

INTERMEDIATE ALGEBRA REVIEW

The Mathematics Department at Onondaga Community College recommends that students who have taken Intermediate Algebra or Course III review this material prior to taking the Placement Exam.

1. $|7 - 2x| = 11$
2. $|3x - 4| > 2$ (graph)
3. $-5 \leq 3x - 2 \leq 4$ (graph)
4. $\frac{7x - 5}{2} + 7 = 4x$
5. $A = -4h(x + 5)$ (For x)
6. Factor: $36x^3 + 12x^2 - 48x$
7. Factor: $a^4 - b^4$
8. Factor: $x^3 + 64$
9. Divide: $(3x^2 + 7x + 7)$ by $(3x + 1)$
10. Solve: $3x^2 - 4x - 3 = 0$
11. Simplify: $\frac{4x - 48}{x^2 - 144}$
12.
$$\frac{\frac{x + 5}{3x^2}}{\frac{x^2 - 25}{6x^3}}$$
13. $\frac{2x}{x + 2} + \frac{5}{x - 5}$
14.
$$\left(\frac{x^2 - 9}{2x + 2} \right) \cdot \left(\frac{x^2 + 2x + 1}{(x - 3) \cdot (x + 1)} \right)$$

15. $\sqrt{2x+1} + 1 = 4$

16. $(4\sqrt{5} - 2) \cdot (2\sqrt{5} + 4)$

17. $\sqrt{125} + 2\sqrt{20} - 4\sqrt{45}$

18. $\left(\sqrt{14x^3y}\right) \cdot \left(\sqrt{7x^3y^3}\right)$

19. $\sqrt{\frac{375x^5}{5x}}$

20. Find the slope of the line $7x + 3y = 21$

21. Find the slope of the line containing the points $(-3, 5)$ and $(6, -1)$.

22. Find the equation of the line passing through $(-6, 2)$ with a slope of -2 .

23. Write the equation of the line through $(2, 5)$ and perpendicular to $y = 2x + 4$.

24. Solve for x , y and z .

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

$$x + 2y + z = -1$$

$$3x - y + 3z = 4$$

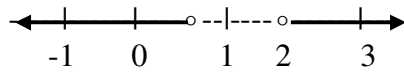
25. Graph $y \geq 3x + 1$

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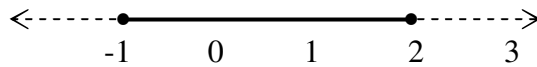
ANSWERS TO THE PROBLEMS

1. $|7 - 2x| = 11$
 $7 - 2x = 11$ $7 - 2x = -11$
 $-2x = 4$ $-2x = -18$
 $x = -2$ or $x = 9$

2. $|3x - 4| > 2$
 $3x - 4 > 2$ or $3x - 4 < -2$
 $3x > 6$ $3x < 2$
 $x > 2$ $x < \frac{2}{3}$



3. $-5 \leq 3x - 2 \leq 4$
 $-3 \leq 3x \leq 6$
 $-1 \leq x \leq 2$



4. $\frac{7x - 5}{2} + 7 = 4x$
 $7x - 5 + 14 = 8x$
 $9 = x$

$$5. \quad A = -4h(x + 5)$$

$$\frac{A}{-4h} = x + 5$$

$$-\frac{A}{4h} - 5 = x$$

$$6. \quad \begin{aligned} &36x^3 + 12x^2 - 48x \\ &12x(3x^2 + x - 4) \\ &12x(3x + 4)(x - 1) \end{aligned}$$

$$7. \quad \begin{aligned} &a^4 - b^4 \\ &(a^2 - b^2)(a^2 + b^2) \\ &(a - b)(a + b)(a^2 + b^2) \end{aligned}$$

$$8. \quad \begin{aligned} &x^3 + 64 \\ &(x + 4)(x^2 - 4x + 16) \end{aligned}$$

$$9. \quad \begin{array}{r} \overline{) 3x^2 + 7x + 7} \\ \underline{-3x^2 - x} \\ 6x + 7 \\ \underline{-6x - 2} \\ 5 \end{array} \quad \begin{array}{l} x + 2 \quad R = 5 \end{array}$$

$$10. \quad \begin{aligned} &3x^2 - 4x - 3 = 0 \\ &x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a} \\ &x = \frac{-(-4) \pm \sqrt{(-4)^2 - 4(3)(-3)}}{2(3)} \\ &x = \frac{4 \pm \sqrt{16 + 36}}{6} = \frac{4 \pm \sqrt{52}}{6} = \frac{4 \pm 2\sqrt{13}}{6} = \frac{2 \pm \sqrt{13}}{3} \end{aligned}$$

