

1-1 to 1-3 Exam Review

1. If $A = \{2, -4, 3, 10, 12\}$ and $B = \{3, -2, 10\}$ find:

A) $A \cap B$

$$\{3, 10\}$$

B) $A \cup B$

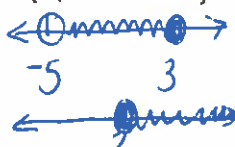
$$\{-4, -2, 2, 3, 10, 12\}$$

2. Express the interval $[-4, 2)$ as an inequality and on a number line.

$$-4 \leq x < 2$$

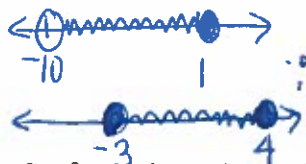


3. Find $\{x | -5 < x \leq 3\} \cup \{x | x \geq 2\}$, express your answer in all three representations.



$$x > -5, (-5, \infty), \leftarrow \oplus$$

4. Find $(-10, 1] \cap [-3, 4]$ express your answer in all three representations.



$$\leftarrow \bullet \rightarrow, [-3, 1], -3 \leq x \leq 1$$

5. Perform the indicated operation and simplify:

a) $-3(x+2)[(x+5)(x-1)]$

$$\begin{aligned} & (-3x-6)(x^2+4x-5) \\ & -3x^3 - 12x^2 + 15x \\ & \quad -6x^2 - 24x + 30 \\ & \boxed{-3x^3 - 18x^2 - 9x + 30} \end{aligned}$$

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

$$\begin{aligned} & 3x^2 + 6x - 18 - 2x^2 + 4x - 5 \\ & \boxed{x^2 + 10x - 23} \end{aligned}$$

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

$$\begin{aligned} & 4x^2 - 5x + 12x - 15 \\ & \boxed{4x^2 + 7x - 15} \end{aligned}$$

d) $(a+\sqrt{b})(\sqrt{a}-\sqrt{b})$

$$\boxed{a\sqrt{a} - a\sqrt{b} + \sqrt{ab} - b}$$

e) $(2x+3)^3$ $(2x+3)(2x+3)(2x+3)$

$$\begin{aligned} & 4x^2 + 6x + 6x + 9 \\ & (4x^2 + 12x + 9)(2x+3) = \boxed{8x^3 + 36x^2 + 54x + 27} \\ & 8x^3 + 24x^2 + 18x + 12x^2 + 36x + 27 \end{aligned}$$

Factor completely:

6. $3z^2 + 4z - 4$

$$(3z - 2)(z + 2)$$

7. $4x^2 - 25$

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

8. $2x^2 + 5x - 12$

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

9. $100x^2 - 2500$

$$100(x^2 - 25)$$

$$100(x-5)(x+5)$$

10. $8x^6 + 125$

$$(2x^2 + 5)(4x^4 - 10x^2 + 25)$$

11. $x^3 - 27y^6$

$$(x - 3y^2)(x^2 + 3xy^2 + 9y^4)$$

12. $x^4 + 27x$

$$x(x^3 + 27)$$

$$x(x+3)(x^2 - 3x + 9)$$

13. $r^2(s^2 - 9) - 16(s^2 - 9)$

$$(r^2 - 16)(s^2 - 9)$$

$$(r-4)(r+4)(s-3)(s+3)$$

14. $(a^2 + 1)^2 - 7(a^2 + 1) + 10$

$$x = (a^2 + 1)$$

$$x^2 - 7x + 10 = (x-5)(x-2)$$

$$[(a^2 + 1) - 5][(a^2 + 1) - 2]$$

15. $3x^{\frac{3}{2}} - 9x^{\frac{1}{2}} + 6x^{-\frac{1}{2}}$

$$3x^{-\frac{1}{2}}[x^2 - 3x + 2]$$

$$3x^{-\frac{1}{2}}(x-2)(x-1)$$

16. $(x+2)^{\frac{9}{2}} - 4(x+2)^{\frac{1}{2}}$

$$(x+2)^{\frac{1}{2}}[(x+2)^4 - 4]$$

$$(x+2)^{\frac{1}{2}}[(x+2)^2 - 2][(x+2)^2 + 2]$$

$$(x+2)^{\frac{1}{2}}(x^2 + 4x + 2)(x^2 + 4x + 6)$$

$$(a^2 - 4)(a^2 - 1)$$

$$(a-2)(a+2)$$

$$(a-1)(a+1)$$

17. $(x-1)(x+2)^2 - (x-1)^2(x+2)$

$$(x-1)(x+2)[(x+2) - (x-1)]$$

$$x+2 - x + 1 = 3$$

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

18. $6s(s^2 + 1)(s-3)^3 + 12(s-3)^2(s^2 + 1)^2$

$$6(s^2 + 1)(s-3)^2[s(s-3) + 2(s^2 + 1)]$$

$$s^2 - 3s + 2s^2 + 2 = 3s^2 - 3s + 2$$

$$6(s^2 + 1)(s-3)^2(3s^2 - 3s + 2)$$

Simplify the expression and eliminate any negative exponents. Assume all letters denote positive numbers.

19. $\frac{(32x^5y^{\frac{-3}{2}})^{\frac{5}{2}}}{(x^{\frac{5}{3}}y^{\frac{2}{3}})^{\frac{5}{2}}}$

$$2^{\frac{5 \cdot 2}{2}} \frac{4x^2y^{-\frac{3}{5}}}{x^1y^{\frac{2}{5}}y^{\frac{3}{5}}}$$

$$\frac{4x}{y}$$

20. $\left(\frac{3x^2y^3}{x^2y^{-1}}\right)^2$

$$\frac{9x^3y^6}{x^4y^{-1}}$$

$$\frac{9y^7}{x}$$

21. $(2a^2b^3c)\left(\frac{3a^2b^3}{c^4}\right)^{-2}$

$$2a^2b^3c \cdot \frac{c^8}{9a^4b^6}$$

$$\frac{2c}{9a^2b^3}$$

Simplify the expression.

$$22. \sqrt[16 \cdot 2]{32} + \sqrt[9 \cdot 2]{18}$$

$$4\sqrt{2} + 3\sqrt{2}$$

$$\boxed{7\sqrt{2}}$$

$$23. \sqrt[100 \cdot 2]{200} - \sqrt[16 \cdot 2]{32}$$

$$10\sqrt{2} - 4\sqrt{2}$$

$$\boxed{6\sqrt{2}}$$

$$24. \sqrt[3]{54a^4b^7} \cdot \sqrt[3]{4ac^4}$$

$$\sqrt[3]{2 \cdot 2 \cdot 2 \cdot 2 \cdot a^5 b^7 c^4} = 2ab^2c \sqrt[3]{a^2bc}$$

$$3 \cdot 2 \cdot ab^3 \sqrt[3]{ab^2} = \cancel{6ab^3} \sqrt[3]{ab^2}$$

$$25. \sqrt[4]{32r^3s} \cdot \sqrt[4]{81rs^4}$$

$$\sqrt[4]{2 \cdot 2 \cdot 2 \cdot 2 \cdot 2 \cdot 3^4 \cdot r^4 s^5}$$

$$2 \cdot 3 \cdot r \cdot s \sqrt[4]{2s} = \boxed{6rs \sqrt[4]{2s}}$$

Rationalize the denominator.

$$26. \frac{3}{\sqrt[3]{x^2}} \cdot \frac{\sqrt[3]{x}}{\sqrt[3]{x}}$$

$$\boxed{\frac{3\sqrt[3]{x}}{x}}$$

$$27. \frac{x}{\sqrt[4]{8x^2}} \cdot \frac{\sqrt[4]{2x^2}}{\sqrt[4]{2x^2}}$$

$$\frac{x\sqrt[4]{2x^2}}{2x} = \boxed{\frac{\sqrt[4]{2x^2}}{2}}$$

$$28. \frac{\sqrt[3]{8x}}{\sqrt[3]{3y^2}}$$

$$\frac{\sqrt[3]{8x}}{\sqrt[3]{3y^2}}$$

$$\frac{2\sqrt[3]{x}}{\sqrt[3]{3y^2}} \cdot \frac{\sqrt[3]{9y}}{\sqrt[3]{9y}}$$

$$\boxed{\frac{2\sqrt[3]{9xy}}{3y}}$$