$(3x^3 - 7x^2 + 5x - 2) + (2x^2 - 9x + 8)$$

$3x^3 - 9x^2 + 14x - 10$

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

$5x^5 - 16x^3 + 13x - 2$

$-14x^4 + 3x^3 - 45x^2 - 16$

13. **Perform the operation:**

$$(x - 4)(4x^2 - 8x + 7)$$

$4x^3 - 24x^2 + 39x - 28$

$4x^3 + 8x^2 - 25x + 28$

$-12x^3 + 24x^2 - 21x$

$-12x^2 + 24x - 21$

14. **Multiply:**

$$-(-3xy^2)^3(-2x^2y)^2$$

$36x^{12}y^{12}$

$-36x^{12}y^{12}$

$108x^7y^8$

$-108x^7y^8$

15. **Which of the following quotients has a remainder?**

$x + 1 \overline{)x^4 + 5x^3 + 5x^2 - 5x - 6}$

$x - 1 \overline{)x^4 + 5x^3 + 5x^2 - 5x - 6}$

$x + 2 \overline{)x^4 + 5x^3 + 5x^2 - 5x - 6}$

$x - 2 \overline{)x^4 + 5x^3 + 5x^2 - 5x - 6}$

16. **What is  $(x - 8)(x + 4) + (x - 3)(x + 9)$ ?**

$x^2 - 2x - 59$

$x^2 + 2x - 59$

$2x^2 - 2x - 59$

$2x^2 + 2x - 59$

17. **Perform the operation:**

$$(2x^4 + 5x^3 + 8x + 24) \div (x + 2)$$

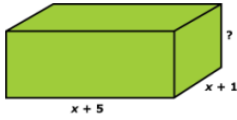
$2x^2 + x + 6 + \frac{12}{x + 2}$

$2x^3 + 9x^2 + 18x + 44 + \frac{112}{x + 2}$

$2x^3 + x^2 - 2x + 12$

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

18. The formula for the volume of a rectangular prism is  $V = Bh$ , where  $B$  is the area of the base and  $h$  is the height of the prism. If the rectangular prism shown below has a volume of  $V = 3x^3 + 8x^2 - 45x - 50$ , what expression represents the length of the unknown side?



- $-3x + 10$
  - $3x - 10$
  - $3x - 10 + \frac{100}{x^2 + 6x + 5}$
  - $x^2 + 6x + 5$
19. Which of these is a factor of  $x^4 - 2x^3 - 13x^2 + 38x - 24$ ?

- $x - 4$
- $x - 1$
- $x + 2$
- $x + 3$

20. Use the Remainder Theorem to find the remainder of  $(x^3 - 2x^2 + 3x - 1) \div (x + 2)$ .

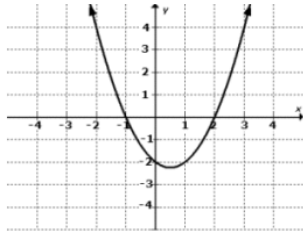
- $-23$
- $-7$
- $0$
- $5$

21. In order for  $x - 2$  to be a factor of  $x^3 - 6x^2 + 11x - 6$ , the remainder of  $(x^3 - 6x^2 + 11x - 6) \div (x - 2)$  must be equal to which of the following values?

- $-6$
- $-2$
- $0$
- $2$

22.

Which of these polynomial functions is graphed below?



- $y = x^2 - 3x + 2$
- $y = x^2 - x - 2$
- $y = x^2 + x - 2$
- $y = x^2 + 3x + 2$

23.

Roger factored a polynomial to determine that the zeros of the polynomial are located at  $x = -5$ ,  $x = -2$  and  $x = 3$ . Which of the following functions is the factored form of that polynomial?

