

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)  $\sqrt{25x^4y^8}$

2a)  $\sqrt{72}$

3a)  $\sqrt{50a^4b^5}$

b)  $\sqrt[4]{81x^{12}}$

b)  $\sqrt[3]{72}$

b)  $\sqrt[3]{54a^4b^{11}}$

In 4 - 5, give a) the simplified radical form, and  
 b) the decimal approximation (nearest hundredth!)

4.  $5\sqrt[3]{24} + 6\sqrt[3]{375}$

5.  $(3\sqrt{6} - 4\sqrt{3})^2$

a)

a)

b)

b)

In 6 - 7, rationalize the denominators:

6.  $\frac{\sqrt{75}}{6 + \sqrt{3}}$

7a)  $\frac{15}{\sqrt{18}}$

b)  $\frac{15}{\sqrt[3]{9}}$

8. Simplify (express all decimals as fractions):

a)  $144^{\frac{1}{2}}$     b)  $-125^{\frac{2}{3}}$     c)  $(-125)^{\frac{2}{3}}$     d)  $32^{-\frac{4}{5}}$     e)  $(-4)^{\frac{3}{2}}$

In 9 - 10, solve for x. Check answers.

9.  $\sqrt[3]{x-4} = 4$

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

In 11 - 14, solve for x, and give interval notation if appropriate:

11.  $|3x-8| \leq 4$

12a)  $|3x-8| < -4$

b)  $|3x-8| \geq -4$

13.  $|x-7| > 3$

14.  $\left| \frac{x-4}{4} \right| \geq 4$

In 15 - 17, solve using complex numbers and radicals if necessary:

15.  $(x - 2)^2 = 40$

16.  $x^2 - 4x - 5 = 0$

17.  $x^2 - 4x + 5 = 0$

18.  $2x(x - 5) = -9$

19. Find the diagonal of a rectangle whose width is 8 ft, and whose length is 15 feet.

20. Find the height of an isosceles triangle whose base is 24 cm. and whose equal sides are 50 cm. (Nearest hundredth, if necessary!)

INTER ALG EXAM 3V Solutions

1a)  $\sqrt{25 \times 49} = 5 \times 7 = 35$   
 b)  $\sqrt[4]{81 \times 12} = 3 \times 3 = 9$   
 2a)  $\sqrt{72} = 6\sqrt{2}$   
 b)  $\sqrt[3]{72} = 2\sqrt[3]{9}$   
 3a)  $\sqrt{50a^2b^5} = 5a\sqrt{2b^5}$   
 b)  $\sqrt[3]{54a^4b^{11}} = 3ab\sqrt[3]{2a^4b^2}$

4a)  $5\sqrt[3]{24} + 6\sqrt[3]{375}$   
 $5\sqrt[3]{8 \cdot 3} + 6\sqrt[3]{125 \cdot 3}$   
 $5 \cdot 2\sqrt[3]{3} + 6 \cdot 5\sqrt[3]{3}$   
 $10\sqrt[3]{3} + 30\sqrt[3]{3}$   
 $40\sqrt[3]{3}$   
 b) 57.69  
 5a)  $(3\sqrt{6} - 4\sqrt{3})(3\sqrt{6} - 4\sqrt{3})$   
 $9 \cdot 6 - 12\sqrt{18} - 12\sqrt{18} + 16 \cdot 3$   
 $54 - 24\sqrt{18} + 48$   
 $102 - 24\sqrt{9 \cdot 2}$   
 $102 - 72\sqrt{2}$   
 b) 0.18  
 6.  $\frac{\sqrt{75}}{(6+\sqrt{3})}$   
 $\frac{5\sqrt{3}(6-\sqrt{3})}{(6+\sqrt{3})(6-\sqrt{3})}$   
 $\frac{30\sqrt{3} - 5 \cdot 3}{36 - 3}$   
 $\frac{3(10\sqrt{3} - 5)}{33}$   
 $\frac{10\sqrt{3} - 5}{11}$   
 or  $\frac{5(2\sqrt{3} - 1)}{11}$

