INTERMEDIATE ALGEBRA EXAM 3 C* NAME_____

SHOW ALL WORK ON THIS TEST OR ON SEPARATE PAPER. Circle answers.
TURN IN ALL WORKSHEETS. CALCULATORS ARE PERMITTED ON THIS TEST.

In 1 - 8, simplify completely:

1a) $\sqrt{64x^{12}}$ **2a)** $\sqrt{48}$ **3a)** $\sqrt{75x^4y^7}$

b) $\sqrt[3]{64x^{12}}$ **b)** $\sqrt[3]{48}$ **b)** $\sqrt[3]{72x^4y^7}$

In 4 - 6, give a) simplest radical form,
b) calculator value (nearest hundredth).

4. $8\sqrt{27} + 3\sqrt{12}$ **5.** $\sqrt[3]{98} \cdot \sqrt[3]{14}$ **6.** $(8 - 2\sqrt{3})^2$

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In 7 - 9, rationalize the denominators.

7. $\dfrac{\sqrt{3}-3}{\sqrt{3}+3}$ **8.** $\dfrac{12x}{\sqrt{20xy^5}}$ **9.** $\dfrac{20}{\sqrt[3]{5}}$

In 10 – 11, simplify:

10a) $27^{\frac{1}{3}}$ **b)** $27^{\frac{4}{3}}$ **c)** $32^{-\frac{3}{5}}$

11a) $(-8)^{\frac{2}{3}}$ **b)** $(-9)^{\frac{3}{2}}$ **c)** $-9^{\frac{3}{2}}$

In 12 – 13 solve for x.

12. $\sqrt{x+2}-7=3$ 13. $\sqrt{x+3}=x-3$

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In 14 - 30, solve for *x*. For inequalities, give interval notation.

14. $|2x - 10| = 6$

15a) $|2x - 10| > -4$

b) $|2x - 10| < -4$

16. $|x - 2| < 5$

17. $\left|\frac{4 - 3x}{2}\right| \geq 4$

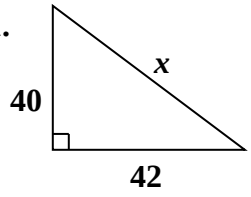
18. $x^2 - 2x = 8$

19. $(x + 3)^2 = 12$

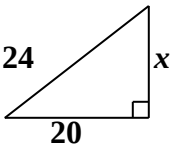
20. $x(x - 4) = -8$

In 21 – 23, find *x*.

21.



22.



23. **The diagonal of a rectangle is 73 cm, and the length is 55 cm. Find the width of the rectangle.**

INTERMEDIATE ALG. EXAM 3C *** Solutions

1a) $\sqrt{64x^{12}} = 8x^6$

b) $\sqrt[3]{64x^{12}} = 4x^4$

2a) $\sqrt{48} = \sqrt{16}\cdot\sqrt{3} = 4\sqrt{3}$

b) $\sqrt[3]{48} = \sqrt[3]{8}\sqrt[3]{6} = 2\sqrt[3]{6}$

3a) $\sqrt{75x^4y^7} = \sqrt{25x^4y^6}\sqrt{3y} = 5x^2y^3\sqrt{3y}$

b) $\sqrt[3]{72x^4y^7} = \sqrt[3]{8x^3y^6}\sqrt[3]{9xy} = 2xy^2\sqrt[3]{9xy}$

4. $8\sqrt{27} + 3\sqrt{12}$

$= 8\cdot 3\sqrt{3} + 3\cdot 2\sqrt{3}$

$= 24\sqrt{3} + 6\sqrt{3}$

$= 30\sqrt{3}$

≈ 51.96

5. $\sqrt[3]{98}\cdot\sqrt[3]{14}$

$= \sqrt[3]{2\cdot 7\cdot 7\cdot 7\cdot 2}$

$= \sqrt[3]{7^3}\cdot\sqrt[3]{4}$

$= 7\sqrt[3]{4}$

≈ 11.11

6. $(8-2\sqrt{3})^2$

$= 64 - 32\sqrt{3} + 4\cdot 3$

$= 76 - 32\sqrt{3}$

$= 20.57$

7. $\dfrac{(\sqrt{3}-3)(\sqrt{3}-3)}{(\sqrt{3}+3)(\sqrt{3}-3)}$

$= \dfrac{3 - 3\sqrt{3} - 3\sqrt{3} + 9}{3-9}$

$= \dfrac{12 - 6\sqrt{3}}{-6} = \dfrac{-1}{-6}(2-\sqrt{3})$

$= -1(2-\sqrt{3}) = -2 + \sqrt{3}$

8. $\dfrac{12x}{\sqrt{20xy^5}} = \dfrac{12x}{2y^2\sqrt{5xy}}$

$= \dfrac{6x}{y^2\sqrt{5xy}}\dfrac{\sqrt{5xy}}{\sqrt{5xy}} = \dfrac{6x\sqrt{5xy}}{y^2\cdot 5xy}$

