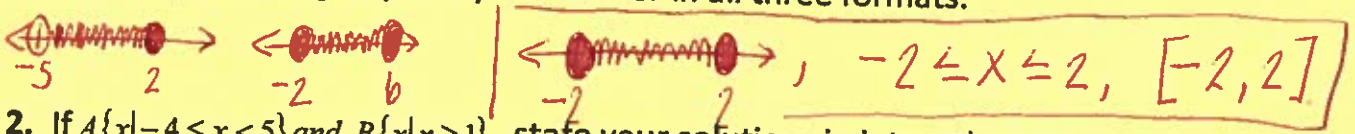


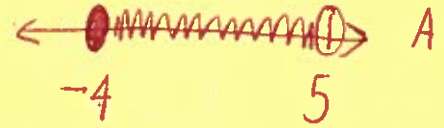
Ch. 1 Exam Review

1. Find $(-5, 2) \cap [-2, 6]$ express your answer in all three formats.

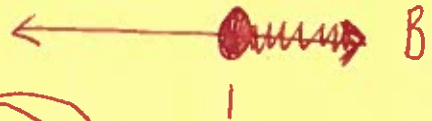


2. If $A = \{x | -4 \leq x < 5\}$ and $B = \{x | x \geq 1\}$, state your solutions in interval notation.

Find $A \cup B$ $[-4, \infty)$



Find $A \cap B$ $[1, 5)$



3. Perform the indicated operation and simplify: $(x^2 + 1)(x^2 - x + 2)$

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

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

Factor completely:

4. $2x^2 - x - 3$
 $(2x - 3)(x + 1)$

5. $5z^2 - 18z - 8$
 $(5z + 2)(z - 4)$

6. $7x^2 + 23x + 6$
 $(7x + 2)(x + 3)$

7. $16x^6 + 250$

$2(8x^6 + 125)$

8. $2a^3 + 16b^3$

$2(a^3 + 8b^3)$

9. $2(x^2 + 1)^2(x - 3) + (x^2 + 1)(4x)(x - 3)^2$

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

10. $4x(x^2 - 3)(x + 2)^2 - (x + 2)^3(12x)(x^2 - 3)^2$

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

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

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

$1 - 3x^3 - 6x^2 + 9x + 18$

$x(x^2 - 3)(x + 2)^2 [-3x^3 - 6x^2 + 9x + 19]$

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

$$x^{2-2} = x^0 \frac{x^2}{x^2} = 1$$

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

$$11. \frac{(32x^5y^{\frac{-3}{2}})^{\frac{2}{5}}}{(x^{\frac{5}{3}}y^{\frac{2}{3}})^{\frac{3}{5}}}$$

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

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

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

$$\boxed{\frac{4x^1}{y}}$$

$$12. \frac{25 \cdot 5^{-1} \cdot 5^{-1}}{(2^{-1} \cdot 2^3)^{-1}}$$

$$\frac{5^2 \cdot 5^{-1} \cdot 5^{-1}}{(2^2)^{-1}} = \frac{5^0}{2^{-2}}$$

$$\frac{1}{2^{-2}} = 2^2 = \boxed{4}$$

$$13. (2a^2b^3c) \left(\frac{3a^2b^3}{c^4} \right)^{-2}$$

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

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

Simplify the expressions.