$$11. \quad \frac{4x - 48}{x^2 - 144} = \frac{4(x - 12)}{(x - 12)(x + 12)} = \frac{4}{x + 12}$$

$$12. \frac{\frac{x+5}{3x^2}}{\frac{x^2-25}{6x^3}} = \frac{x+5}{3x^2} \cdot \frac{6x^3}{x^2-25} = \frac{(x+5) \cdot (6x^3)}{(3x^2) \cdot (x+5) \cdot (x-5)} = \frac{2x}{x-5}$$

$$13. \frac{2x}{x+2} + \frac{5}{x-5} = \frac{2x^2 - 10x + 5x + 10}{(x+2)(x-5)} = \frac{2x^2 - 5x + 10}{(x+2)(x-5)}$$

$$14. \left(\frac{x^2-9}{2x+2} \right) \cdot \left(\frac{x^2+2x+1}{(x-3) \cdot (x+1)} \right) = \frac{(x-3) \cdot (x+3)}{2(x+1)} = \frac{(x+1) \cdot (x+1)}{(x-3) \cdot (x+1)} = \frac{x+3}{2}$$

$$15. \begin{aligned} \sqrt{2x+1} + 1 &= 4 \\ \sqrt{2x+1} &= 3 \\ 2x+1 &= 9 \\ x &= 4 \end{aligned}$$

$$16. \frac{4\sqrt{5}-2}{2\sqrt{5}+4} \cdot \frac{8 \cdot 5 - 4\sqrt{5}}{+16\sqrt{5}-8} = \frac{40+12\sqrt{5}-8}{32+12\sqrt{5}}$$

$$17. \sqrt{125} + 2\sqrt{20} - 4\sqrt{45} = \sqrt{5 \cdot 25} + 2\sqrt{5 \cdot 4} - 4\sqrt{5 \cdot 9} = 5\sqrt{5} + 4\sqrt{5} - 12\sqrt{5} = -3\sqrt{5}$$

$$18. \left(\sqrt{14x^3y} \right) \cdot \left(\sqrt{7x^3y^3} \right) = \sqrt{98x^6y^4} = 7x^3y^2\sqrt{2}$$

$$19. \sqrt{\frac{375x^5}{5x}} = \sqrt{75x^4} = 5x^2\sqrt{3}$$

$$\begin{aligned}
 20. \quad & 7x + 3y = 21 \\
 & \frac{3y}{3} = \frac{-7x}{3} + \frac{21}{3} \\
 & y = -\frac{7x}{3} + 7 \\
 & m = -\frac{7}{3}
 \end{aligned}$$

$$21. \quad m = \frac{-1-5}{6-(-3)} = \frac{-6}{9} = -\frac{2}{3}$$

$$\begin{aligned}
 22. \quad & y - y_1 = m(x - x_1) \\
 & y - 2 = -2(x + 6) \\
 & y - 2 = -2x - 12 \\
 & y = -2x - 10
 \end{aligned}$$

$$\begin{aligned}
 23. \quad & y = 2x + 4 \quad m = 2 \quad \text{perpendicular } m = -\frac{1}{2} \\
 & y - y_1 = m(x - x_1) \\
 & y - 5 = -\frac{1}{2}(x - 2) \\
 & y - 5 = -\frac{1}{2}x + 1 \\
 & y = -\frac{1}{2}x + 6
 \end{aligned}$$

$$\begin{array}{lll}
 24. \quad 2x - 3y + z = 1 & -2x + 3y - z = -1 & -3x - 6y - 3z = 3 \\
 \quad \quad x + 2y + z = -1 & \quad \quad \underline{x + 2y + z = -1} & \quad \quad \underline{3x - y + 3z = 4} \\
 \quad \quad 3x - y + 3z = 4 & \quad \quad -x + 5y = -2 & \quad \quad -7y = 7 \\
 & & \quad \quad y = -1 \\
 \\
 \quad \quad -x + 5(-1) = -2 & \quad \quad x + 2y + z = -1 & \\
 \quad \quad -x = 3 & \quad \quad -3 + 2(-1) + z = -1 & \\
 \quad \quad x = -3 & \quad \quad -5 + z = -1 & \\
 & \quad \quad z = 4 & \\
 \\
 \quad \quad (-3, -1, 4) & &
 \end{array}$$

25. $y \geq 3x + 1$

