

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

In 1-8, simplify completely:

1a) $\sqrt{16x^4y^8}$

2a) $\sqrt{72}$

3a) $\sqrt{98x^6y^5}$

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

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

b) $\sqrt[4]{80x^6y^{11}}$

In 4-6, a) simplify the radicals and

b) find the decimal approximation (nearest hundredth)

4. $6\sqrt[3]{75} \cdot 4\sqrt[3]{10}$

5. $\frac{\sqrt{54} + \sqrt{18}}{9}$

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

a)

b)

In 7 - 9, rationalize the denominators and simplify:

7. $\frac{\sqrt{8}}{3\sqrt{2} + 4}$

8. $\frac{10}{\sqrt{5}}$

9. $\frac{10}{\sqrt[3]{5}}$

10. Simplify:

a) $16^{\frac{1}{2}}$ b) $32^{\frac{3}{5}}$ c) $9^{-\frac{3}{2}}$ d) $-125^{\frac{2}{3}}$ e) $(-125)^{\frac{2}{3}}$

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

11. $|2x - 6| < 4$

12a) $|2x - 6| < -4$

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

13. $|3x - 2| \geq 7$

14. $\left| \frac{x - 3}{3} \right| > 5$

In 15 - 20, solve for x , check if necessary:

15. $x^2 - 5x = 6$

16. $x^2 + 5x + 2 = 0$

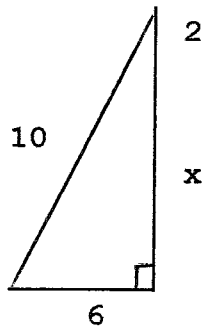
17. $(x - 7)^2 = 20$

18. $5x^2 - 4x + 1 = 0$

19. $2x(2 - x) = 3$

20. $\sqrt{6 - x} = x - 4$

21. Find x :



22. Find the length of a rectangle whose diagonal is 73 feet and whose width is 48 feet

23. An isosceles triangle is of height 18 m. with base 24 m. Find the length of the equal sides. (Nearest hundredth, if necessary!)

INTER. ALG EXAM 3 U Solutions.

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

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

3a) $\sqrt{98x^6y^5} = \sqrt{49 \cdot 2 \cdot x^4 \cdot y^4 \cdot y} = 7x^2y^2\sqrt{2y}$

4) $\sqrt[4]{80x^6y^{11}} = \sqrt[4]{16x^4y^8 \cdot 5x^2y^3} = 2xy^2\sqrt[4]{5x^2y^3}$

b) $\sqrt[3]{27x^{27}} = 3x^9$

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

4a) $6\sqrt[3]{75} \cdot 4\sqrt[3]{10} = 24\sqrt[3]{3 \cdot 5^2 \cdot 5 \cdot 2} = 24\sqrt[3]{5^3 \cdot 6} = 24 \cdot 5 \sqrt[3]{6} = 120\sqrt[3]{6}$

b) 218.05

5. $\frac{\sqrt{9} + \sqrt{18}}{9} = \frac{\sqrt{9}\sqrt{1} + \sqrt{9}\sqrt{2}}{9} = \frac{3\sqrt{1} + 3\sqrt{2}}{9} = \frac{3(\sqrt{1} + \sqrt{2})}{9} = \frac{(\sqrt{1} + \sqrt{2})}{3} = 1.29$

$\frac{(\sqrt{6} + \sqrt{2})}{3} = 1.29$

6. $(6\sqrt{3} + 3\sqrt{6})(6\sqrt{3} + 3\sqrt{6}) = 36 \cdot 3 + 18\sqrt{18} + 18\sqrt{18} + 9 \cdot 6 = 108 + 36\sqrt{18} + 54 = 162 + 36\sqrt{9 \cdot 2} = 162 + 36 \cdot 3\sqrt{2} = 162 + 108\sqrt{2} = 314.74$

7. $\frac{\sqrt{8}(3\sqrt{2}-4)}{(3\sqrt{2}+4)(3\sqrt{2}-4)} = \frac{3\sqrt{16} - 4\sqrt{8}}{9 \cdot 2 - 16} = \frac{3 \cdot 4 - 4 \cdot 2\sqrt{2}}{18 - 16} = \frac{12 - 8\sqrt{2}}{2} = 6 - 4\sqrt{2}$

