

Sample Final Exam Problems

1. Simplify: $35 - 16 \div 8 + 3$
2. Simplify: $4^2 + 12 \cdot 13 - (25 + 25 \cdot 4)$
3. Evaluate: $3a^2 + 5b - c$ when $a = -1$, $b = 2$, and $c = -2$
4. Simplify: $-|-5| - |2| + |3|$
- 5a. Simplify: $7(x-1) - 2(3x+5)$
- 5b. Simplify: $-3[10 - 8(3 - 2x) - 4x]$
- 6a. Solve: $7y - 5 = 2y + 4y$
- 6b. Solve: $5x + 4(2x - 3) = 2x + 11$
7. Solve: $x + \frac{1}{5} = -\frac{3}{10}$
8. Solve for "y": $3x + 2y = 5$
9. Solve: $3(2x + 5) < 7x + 6$
10. Translate "the difference between five times a number and three equals six more than twice the number" into an equation.
- 11a. The length of a rectangle is 4 meters less than the width. The perimeter is 40 meters. Find the length.
 - b. \$550 is invested for 4 years at 6% simple interest. How much interest is earned in 4 years?
12. Set up the correct proportion:
If there are 240 calories in 15 grams of a food, how many calories are in 20 grams of the same food?
- 13a. Simplify: $(3x^4y^2)^3$
 - b. Simplify $\frac{2x^3y}{10x^2y^5}$
- 14a. Simplify: $(4x^{-3}y^5)^{-2}$
 - b. Simplify: $\frac{-2x^4y^2}{12x^3y^{-5}}$
 - c. Simplify: $x^{-3} \cdot x^{-2}$
- 15a. Simplify: $-(4x)^0$
- 15b. Simplify: $\frac{3x^2y^0}{6x^{-3}y}$

- 16a. Change to Scientific Notation: 62,700,000
- b. Convert to standard form: 6.21×10^{-4}
17. Simplify: $(x^2 - 3x + 8) - (-5x^2 + 3x - 17)$
18. Simplify: $-3x^2y(2x^2 - 5xy + xy^2)$
- 19a. Simplify: $(3x - 2)(x + 4)$
- b. Simplify: $(2x - 5y)^2$
20. Factor: $12x^2y^4 - 30xy^7$
21. Which of the following is a factor of $8x^2 - 14x - 15$?
- A) $(2x + 5)$ B) $(8x - 1)$ C) $(4x + 3)$ D) None of the above
22. Factor: $9x^2 - 25y^2$
23. Factor Completely: $x^3 + 4x^2 + 2x + 8$
24. Simplify: $\frac{x^2 - 36}{x^2 - x - 30}$
25. Solve: $x^2 - 3x - 28 = 0$
26. Solve: $2x^2 - 5x - 3 = 0$
27. Simplify (the variable represents a non-negative number): $\sqrt{75x^5}$
28. Simplify: $\sqrt{20} - \sqrt{45}$
29. Find the x intercept of $5x + 2y = 6$
- 30a. Graph: $4x + 5y = 20$
- b. Graph: $y = 2x - 3$

Sample Final Answer Sheet

(1) $35 - 2 + 3 = 33 + 3 = 36$

(2) $16 + 156 - (25 + 100) = 172 - 125 = 47$

(3) $3(-1)^2 + 5(2) - (-2) = 3(1) + 10 + 2 = 3 + 10 + 2 = 15$

(4) $-5 - 2 + 3 = -7 + 3 = -4$

(5)a $7x - 7 - 6x - 10 = x - 17$

(5)b $-3[10 - 24 + 16x - 4x] = -3[-14 + 12x] = 42 - 36x$

(6)a $5x + 8x - 12 = 2x + 11$

$$13x - 12 = 2x + 11$$

$$11x = 23$$

$$x = \frac{23}{11}$$

(6)b $7y - 5 = 6y$

$$y - 5 = 0$$

$$y = 5$$

(7) $10x + 10\left(\frac{1}{5}\right) = 10\left(-\frac{3}{10}\right)$ multiply by 10

$$10x + 2 = -3$$

$$10x = -5$$

$$x = \frac{-5}{10} = \frac{-1}{2}$$

(8) $2y = 5 - 3x$ or $-3x + 5$

$$y = \frac{5 - 3x}{2} \text{ or } \frac{-3x + 5}{2}$$

(9) $6x + 15 < 7x + 6$

$$9 < x \text{ or } x > 9$$

(10) $5n - 3 = 2n + 6$

(11)a. $L = W - 4; P = 40$

$$P = 2L + 2W$$

$$40 = 2(W - 4) + 2W$$

$$40 = 2W - 8 + 2W$$

$$40 = 4W - 8$$

$$48 = 4W$$

$$12m = W \text{ thus } L = 12 - 4 = 8m$$

(11) b. $I = PRT$

$$I = (\$550)(0.06)(4)$$

$$I = \$132$$

(12) $\frac{240\text{cal.}}{15\text{g}} = \frac{x}{20\text{g}}$ or $\frac{x}{240\text{cal}} = \frac{20\text{g}}{15\text{g}}$

