INTERMEDIATE ALGEBRA EXAM 4 A* 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 - 6, solve the equations by the method of your choice:

1. $|2X - 3| = 7$

2. $|2X - 3| = -7$

3. $X^2 + 8X = 20$

4. $X^2 + 8X = -20$

5. $(X + 5)^2 = 2$

6. $(X + 5)(X - 1) = 2$

In 7 - 13, solve the inequalities. Give interval notation:

7. $|2X + 5| < 5$

8. $|2X + 5| > -5$

9. $|2X + 5| \geq 15$

10. $|6 - 3X| \leq 15$

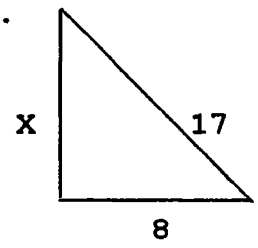
11. $X^2 - X - 12 \leq 0$

12. $X^2 - X - 12 > 0$

In 14 - 15, find X:

13. $4 - X^2 \geq 3X$

14.



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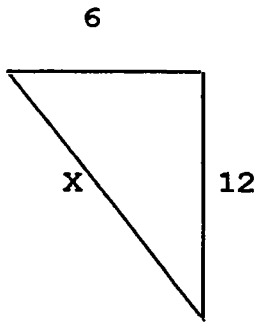


16. The area of a circle is 500 square centimeters. Find the radius of the circle. Use $\pi=3.14$ (or calculator value), and round to nearest hundredth.

17. The area of a triangle is 20 square cm. The base is 3 less than the height. Give the equation, the base, and height.

18. The longer leg of a right triangle is 1 less than twice the shorter leg, and the hypotenuse is 1 more than twice the shorter leg. Find the sides of the triangle.

Exam 4A* Solutions

1. $|2x-3|=7$

$2x-3=7 \quad 2x-3=-7$

$2x=10 \quad 2x=-4$

$x=5 \quad x=-2$

2. $|2x-3|=-7$

No Solution

3. $x^2+8x=20$

$x^2+8x-20=0$

$(x+10)(x-2)=0$

$x=-10 \quad x=2$

4. $x^2+8x=-20$

$x^2+8x+20=0$

Does not factor!

$a=1 \quad b=8 \quad c=20$

$x=\frac{-8\pm\sqrt{64-4(1)(20)}}{2(1)}$

$=\frac{-8\pm\sqrt{-16}}{2}$

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

5. $(x+5)^2=2$

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

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

6. $(x+5)(x-1)=2$

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

$x^2+4x-7=0$

$x=\frac{-4\pm\sqrt{16-4(1)(-7)}}{2}$

$=\frac{-4\pm\sqrt{44}}{2}$

$=\frac{-4\pm 2\sqrt{11}}{2}$

$=\frac{2(-2\pm\sqrt{11})}{2}$

$=-2\pm\sqrt{11}$

7. $|2x+5|\leq 5$ Between-ness

Endpts;

$2x+5=5 \quad 2x+5=-5$

$2x=0 \quad 2x=-10$

$x=0 \quad x=-5$

$-5\leq x\leq 0$

$[-5,0]$

(Completing Square somewhat easier!)

8. $|2x+5|>-5$

All Reals

$(-\infty,\infty)$

9. $|2x+5|\geq 15$ EXTR

$2x+5=15$ or $2x+5=-15$

$-5 \quad -5 \quad -5 \quad -5$

$2x=10 \quad 2x=-20$

$x=5 \quad x=-10$

$(-\infty,-10]\cup[5,\infty)$

10. $|6-3x|\leq 15$ BETW

$-15\leq 6-3x\leq 15$

$-6 \quad -6 \quad -6$

$-21\leq -3x\leq 9$

$\frac{}{-3} \quad \frac{}{-3} \quad \frac{}{-3}$

$7\geq x\geq -3$

$[-3,7]$

11. $x^2-x-12\leq 0$ BETW!

