INTERMEDIATE ALGEBRA EXAM 3 GR NAME ______________________

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

In 1-8, simplify completely:

1a) $\sqrt{4X^6Y^{16}}$ 2a) $\sqrt{80}$ 3a) $\sqrt{72X^5Y}$

b) $\sqrt[4]{16a^8}$ b) $\sqrt[3]{72}$ b) $\sqrt[3]{80X^6Y^{11}}$

4. $\dfrac{\sqrt{27} + \sqrt{18}}{12}$ 5. $(6\sqrt{2} - 2\sqrt{6})^2$

4. Decimal approx ______________ 5. Decimal approx: ______________

In 6 - 7, rationalize the denominators:

6. $\dfrac{\sqrt{6}}{\sqrt{6} - \sqrt{3}}$ 7a) $\dfrac{10}{\sqrt{5}}$ b) $\dfrac{10}{\sqrt[3]{5}}$

8. Simplify:

a) $27^{\frac{2}{3}}$ b) $\sqrt{-16}$ c) $-16^{\frac{1}{2}}$ d) $32^{-\frac{3}{5}}$ e) $\sqrt[3]{-27}$

In 9 - 12, solve for X, and give interval notation if appropriate:

9. $|2X + 8| \leq 4$

10a) $|2X + 8| < -4$

b) $|2X + 8| \geq -4$

11. $|X + 2| > 5$

12. $\left|\frac{X + 2}{2}\right| \geq 5$

In 13 - 16, solve for X, check if necessary:

13. $(X - 3)^2 = 5$

14. $3X^2 - 4X + 1 = 0$

15. $2X(2 - X) = 3$

16. $\sqrt{6 - X} = X - 4$

17. Find the length of a rectangle whose width is 8 ft, and whose diagonal is 17 feet.

18. Find the hypotenuse of a right triangle whose legs are 10 cm and 14 cm respectively. (Nearest hundredth, if necessary!)

INTERMEDIATE ALG. EXAM 3 Solutions

1a) $\sqrt{4x^6y^{16}} = 2x^3y^8$

b) $\sqrt[4]{16a^8} = 2a^2$

2a) $\sqrt{80} = \sqrt{16}\cdot\sqrt{5} = 4\sqrt{5}$

b) $\sqrt[3]{72} = \sqrt[3]{8}\sqrt[3]{9} = 2\sqrt[3]{9}$

3a) $\sqrt{72x^5y} = \sqrt{36x^4}\sqrt{2xy} = 6x^2\sqrt{2xy}$

b) $\sqrt[3]{80x^6y^{11}} = \sqrt[3]{8x^6y^9}\sqrt[3]{10y^2} = 2x^2y^3\sqrt[3]{10y^2}$

4. $\dfrac{\sqrt{27}+\sqrt{18}}{12} = \dfrac{3\sqrt{3}+3\sqrt{2}}{12} = \dfrac{3(\sqrt{3}+\sqrt{2})}{12} = \dfrac{\sqrt{3}+\sqrt{2}}{4}$

5. $(6\sqrt{2}-2\sqrt{6})^2 = 36\cdot 2 - 24\sqrt{12} + 4\cdot 6 = 72 - 24\cdot 2\sqrt{3} + 24 = 96 - 48\sqrt{3}$

6. $\dfrac{\sqrt{6}\,(\sqrt{6}+\sqrt{3})}{(\sqrt{6}-\sqrt{3})(\sqrt{6}+\sqrt{3})} = \dfrac{6+\sqrt{18}}{6-3} = \dfrac{6+3\sqrt{2}}{3} = \dfrac{\cancel{3}(2+\sqrt{2})}{\cancel{3}} = 2+\sqrt{2}$

7a) $\dfrac{10}{\sqrt{5}}\cdot\dfrac{\sqrt{5}}{\sqrt{5}} = \dfrac{10\sqrt{5}}{5} = 2\sqrt{5}$

b) $\dfrac{10}{\sqrt[3]{5}}\cdot\dfrac{\sqrt[3]{25}}{\sqrt[3]{25}} = \dfrac{10\sqrt[3]{25}}{5} = 2\sqrt[3]{25}$

8a) $27^{2/3} = (\sqrt[3]{27})^2 = 3^2 = 9$

b) $(-16)^{1/2} = \sqrt{-16} =$ No Real (or $4i$)

c) $-16^{1/2} = -\sqrt{16} = -4$

d) $(-32)^{-3/5} = (\sqrt[5]{-32})^{-3} = (-2)^{-3} = \dfrac{1}{(-2)^3} = -\dfrac{1}{8}$ or -0.125

e) $(-8)^{-4/3} = (\sqrt[3]{-8})^{-4} = (-2)^{-4} = \dfrac{1}{(-2)^4} = \dfrac{1}{16}$ or 0.0625

9. $|2x+8| \le 4$

Betweenness

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

$2x=-4$ $2x=-12$

$x=-2$ $x=-6$

$[-6,-2]$

10a) $|2x+8| < -4$ No SOLUTION

b) $|2x+8| \ge -4$ ALL REALS or $(-\infty,\infty)$

11. $|x+2| > 5$

EXTREMES

$x+2=5$ $x+2=-5$

$x=3$ $x=-7$

$(-\infty,-7)\cup(3,\infty)$

12. $\left|\dfrac{x+2}{2}\right| \ge 5$ EXTR.

$\dfrac{x+2}{2} = \dfrac{5}{1}$ $\dfrac{x+2}{2} = \dfrac{-5}{1}$

$x+2=10$ $x+2=-10$

$x=8$ $x=-12$

$(-\infty,-12]\cup[8,\infty)$

13. $(x-3)^2 = 5$

$x-3 = \pm\sqrt{5}$

$x = 3\pm\sqrt{5}$

14. $3x^2-4x+1=0$

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

$3x=1$ $x=1$

$x=1/3$ $x=1$

15. $2x(2-x) = 3$

$4x-2x^2-3=0$

$2x^2-4x+3=0$

$a=2$ $b=-4$ $c=3$

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

$= \dfrac{4\pm\sqrt{16-\overbrace{4(2)(3)}^{24}}}{2(2)}$

$= \dfrac{4\pm\sqrt{-8}}{4}$ $\sqrt{-8} = \sqrt{-4}\sqrt{2}$

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

$= \dfrac{\cancel{2}(2\pm i\sqrt{2})}{\cancel{4}\,2} = \dfrac{2\pm i\sqrt{2}}{2}$

16. $(\sqrt{6-x})^2 = (x-4)^2$

$6-x = x^2-8x+16$

$-6+x \qquad +x-6$

$0 = x^2-7x+10$

$0 = (x-5)(x-2)$

$x=5$ $\cancel{x=2}$

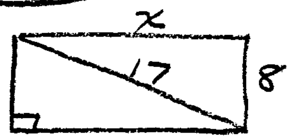
Ch $x=5$: $\sqrt{6-5} = 5-4$

$\sqrt{1} = 1$

Ch: $x=2$: $\sqrt{6-2} = 2-4$

$\sqrt{4} = -2$ No!

17.



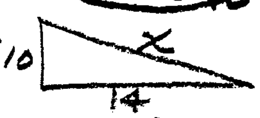
$x^2+8^2=17^2$

$x^2+64=289$

$x^2=225$

$x=15$ ft.

18.



$10^2+14^2=x^2$

$100+196=x^2$

$x^2=296$

$x=\pm\sqrt{296} = 17.20$ cm.

(Reject $x=-\sqrt{296}$)