7a)  $\frac{15}{\sqrt{18}}$   
 $\frac{5 \cdot 3}{3\sqrt{2 \cdot 2}}$   
 $\frac{5\sqrt{2}}{2}$   
 b)  $\frac{15\sqrt[3]{3}}{39\sqrt[3]{3}}$   
 $\frac{15\sqrt[3]{3}}{3\sqrt[3]{27}}$   
 $\frac{15\sqrt[3]{3}}{3 \cdot 3}$   
 $\frac{5\sqrt[3]{3}}{3}$   
 8a)  $144^{1/2} = \sqrt{144} = 12$   
 b)  $-125^{2/3} = -(\sqrt[3]{125})^2$   
 $= -5^2 = -25$   
 c)  $(-125)^{2/3} = (\sqrt[3]{-125})^2$   
 $= (-5)^2 = 25$   
 d)  $32^{-4/5} = (\sqrt[5]{32})^{-4}$   
 $= 2^{-4} = \frac{1}{16}$   
 e)  $(-4)^{1/2} = \sqrt{-4}$  No Real  
 9.  $(\sqrt[3]{x-4})^3 = 4^3$   
 $x-4 = 64$   
 $x = 68$   
 10.  $(\sqrt{2x+3})^2 = (2x-3)^2$   
 $2x+3 = 4x^2 - 12x + 9$   
 $-2x-3 = -2x-3$   
 $0 = 4x^2 - 14x + 6$   
 $0 = 2(2x^2 - 7x + 3)$   
 $2(2x-1)(x-3)$   
 $x = \frac{1}{2}$  or  $x = 3$   
 $x = \frac{1}{2}: \sqrt{1+3} = 1-3$  Reject.  
 $x = 3: \sqrt{6+3} = 6-3$  Yes.

11.  $|3x-8| \leq 4$   
 Betweenness  
 $3x-8 = 4$     $3x-8 = -4$   
 $+8$     $+8$   
 $3x = 12$     $3x = 4$   
 $x = 4$     $x = 4/3$   
 $\left[\frac{4}{3}, 4\right]$

12a)  $|3x-8| < -4$   
 No Solution  
 b)  $|3x-8| \geq -4$   
 $(-\infty, \infty)$   
 13.  $|x-7| > 3$   
 EXTREMES!  
 $x-7 = 3$     $x-7 = -3$   
 $x = 10$     $x = 4$   
 $(-\infty, 4) \cup (10, \infty)$   
 14.  $\left|\frac{x-4}{4}\right| \geq 4$   
 EXTREMES!  
 $\frac{x-4}{4} = 4$     $\frac{x-4}{4} = -4$   
 $x-4 = 16$     $x-4 = -16$   
 $x = 20$     $x = -12$   
 $(-\infty, -12] \cup [20, \infty)$

15.  $(x-2)^2 = 40$   
 $x-2 = \pm\sqrt{40}$   
 $x-2 = \pm 2\sqrt{10}$   
 $x = 2 \pm 2\sqrt{10}$

16.  $x^2 - 4x - 5 = 0$   
 $(x-5)(x+1) = 0$   
 $x = 5$     $x = -1$

17.  $x^2 - 4x + 5 = 0$   
 Does NOT factor!  
 $a=1$     $b=-4$     $c=5$   
 $x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$   
 $= \frac{4 \pm \sqrt{16 - 4(1)(5)}}{2}$   
 $= \frac{4 \pm \sqrt{-4}}{2}$   
 $= \frac{4 \pm 2i}{2}$   
 $= \frac{2(2 \pm i)}{2}$   
 $= 2 \pm i$

18.  $2x(x-5) = -9$   
 $2x^2 - 10x + 9 = 0$   
 $a=2$     $b=-10$     $c=9$   
 $x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$   
 $= \frac{10 \pm \sqrt{100 - 4(2)(9)}}{2(2)}$   
 $= \frac{10 \pm \sqrt{100 - 72}}{4}$   
 $= \frac{10 \pm \sqrt{28}}{4}$   
 $= \frac{10 \pm 2\sqrt{7}}{4}$   
 $= \frac{2(5 \pm \sqrt{7})}{4} = \frac{5 \pm \sqrt{7}}{2}$

