INTERMEDIATE ALGEBRA EXAM 3 S* 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) $\sqrt{49a^{12}}$ 2a) $\sqrt{48}$ 3a) $\sqrt{300x^7y^{12}}$

b) $\sqrt[3]{27x^{12}}$ b) $\sqrt[3]{48}$ b) $\sqrt[4]{32x^{12}y^9}$

In 4 - 5, a) give simplest radical form;
b) calculate the value (nearest hundredth).

4a) $3\sqrt{75} + 4\sqrt{12}$ 5a) $(4\sqrt{6} - 6\sqrt{2})^2$

4b) Decimal _____ 5b) Decimal _____

In 6 - 7, rationalize the denominators:

6a) $\frac{72}{\sqrt{2}}$ b) $\sqrt[3]{\frac{3}{y^2}}$ 7. $\frac{\sqrt{27}}{3\sqrt{3} - 2\sqrt{6}}$

6) alternate: $\frac{28}{\sqrt[3]{7}}$

In 8- 9, simplify:

8 a) $25^{\frac{3}{2}}$ b) $-9^{\frac{3}{2}}$ c) $(-32)^{\frac{4}{5}}$

9 a) $-16^{\frac{3}{2}}$ b) $(-16)^{\frac{3}{2}}$ c) $\left(\frac{27}{64}\right)^{-\frac{2}{3}}$

In 10 - 11, solve for X, (check if necessary):

10. $\sqrt[3]{2x - 5} = 5$ 11. $\sqrt{x + 3} = x - 3$

In 12 - 14, solve for X. Give interval notation.

12. $|2x - 7| < 15$ 13a) $|2x - 7| < -15$

b) $|2x - 7| \geq -15$

14. $|2 - 3x| \geq 10$

In 15 - 18, solve for x, (use "i" and radical form if necessary):

15. $(x - 2)^2 = 20$

16. $3x^2 - 11x - 4 = 0$

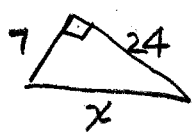
17. $x(x + 6) = -25$

18. $x^2 = 4(x + 2)$

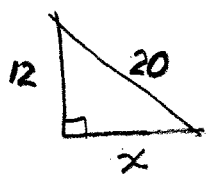
NOTE: In 19 - 22, an equation is required.

In 19 - 20, find x (nearest hundredth if necessary).

19.



20.



21. An isosceles triangle has a base that is 140 cm. and equal sides of 74 cm. Find the height of the triangle.

22. The guy wire from the top of a 75 foot pole reaches the ground 15 feet from the base of the pole. How long is the wire? (Nearest hundredth, if necessary!)

INTERMEDIATE ALGEBRA EXAM 3S* Solutions

1a) $\sqrt{49a^{12}} = 7a^6$

b) $\sqrt[3]{27x^{12}} = 3x^4$

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

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

3a) $\sqrt{300x^7y^{12}} = \sqrt{100x^6y^{12}}\sqrt{3x} = 10x^3y^6\sqrt{3x}$

b) $\sqrt[4]{32x^{12}y^9} = \sqrt[4]{16x^{12}y^8}\sqrt[4]{2y} = 2x^3y^2\sqrt[4]{2y}$

4. $3\sqrt{75} + 4\sqrt{12}$

$3\sqrt{25}\sqrt{3} + 4\sqrt{4}\sqrt{3}$

$3 \cdot 5\sqrt{3} + 4 \cdot 2\sqrt{3}$

$15\sqrt{3} + 8\sqrt{3}$

$23\sqrt{3}$

39.84

5. $(4\sqrt{6} - 6\sqrt{2})(4\sqrt{6} - 6\sqrt{2})$

$= 16 \cdot 6 - 24\sqrt{12} - 24\sqrt{2} + 36 \cdot 2$

$= 96 - 48\sqrt{12} + 72$

$= 168 - 48\sqrt{4}\sqrt{3}$

$= 168 - 96\sqrt{3} \approx 1.72$

6a) $\frac{72}{\sqrt{2}\sqrt{2}} = \frac{72\sqrt{2}}{2} = 36\sqrt{2}$

b) $\sqrt[3]{\frac{3}{y^2}} = \frac{\sqrt[3]{3}\sqrt[3]{y}}{\sqrt[3]{y^2}\sqrt[3]{y}} = \frac{\sqrt[3]{3y}}{y}$

