

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)  $\sqrt{64X^6}$

2a)  $\sqrt{180}$

3a)  $\sqrt{108X^6Y^5}$

b)  $\sqrt[3]{8a^9b^6}$

b)  $\sqrt[3]{270}$

b)  $\sqrt[3]{108X^5Y^{19}}$

In 4 - 5, give A) simplest radical form;

B) calculator value (nearest hundredth).

4.  $2\sqrt{63} + 5\sqrt{175}$

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

In 6 - 7, rationalize the denominators:

6.  $\frac{\sqrt{6}}{\sqrt{6} - 2\sqrt{2}}$

7.  $\frac{12}{\sqrt[3]{4}}$

In 8 - 9, simplify:

8a)  $16^{\frac{3}{4}}$

b)  $81^{-\frac{3}{4}}$

c)  $(-125)^{\frac{2}{3}}$

9a)  $-16^{\frac{3}{2}}$

b)  $(-16)^{\frac{3}{2}}$

c)  $\left(\frac{4}{9}\right)^{-\frac{3}{2}}$

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

10.  $\sqrt{5X + 4} = 7$

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

In 12 - 14, solve the inequalities. Give interval notation:

12.  $|2X + 10| \leq 6$

13a)  $|2X - 10| > -4$

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

14.  $|4 - 3X| \geq 4$

In 15 - 18, solve for X (use "i" if necessary):

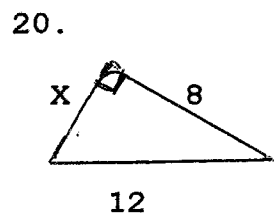
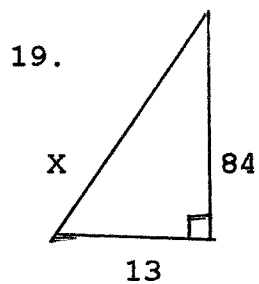
15.  $(X + 2)^2 = 6$

16.  $2X^2 - 9X + 10 = 0$

17.  $X(X + 2) = -5$

18.  $X^2 - 3X - 7 = 0$

In 19 - 20, find X:



21. An isosceles triangle has base that is 24 cm and height 9 cm. How long are the equal sides?

INTERMEDIATE ALGEBRA EXAM 3D\*\* Solutions

1a)  $\sqrt{64 \times 6} = (8\sqrt{6})$  2a)  $\sqrt{180} = \sqrt{36 \times 5} = 6\sqrt{5}$  3a)  $\sqrt{108x^6y^5} = \sqrt{36 \times 3 \times y^4} \sqrt{3y} = 6x^3y^2\sqrt{3y}$

b)  $\sqrt[3]{8a^9b^6} = (2a^3b^2)$

b)  $\sqrt[3]{270} = \sqrt[3]{27 \cdot 10} = 3\sqrt[3]{10}$

b)  $\sqrt[3]{108x^6y^9} = \sqrt[3]{27 \times 4 \times x^6 \times y^9} = 3xy^3\sqrt[3]{4x^2y}$

4.  $2\sqrt{63} + 5\sqrt{175}$   
 $= 2 \cdot \sqrt{9 \cdot 7} + 5\sqrt{25 \cdot 7}$   
 $= 2 \cdot 3\sqrt{7} + 5 \cdot 5\sqrt{7}$   
 $= 6\sqrt{7} + 25\sqrt{7}$   
 $= (31\sqrt{7}) \text{ or } 82.02$

5.  $(4\sqrt{2} - 2\sqrt{6})(4\sqrt{2} - 2\sqrt{6})$   
 $= 16 \cdot 2 - 8\sqrt{2} \cdot 2\sqrt{6} - 8\sqrt{2} \cdot 2\sqrt{6} + 4 \cdot 6$   
 $= 32 - 16\sqrt{12} + 24$   
 $= 56 - 16 \cdot 2\sqrt{3}$   
 $= (56 - 32\sqrt{3}) \text{ or } 0.57$

6.  $\frac{\sqrt{6}(\sqrt{6} + 2\sqrt{2})}{(\sqrt{6} - 2\sqrt{2})(\sqrt{6} + 2\sqrt{2})}$   
 $= \frac{6 + 2\sqrt{12}}{6 - 4 \cdot 2} = \frac{6 + 2 \cdot 2\sqrt{3}}{-2}$   
 $= \frac{2(3 + 2\sqrt{3})}{-2} = -(3 + 2\sqrt{3})$