(13)a. $27x^{12}y^6$

b. $\frac{x}{5y^4}$

(14)a. $4^{-2}x^6y^{-10}$

$$= \frac{x^6}{16y^{10}}$$

b. $\frac{-xy^2y^5}{6}$

$$= \frac{-xy^7}{6}$$

c. $\frac{1}{x^3} \cdot \frac{1}{x^2}$

$$= \frac{1}{x^5}$$

(15)a $-(4x)^0 = -(1) = -1$

(15)b $\frac{x^2x^3}{2y}$ recall $y^0 = 1$ thus $\frac{x^5}{2y}$

(16)a 6.27×10^7

(16)b. 0.000621

(17) $x^2 - 3x + 8 + 5x^2 - 3x + 17$
 $= 6x^2 - 6x + 25$

(18) $-6x^4y + 15x^3y^2 - 3x^3y^3$

(19)a. $3x^2 + 12x - 2x - 8 = 3x^2 + 10x - 8$

b. $(2x - 5y)(2x - 5y) = 4x^2 - 10xy - 10xy + 25y^2 = 4x^2 - 20xy + 25y^2$

(20) $6xy^4(2x - 5y^3)$

(21) $(2x - 5)(4x + 3)$ thus C

(22) $(3x + 5y)(3x - 5y)$

(23) $x^2(x + 4) + 2(x + 4)$
 $= (x + 4)(x^2 + 2)$

(24) $\frac{(x-6)(x+6)}{(x-6)(x+5)} = \frac{x+6}{x+5}$ factor & cancel

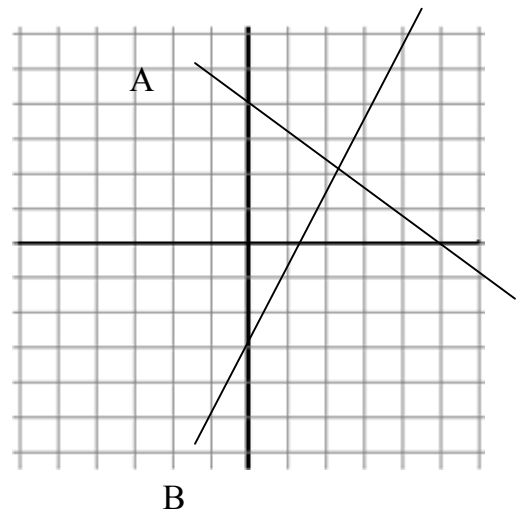
(25) $(x-7)(x+4) = 0$
 $x-7 = 0$ or $x+4 = 0$
 $x = 7$ or $x = -4$
 $\{-4, 7\}$

(26) $(2x+1)(x-3) = 0$
 $2x+1 = 0$ or $x-3 = 0$
 $x = -\frac{1}{2}$ or $x = 3$ $\{-\frac{1}{2}, 3\}$

(27) $\sqrt{(25)(3)(x^4)} = 5x^2\sqrt{3x}$ or by using primes $\sqrt{3 \cdot 5 \cdot 5 \cdot x \cdot x \cdot x \cdot x \cdot x} = 5x^2\sqrt{3x}$

(28) $\sqrt{4 \cdot 5} - \sqrt{9 \cdot 5} = 2\sqrt{5} - 3\sqrt{5} = -\sqrt{5}$

(29) let $y = 0$ $5x = 6$ thus $x = \frac{6}{5}$ thus $(\frac{6}{5}, 0)$



(30)a using intercepts: let $x = 0$ then $y = 4$ plot $(0, 4)$
let $y = 0$ then $x = 5$ plot $(5, 0)$

b. plot any two points: let $x = 0$ then $y = -3$ plot $(0, -3)$
let $x = 2$ then $y = 1$ plot $(2, 1)$
or use slope and intercept method $m = 2$ and y intercept = $(0, -3)$