7. $\frac{\sqrt{27}}{(3\sqrt{3} - 2\sqrt{6})}(3\sqrt{3} + 2\sqrt{6})$

$\frac{3\sqrt{81} + 2\sqrt{162}}{9 \cdot 3 - 4 \cdot 6}$

$\frac{3 \cdot 9 + 2\sqrt{81}\sqrt{2}}{27 - 24}$

$\frac{27 + 18\sqrt{2}}{3} = 9 + 6\sqrt{2}$

8a) $25^{3/2}$

$(\sqrt{25})^3$

5^3

125

b) $9^{-3/2}$

$(\sqrt{9})^{-3}$

3^{-3}

$\frac{1}{27}$

c) $(-32)^{4/5}$

$(\sqrt[5]{-32})^4$

$(-2)^4$

16

9a) $-16^{3/2}$

$-(\sqrt{16})^3$

-4^3

-64

b) $(-16)^{3/2}$

$(\sqrt{-16})^3$

No Real

c) $\left(\frac{27}{64}\right)^{-2/3} = \left(\sqrt[3]{\frac{27}{64}}\right)^{-2} = \left(\frac{3}{4}\right)^{-2} = \left(\frac{4}{3}\right)^2 = \frac{16}{9}$

10. $\left(\sqrt[3]{2x-5}\right)^3 = 5^3$

$2x - 5 = 125$

$2x = 130$

$x = 65$

11. $\left(\sqrt{x+3}\right)^2 = (x-3)^2$

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

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

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

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

$x = 6 \quad x \neq 1$

12. $|2x-7| \leq 15$ Between.

$2x - 7 = 15 \qquad 2x - 7 = -15$

$+7 \quad +7 \qquad +7 \quad +7$

$2x = 22 \qquad 2x = -8$

$x = 11 \qquad x = -4$

$(-4, 11)$

13a) $|2x-7| < -15$

No Solution

b) $|2x-7| > -15$

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

14. $|2 - 3x| \geq 10$ EXTREMES

$2 - 3x = 10 \qquad 2 - 3x = -10$

$-2 \quad -2 \qquad -2 \quad -2$

$-3x = 8 \qquad -3x = -12$

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

$(-\infty, -8/3] \cup [4, \infty)$

15. $(x-2)^2 = 20$

$x - 2 = \pm\sqrt{20}$

$x = 2 \pm \sqrt{20}$

$x = 2 \pm 2\sqrt{5}$

16. $3x^2 - 11x - 4 = 0$

$(3x+1)(x-4) = 0$

$3x = -1 \quad x = 4$

$x = -1/3$

Also use calculator – 2nd POLY

17. $x(x+6) = -25$

$x^2 + 6x + 25 = 0$

$a = 1 \quad b = 6 \quad c = 25$

$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$

$x = \frac{-6 \pm \sqrt{36 - 4(1)(25)}}{2(1)}$

$= \frac{-6 \pm \sqrt{-64}}{2}$

$= \frac{-6 \pm 8i}{2} = -3 \pm 4i$

Also use calculator 2nd POLY

$(3, 4)$

$(3, -4)$ means $3 \pm 4i$

18. $x^2 = 4(x+2)$

$x^2 = 4x + 8$

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

$a = 1 \quad b = -4 \quad c = -8$

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

$= \frac{4 \pm \sqrt{48}}{2}$

$= \frac{4 \pm 4\sqrt{3}}{2}$

$= \frac{4(1 \pm \sqrt{3})}{2}$

$= 2(1 \pm \sqrt{3})$

or $2 \pm 2\sqrt{3}$

[2nd POLY gives only decimal approx.]

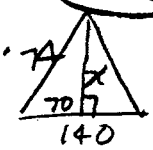
19. $7^2 + 24^2 = x^2$

$49 + 576 = x^2$

$x^2 = 625$

$x = \pm 25$

$x = 25$

21. 

$x^2 + 70^2 = 74^2$

$x^2 + 4900 = 5476$

$x^2 = 576$

$x = 24$ cm.

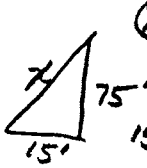
20. $x^2 + 12^2 = 20^2$

$x^2 + 144 = 400$

$x^2 = 256$

$x = \pm 16$

$x = 16$

22. 

$15^2 + 75^2 = x^2$

$225 + 5625 = x^2$

$x^2 = 5850$

$x = \sqrt{5850}$

$= 76.49$ ft