$(x-4)(x+3)=0$ endpts.

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

$[-3,4]$

12. $x^2-x-12\geq 0$ EXTREMES!

Same endpts as #11.

$(-\infty,-3)\cup(4,\infty)$

13. $4-x^2\geq 3x$

$-x^2-3x+4\geq 0$

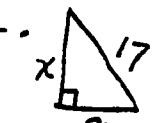
$x^2+3x-4\leq 0$ BETW!

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

$x=-4 \quad x=1$

$[-4,1]$

14.



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

$x^2+64=289$

$x^2=225$

$x=\pm 15$

$x=15$

15.

$6^2+12^2=x^2$

$36+144=x^2$

$x^2=180$

$x=\pm\sqrt{180}$

$x=\sqrt{36}\sqrt{5}$

$x=6\sqrt{5}$

$x\approx 13.42$

16. $A=\pi r^2=500$

$r^2=\frac{500}{\pi}$

$r=\sqrt{\frac{500}{\pi}}$

$r=12.619$ using 3.14

$r=12.616$ using calculator Value.

Either way (in this case)

$r=12.62$ cm

17. Let $x=$ height

$x-3=$ base

$A=\frac{1}{2}bh$

$2\left(\frac{1}{2}x(x-3)\right)=2(20)$

$x^2-3x=40$

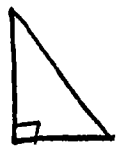
$x^2-3x-40=0$

$(x-8)(x+5)=0$

$x=8$ cm ~~$x=-5$~~

$x-3=5$ cm

18.



Let $x=$ shorter leg.

$2x-1=$ longer leg.

$2x+1=$ hypotenuse

$x^2+(2x-1)^2=(2x+1)^2$

$x^2+4x^2-4x+1=4x^2+4x+1$

$-4x^2-4x+1 \quad -4x^2-4x-1$

$x^2-8x=0$

$x(x-8)=0$

$x=0 \quad x=8$

$x=8$

$2x-1=15$

$2x+1=17$

INTERMEDIATE ALGEBRA EXAM 4B* NAME _____
SHOW ALL WORK ON THIS TEST OR ON SEPARATE PAPER. Circle answers.
TURN IN ALL WORKSHEETS. CALCULATORS ARE RECOMMENDED ON THIS TEST.

In 1 - 6, solve for the equations by the method of your choice.

1. $|3X + 9| = 9$

2. $|3X + 9| = 0$

3. $X^2 + 8 = 6X$

4. $6X^2 - X = 35$

5. $(X + 5)(X - 1) = 4$

6. $(X - 5)^2 = 12$

In 7 - 13, solve the inequalities. Give interval notation:

7. $|5X - 10| \leq 10$

8. $|X - 4| < -4$

9. $|5X - 10| > 30$

10. $|6 - 2X| \geq 14$

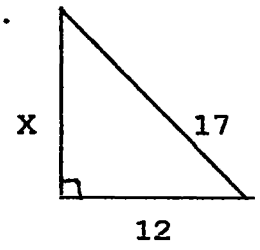
11. $X^2 - 12X + 32 < 0$

12. $X^2 + X - 12 \geq 0$

13. $4 - X^2 \geq -3X$

In 14 - 15, find X:

14.



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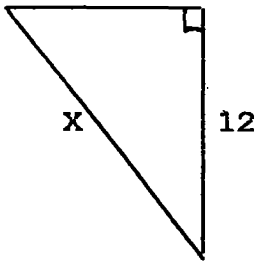
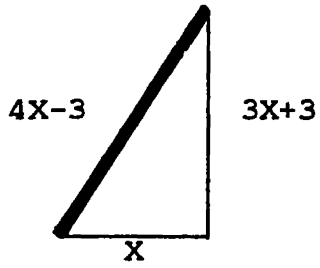


16. Write the equation, solve for X, and find the sides:



17. The area of a rectangle is 20 square cm. The length is 3 more than twice the width. Give the equation and the dimensions.