$$14. \sqrt{32} \cdot \sqrt{18}$$

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

$$4 \cdot 2 \cdot 3$$

$$\boxed{24}$$

$$15. \sqrt{27} \cdot \sqrt{12}$$

$$\sqrt{3 \cdot 3 \cdot 3 \cdot 3 \cdot 2 \cdot 2}$$

$$3 \cdot 3 \cdot 2$$

$$\boxed{18}$$

$$16. \sqrt[3]{36a^4b^7} \cdot \sqrt[3]{24ac^4}$$

$$\sqrt[3]{(b \cdot b \cdot b) 4 a^2 b^2 c^4}$$

$$ba^2b^2c \sqrt[3]{4a^2bc}$$

$$17. \sqrt[3]{x^5y^2} \cdot \sqrt[3]{16x^2y^4}$$

$$\sqrt[3]{2^4 x^7 y^6}$$

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

$$18. \frac{x^3 + 6x^2 + 5x}{x^2 + 12x + 35}$$

$$19. \frac{x^2 - 25}{x + 5} \div \frac{x - 5}{2x + 10}$$

$$20. \frac{x^3 - 4x}{x^2 + 4x + 4} \cdot \frac{x^2 - 2x}{x^2 + 3x + 2}$$

$$\frac{x(x+5)(x+1)}{(x+7)(x+5)}$$

$$\boxed{\frac{x(x+1)}{x+7}}$$

$$\frac{(x-5)(x+5) \cdot \frac{2(x+5)}{x-5}}{x+5}$$

$$\boxed{2(x+5) \text{ OR } 2x+10}$$

$$\frac{x(x-2)(x+2)}{(x+2)(x+2)} \cdot \frac{x(x-2)}{(x+2)(x+1)}$$

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

$$21. \frac{(x+5) \cdot 2}{x+1} + \frac{-1}{x^2+6x+5}$$

$$\frac{2x+10}{(x+5)(x+1)} + \frac{-1}{(x+5)(x+1)}$$

$$\boxed{\frac{2x+9}{(x+5)(x+1)}}$$

$$22. \frac{2 \left(\frac{x}{2} + 2 \right)}{2 \left(\frac{x}{2} + 2 \right)}$$

$$\boxed{\frac{x+4}{x-4}}$$

$$23. \frac{(h+1)(h-1) \cdot \frac{1+(-1)}{h+1}}{(h+1)(h+1) \cdot \frac{1}{h-1+1}} = \frac{(h+1)(h-1)}{(h+1)(h+1)}$$

$$\frac{(h^2-1) - h+1}{(h+1) - 1(h^2-1)}$$

$$\frac{h^2-h}{(h^2-h-2)} = \frac{h(h-1)}{(h-2)(h+1)}$$

$$24. \frac{x(x+1) \cdot \frac{x-1}{x} + \frac{1}{x+1}}{x(x+1) \cdot \frac{1}{x+1} + \frac{x+1}{x}} = \frac{x^2-1+x}{x+(-x^2-2x)}$$

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

25. Rationalize the denominator:

A) $\frac{4}{\sqrt[3]{4x}} = \frac{4}{\sqrt[3]{2^2x}} \cdot \frac{\sqrt[3]{2x^2}}{\sqrt[3]{2x^2}} = \frac{4\sqrt[3]{2x^2}}{2x}$

B) $\frac{6x}{\sqrt[4]{27x^2}} = \frac{6x}{\sqrt[4]{3^3x^2}} \cdot \frac{\sqrt[4]{3x^2}}{\sqrt[4]{3x^2}} = \frac{6x\sqrt[4]{3x^2}}{3x} = \frac{2\sqrt[4]{3x^2}}{1}$

C) $\frac{4}{\sqrt{2+\sqrt{6}}} \cdot \frac{\sqrt{2-\sqrt{6}}}{\sqrt{2-\sqrt{6}}} = \frac{4\sqrt{2-4\sqrt{6}}}{2-6-4} = \frac{4\sqrt{2-4\sqrt{6}}}{-8} = \frac{-\sqrt{2-\sqrt{6}}}{2}$

D) $\frac{3}{6+\sqrt{2}} \cdot \frac{6-\sqrt{2}}{6-\sqrt{2}} = \frac{18-3\sqrt{2}}{6-2} = \frac{18-3\sqrt{2}}{4}$

Write the equation of the line,

26. through $(-1, -6)$ and $(2, -4)$

$m = \frac{-4 - (-6)}{2 - (-1)} = \frac{2}{3}$

$y = \frac{2}{3}(x+1) - 6$

28. through X-intercept of 4 and y-intercept of 12

$(4, 0)$ $(0, 12)$

$m = \frac{12 - 0}{0 - 4} = \frac{12}{-4} = -3$

27. through $(1, 7)$ perpendicular to $x - 3y + 16 = 0$

$m = \frac{-1}{-3} = \frac{1}{3}$ $m_{\perp} = -3$
so

$y = -3(x-1) + 7$

$y = -3(x-0) + 12$

$y = -3x + 12$

29. The maximum weight M that can be supported by a beam is jointly proportional to its width w and the square of its height h and inversely proportional to its length l .

A) Write an equation that expresses this variation.

$M = \frac{k \cdot w \cdot h^2}{l}$

B) Find the constant of proportionality if a beam 4 in. wide, 6 in. high and 12 feet long can support a weight of 4800 lb.

$4800 = \frac{k \cdot 4 \cdot 36}{12}$

$57600 = 144k$
 $400 = k$

C) If a 10 ft. beam made of the same material is 3 in. wide and 10 in. high, what is the maximum weight it can support?

$M = \frac{400 \cdot 3 \cdot 100}{10} = \frac{120,000}{10} = 12,000 \text{ lbs}$

30. The maximum range of a projectile is directly proportional to the square of its velocity. A baseball pitcher throws a ball at 60 mi/h, with a maximum range of 242 ft. What is his maximum range if he throws the ball at 70 mi/h?

$R = k \cdot v^2$

$k = \frac{242}{3600} = \frac{121}{1800}$

$R = \frac{121}{1800} \cdot 70^2$

$242 = k \cdot 60^2$

$242 = 3600k$

$R \approx 329.4 \text{ ft}$