- $f(x) = (x + 5)(x + 2)(x + 3)$
- $f(x) = (x - 5)(x - 2)(x - 3)$
- $f(x) = (x - 5)(x - 2)(x + 3)$
- $f(x) = (x + 5)(x + 2)(x - 3)$

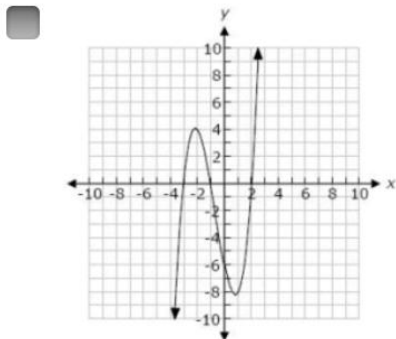
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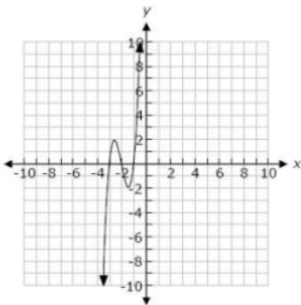
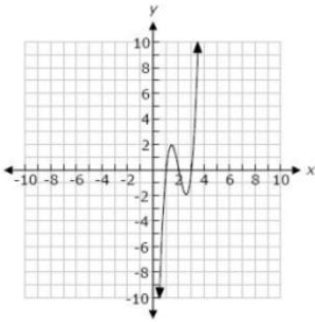
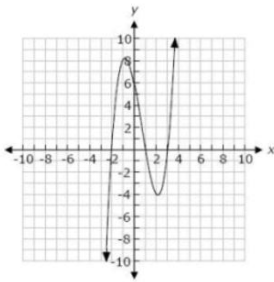
What are the zeros of a polynomial that is factored as  $f(x) = (x - 4)(x - 1)(x + 3)$ ?

- $(0, -4), (0, -1)$  and  $(0, 3)$
- $(0, 4), (0, 1)$  and  $(0, -3)$
- $(-4, 0), (-1, 0)$  and  $(3, 0)$
- $(4, 0), (1, 0)$  and  $(-3, 0)$

25.

Identify the zeros of the factored polynomial  $y = (x - 3)(x - 1)(x + 2)$  to determine which of the following graphs represents the function.





26.

James is working with the equation  $ax^2 + bx + c = 0$ . Which of the following will James be able to prove is the solution for  $x$ ?

$x = -\frac{b}{2} \pm \sqrt{\frac{b-2c}{2}}$

$x = -\frac{b}{2a} \pm \sqrt{\frac{b-2c}{2a}}$

$x = \frac{-b \pm \sqrt{b^2 - 4c}}{2}$

$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$

27. Simplify:

$$\frac{2x^2 + 9x + 9}{x^2 - 6x - 27}$$

$\frac{2}{x-3}$

$\frac{1}{3}$

$\frac{2x+3}{x-9}$

Already in most simplified form

28. How do you write the sum in simplest form?

$$\frac{2x+1}{2x^2} + \frac{-1}{10x}$$

$\frac{1}{10x^2}$

$\frac{2x+9}{20x^3}$

$\frac{2x}{12x^3}$

$\frac{9x+5}{10x^2}$

29. How do you write the difference in simplest form?

$$\frac{1}{x+3} - \frac{6}{x-3}$$

$\frac{-5}{x-3}$

$\frac{-5x-21}{x^2-9}$

$\frac{-5}{x^2-9}$

$\frac{-5x-21}{x+3}$



30.

Simplify:

$$\frac{x^2 - 2x - 8}{x^2 + 2x - 15}$$

$$\frac{x^2 - 16}{x^2 - 5x + 6}$$

$\frac{x^2 - 4}{x^2 + 9x + 20}$

$\frac{(x + 2)(x + 4)(x - 4)^2}{(x - 2)(x - 3)^2(x + 5)}$

$\frac{(x + 2)(x + 6)(x - 1)}{(x + 4)(x - 3)(x + 5)}$

$\frac{x^2 - 4x + 4}{x^2 + 9x + 20}$

31.

$$y = -2x^2 + 4x + 1$$

Find the vertex for the graph of the above equation and identify whether it is a maximum or a minimum.

$(-1, -5)$ , minimum

$(1, 3)$ , minimum

$(1, 3)$ , maximum

$(-1, -5)$ , maximum

32.

A scientist launched an object upward at a speed of 32 ft per second from a height of 240 feet. The height of the object is modeled by the equation  $h = 240 + 32t - 16t^2$ . After how much time will the object hit the ground?

3 seconds

5 seconds

12 seconds

20 seconds