18. The circumference of a circle is 26π centimeters. Find the radius and area of the circle. Give area in terms of π.

EXAM 4B* Solutions

1. $|3x+9|=9$

$3x+9=9 \quad 3x+9=-9$

$3x=0 \quad 3x=-18$

$x=0 \quad x=-6$

2. $|3x+9|=0$

$3x+9=0$

$3x=-9$

$x=-3$

3. $x^2+8=6x$

$x^2-6x+8=0$

$(x-4)(x-2)=0$

$x=4 \quad x=2$

4. $6x^2-x-35=0$

$(3x+7)(2x-5)=0$

$3x=-7 \quad 2x=5$

$x=-\frac{7}{3} \quad x=\frac{5}{2}$

5. $(x+5)(x-1)=4$

$x^2+4x-5=4$

$x^2+4x-9=0$

(Use quad formula or compl. square)

$x=\frac{-4\pm\sqrt{16-4(1)(-9)}}{2(1)}$

$=\frac{-4\pm\sqrt{52}}{2}$

$=\frac{-4\pm 2\sqrt{13}}{2}$

$=\frac{2(-2\pm\sqrt{13})}{2}=-2\pm\sqrt{13}$

6. $(x-5)^2=12$

$x-5=\pm\sqrt{12}$

$x=5\pm 2\sqrt{3}$

7. $|5x-10|\leq 10$ BETW!

ENDPTS:

$5x-10=10 \quad 5x-10=-10$

$5x=20 \quad 5x=0$

$x=4 \quad x=0$

$0\leq x\leq 4$

$[0,4]$

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

No Solution

9. $|5x-10|>30$ EXTR!

$5x-10=30$ or $5x-10=-30$

$5x=40$ or $5x=-20$

$x=8 \quad x=-4$

$(-\infty,-4)\cup(8,\infty)$

10. $|6-2x|\geq 14$ EXTREMES!

$6-2x=14 \quad 6-2x=-14$

$-2x=8 \quad -2x=-20$

$x=-4 \quad x=10$

$(-\infty,-4]\cup[10,\infty)$

11. $x^2-12x+32<0$ BETW!

$(x-8)(x-4)=0$ Endpts.

$x=8 \quad x=4$

$(4,8)$

12. $x^2+x-12\geq 0$ EXTR!

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

$x=-4 \quad x=3$

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

13. $4-x^2\geq -3x$

$-x^2+3x+4\geq 0$

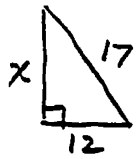
$x^2-3x-4\leq 0$ BETW

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

$x=4 \quad x=-1$

$[-1,4]$

14.



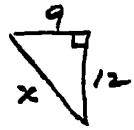
$x^2+12^2=17^2$

$x^2+144=289$

$x^2=145$

$x=\sqrt{145}\approx 12.04$

15.



$9^2+12^2=x^2$

$81+144=x^2$

$225=x^2$

$x^2=225$

$x=15$

16. $x^2+(3x+3)^2=(4x-3)^2$

$x^2+9x^2+18x+9=16x^2-24x+9$

$10x^2+18x+9=16x^2-24x+9$

$-10x^2-18x-9 \quad -10x^2-18x-9$

$0=6x^2-42x$

$0=6x(x-7)$

$x\neq 0 \quad x=7$

$3x+3=24$

$4x-3=25$

17. Let x = width

$2x+3$ = length.

$A=x(2x+3)=20$

$2x^2+3x-20=0$

$(2x-5)(x+4)=0$

$2x=5 \quad x=-4$

$x=5/2$ cm.

$2x+3=8$ cm.

18. $C=2\pi r=26\pi$

$\frac{2\pi r}{2\pi}=\frac{26\pi}{2\pi}$

$r=13$ cm.

$A=\pi r^2=169\pi$ cm^2

Dr. Robert J. Rapalje