7.  $\frac{12\sqrt[3]{2}}{\sqrt[3]{4}\sqrt[3]{2}} = \frac{12\sqrt[3]{2}}{2} = 6\sqrt[3]{2}$

8a)  $16^{3/4} = (\sqrt[4]{16})^3 = 2^3 = 8$   
 a)  $81^{-3/4} = (\sqrt[4]{81})^{-3} = 3^{-3} = \frac{1}{27}$   
 c)  $(-125)^{2/3} = (\sqrt[3]{-125})^2 = (-5)^2 = 25$

10.  $(\sqrt{5x+4})^2 = 7^2$   
 $5x+4=49$   
 $5x=45$   
 $x=9$   
 Check:  $\sqrt{49}=7$  Yes

11.  $(\sqrt{6-x})(x-4)^2$   
 $6-x = x^2 - 8x + 16$   
 $0 = x^2 - 7x + 10$   
 $(x-5)(x-2) = 0$   
 $x=5$  or  $x=2$   
 Check:  $\sqrt{1} = 1$  Yes;  $\sqrt{4} = 2$  Reject

9a)  $-16^{3/2} = -(\sqrt{16})^3 = -4^3 = -64$   
 b)  $(-16)^{3/2} = (\sqrt{-16})^3$  No real  
 c)  $(\frac{4}{9})^{-3/2} = (\sqrt{\frac{4}{9}})^{-3} = (\frac{2}{3})^{-3} = (\frac{3}{2})^3 = \frac{27}{8}$

12.  $|2x+10| \leq 6$   
 Betweenness  
 $2x+10=6$   $2x+10=-6$   
 $2x=-4$   $2x=-16$   
 $x=-2$   $x=-8$   
 $[-8, -2]$

13a)  $|2x-10| > -4$   
 All Reals  $(-\infty, \infty)$   
 b)  $|2x-10| < -4$   
 No Solution

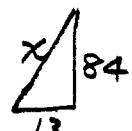
14.  $|4-3x| \geq 4$   
 EXTREMES.  
 $4-3x=4$   $4-3x=-4$   
 $-3x=0$   $-3x=-8$   
 $x=0$   $x=8/3$   
 $(-\infty, 0] \cup [8/3, \infty)$

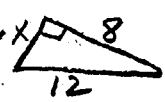
15.  $(x+2)^2 = 6$   
 $x+2 = \pm\sqrt{6}$   
 $x = -2 \pm \sqrt{6}$

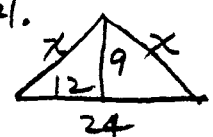
16.  $2x^2 - 9x + 10 = 0$   
 $(2x-5)(x-2) = 0$   
 $x = 5/2$   $x = 2$

17.  $x(x+2) = -5$   
 $x^2 + 2x + 5 = 0$   
 $a=1$   $b=2$   $c=5$   
 $x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$   
 $= \frac{-2 \pm \sqrt{4 - 4 \cdot 1 \cdot 5}}{2}$   
 $= \frac{-2 \pm \sqrt{-16}}{2}$   
 $= \frac{-2 \pm 4i}{2} = -1 \pm 2i$

18.  $x^2 - 3x - 7 = 0$   
 $a=1$   $b=-3$   $c=-7$   
 $x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$   
 $= \frac{3 \pm \sqrt{9 - 4(1)(-7)}}{2}$   
 $= \frac{3 \pm \sqrt{9 + 28}}{2}$   
 $= \frac{3 \pm \sqrt{37}}{2}$

19.   
 $13^2 + 84^2 = x^2$   
 $169 + 7056 = x^2$   
 $7225 = x^2$   
 $x = \pm\sqrt{7225}$   
 $x = \pm 85$   
 $x = 85$

20.   
 $x^2 + 8^2 = 12^2$   
 $x^2 + 64 = 144$   
 $x^2 = 80$   
 $x = \pm\sqrt{80}$   
 $x = 4\sqrt{5}$   
 or 8.94

21.   
 $12^2 + 9^2 = x^2$   
 $144 + 81 = x^2$   
 $225 = x^2$   
 $x = \pm 15$   
 $x = 15 \text{ cm.}$