$= \dfrac{6\sqrt{5xy}}{5y^3}$

9. $\dfrac{20}{\sqrt[3]{5}}\dfrac{\sqrt[3]{25}}{\sqrt[3]{25}}$

$= \dfrac{20\sqrt[3]{25}}{5}$

$= 4\sqrt[3]{25}$

10a) $27^{1/3} = \sqrt[3]{27} = 3$

b) $27^{4/3} = (\sqrt[3]{27})^4$

$= 3^4 = 81$

c) $32^{-3/5} = (\sqrt[5]{32})^{-3}$

$= 2^{-3} = \dfrac{1}{8}$

11a) $(-8)^{2/3} = (\sqrt[3]{-8})^2$

$= (-2)^2 = 4$

b) $(-9)^{3/2} = (\sqrt{-9})^3$

$=$ No Real

c) $-9^{3/2} = -(\sqrt{9})^3$

$= -27$

12. $\sqrt{x+2} - 7 = 3$

$(\sqrt{x+2})^2 = (10)^2$

$x + 2 = 100$

$x = 98$

Ch: $\sqrt{100} - 7 = 3$ ✓

13. $(\sqrt{x+3})^2 = (x-3)^2$

$x + 3 = x^2 - 6x + 9$

$-x \quad -3 \qquad -x \quad -3$

$0 = x^2 - 7x + 6$

$0 = (x-6)(x-1)$

$x = 6 \qquad x = 1$

Ch: $x = 6$: $\sqrt{9} = 6 - 3$ ✓ $\qquad x = 1$: $\sqrt{4} = -3$ No!

14. $|2x-10| = 6$ TWO SOLUTIONS

$2x - 10 = 6$ $\qquad 2x - 10 = -6$

$+10 \quad +10 \qquad +10 \quad +10$

$2x = 16 \qquad 2x = +4$

$x = 8 \qquad x = +2$

15a) $|2x-10| > -4$

All Reals $(-\infty, \infty)$

b) $|2x-10| < -4$

No WAY

16. $|x-2| \le 5$ → Between!

$x - 2 = 5$ $\qquad x - 2 = -5$

$+2 \quad +2 \qquad +2 \quad +2$

$x = 7 \qquad x = -3$

$[-3, 7]$

17. $\left|\dfrac{4-3x}{2}\right| \ge 4$ → EXTREMES

$\dfrac{4-3x}{2} = 4$ or $\dfrac{4-3x}{2} = -4$

$4 - 3x = 8 \qquad 4 - 3x = -8$

$-3x = 4 \qquad -3x = -12$

$x = -4/3 \qquad x = 4$

$(-\infty, -4/3] \cup [4, \infty)$

18. $x^2 - 2x - 8 = 0$

$(x-4)(x+2) = 0$

$x = 4 \quad x = -2$

19. $(x+3)^2 = 12$

$x + 3 = \pm\sqrt{12}$

$x = -3 \pm 2\sqrt{3}$

20. $x(x-4) = -8$

$x^2 - 4x + 8 = 0$

$x = \dfrac{4 \pm \sqrt{16 - 4(1)(8)}}{2}$

$= \dfrac{4 \pm \sqrt{-16}}{2} = \dfrac{4 \pm 4i}{2}$

$= 2 \pm 2i$

21. $40^2 + 42^2 = x^2$

$1600 + 1764 = x^2$

$x^2 = 3364$

$x = 58$

22. $20^2 + x^2 = 24^2$

$400 + x^2 = 576$

$x^2 = 176$

$x = \pm\sqrt{176}$

$x = 13.27$

23. $55^2 + x^2 = 73^2$

$3025 + x^2 = 5329$

$x^2 = 2304$

$x = 48$ cm