$\frac{12 - 8\sqrt{2}}{2} = 6 - 4\sqrt{2}$

8. $\frac{10\sqrt{5}}{\sqrt{5}\sqrt{5}} = \frac{10\sqrt{5}}{5} = 2\sqrt{5}$

9. $\frac{10\sqrt[3]{25}}{\sqrt[3]{5}\sqrt[3]{25}} = \frac{10\sqrt[3]{25}}{\sqrt[3]{125}} = \frac{10\sqrt[3]{25}}{5} = 2\sqrt[3]{25}$

10a) $16^{1/2} = \sqrt{16} = 4$

b) $32^{3/5} = (\sqrt[5]{32})^3 = 2^3 = 8$

c) $9^{-3/2} = (\sqrt{9})^{-3} = 3^{-3} = \frac{1}{27}$

d) $-125^{2/3} = -(\sqrt[3]{125})^2 = -5^2 = -25$

e) $(-125)^{2/3} = (\sqrt[3]{-125})^2 = (-5)^2 = 25$

11. $|2x-6| < 4$
Betweenness!

$2x-6=4 \Rightarrow 2x=10 \Rightarrow x=5$
 $2x-6=-4 \Rightarrow 2x=2 \Rightarrow x=1$

$(1, 5)$

12a) $|2x-6| < -4$ No Sol.

b) $|2x-6| \geq -4$ All Reals.
 $(-\infty, \infty)$

13. $|3x-2| \geq 7$
EXTREMES.

Endpts: $3x-2=7 \Rightarrow 3x=9 \Rightarrow x=3$
 $3x-2=-7 \Rightarrow 3x=-5 \Rightarrow x=-5/3$

$(-\infty, -5/3] \cup [3, \infty)$

14. $|\frac{x-3}{3}| \geq 5$
EXTREMES.

$\frac{x-3}{3} = 5 \Rightarrow x-3=15 \Rightarrow x=18$
 $\frac{x-3}{3} = -5 \Rightarrow x-3=-15 \Rightarrow x=-12$

$(-\infty, -12) \cup (18, \infty)$

15. $x^2 - 5x = 6$
 $x^2 - 5x - 6 = 0$
 $(x-6)(x+1) = 0$
 $x=6 \quad x=-1$

16. $x^2 + 5x + 2 = 0$
 $a=1 \quad b=5 \quad c=2$
 $x = \frac{-5 \pm \sqrt{25-4(1)(2)}}{2(1)} = \frac{-5 \pm \sqrt{17}}{2}$

17. $(x-7)^2 = 20$
 $x-7 = \pm\sqrt{20} = \pm 2\sqrt{5}$
 $x = 7 \pm 2\sqrt{5}$

18. $5x^2 - 4x + 1 = 0$
 $a=5 \quad b=-4 \quad c=1$
 $x = \frac{4 \pm \sqrt{16-4(5)(1)}}{2(5)} = \frac{4 \pm \sqrt{4}}{10} = \frac{4 \pm 2i}{10} = \frac{2 \pm i}{5}$

19. $2x(2-x) = 3$
 $4x - 2x^2 = 3$
 $0 = 2x^2 - 4x + 3$
 $a=2 \quad b=-4 \quad c=3$
 $x = \frac{4 \pm \sqrt{16-4(2)(3)}}{2(2)} = \frac{4 \pm \sqrt{-8}}{4} = \frac{4 \pm 2i\sqrt{2}}{4} = \frac{2 \pm i\sqrt{2}}{2}$

20. $(\sqrt{6-x}) = (x-4)^2$
 $6-x = x^2 - 8x + 16$
 $-6+x = x^2 - 8x + 16$
 $0 = x^2 - 7x + 10$
 $0 = (x-5)(x-2)$
 $x=5 \quad x=2$
Reject $x=2$

21. $6^2 + x^2 = 10^2 \Rightarrow 36 + x^2 = 100 \Rightarrow x^2 = 64 \Rightarrow x = 8$

22. $x^2 + 48^2 = 73^2$
 $x^2 + 2304 = 5329$
 $x^2 = 3025$
 $x = \sqrt{3025} = 55$

23. $12^2 + 18^2 = x^2$
 $144 + 324 = x^2$
 $x^2 = 468$
 $x = \sqrt{468} = 21.634$