8-5-14

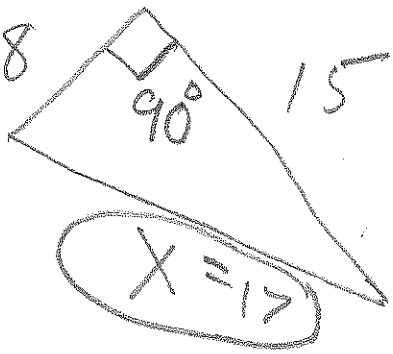
8.6 QUICK GRID PYTHAGOREAN

Ex 1 → 5

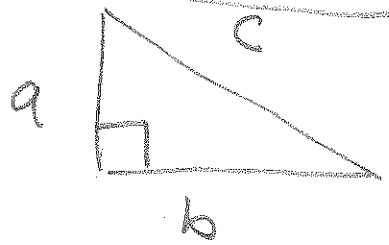
Ex 2 → 7

Ex 3 → 23

(5.)



$c^2 = a^2 + b^2$



$x^2 = 8^2 + 15^2$

$x^2 = 64 + 225$

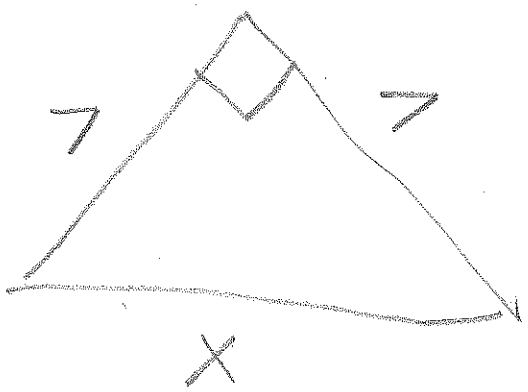
$x^2 = 289$

$\sqrt{x^2} = \sqrt{289}$

$x = 17$

$$\begin{array}{r} 17 \\ \times 17 \\ \hline 119 \\ 17 \\ \hline 289 \end{array}$$

(7)



$x^2 = 7^2 + 7^2$

$x^2 = 49 + 49 = 2 \cdot 49$

$x^2 = 98 \Rightarrow \sqrt{x^2} = \sqrt{98}$

$x = \sqrt{98}$ ← simplify by finding perfect squares under $\sqrt{\ }$.

Guess:
$\sqrt{100} = 10 \Rightarrow x \approx 10$

$\sqrt{98} = \sqrt{2 \cdot 49} = \sqrt{2 \cdot 7^2}$

$= \sqrt{2} \cdot \sqrt{7^2}$

$x = \sqrt{2} \cdot 7$

$x = 7\sqrt{2} \Rightarrow$

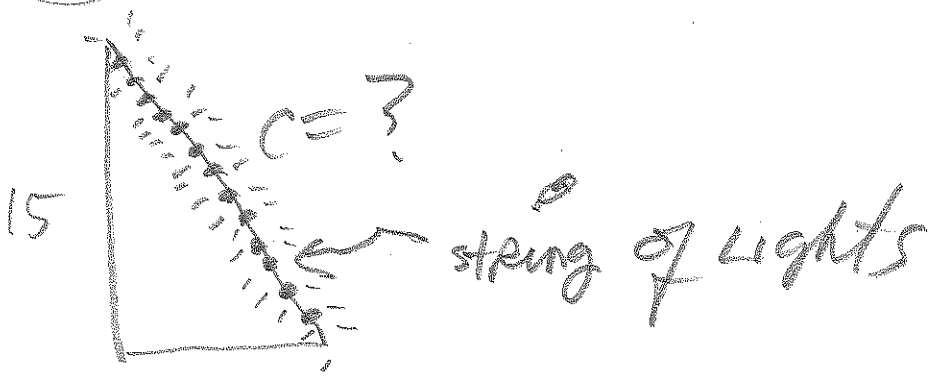
$\sqrt{2} = 1.41$

$\begin{array}{r} 1.41 \\ \times \quad 7 \\ \hline \end{array}$

$x \approx 9.87 \approx 10$

§4.6

23.



$c^2 = 15^2 + 8^2$

$c^2 = 225 + 64$

$c^2 = 289$

$\sqrt{c^2} = \sqrt{289}$

$c = 17, \quad 17^2 = 289$

9.1

example

Ex 1 → 5, 7.

Ex 2 → 11, 13.

Ex 3 → 21, 23, 25

Ex 4 → 35, 37, 39.

$x^2 = p$

$x = \pm\sqrt{p}$

$x = -\sqrt{p}$ OR $x = \sqrt{p}$

$x = -\sqrt{p}, \sqrt{p}$

5)

$t^2 = 81$

$t = -\sqrt{81}$ or $t = \sqrt{81}$

$t = \pm\sqrt{81}$

$\sqrt{81} = 9$ since $9^2 = 81$

(5.)

$t = -9$ or $t = 9$

$t = \pm 9$

$t = -9, 9$

(2.) $x^2 = 1$

$x = \pm\sqrt{1}$

$\sqrt{1} = 1$, reason: $1^2 = 1$

$x = \pm 1$

$x = -1$ or $x = 1$

$x = -1, 1$

9.1

(11.) $10x^2 = 40$

$\frac{10x^2}{10} = \frac{40}{10}$

$x^2 = 4$

$x = \pm\sqrt{4}$

$x = \pm 2$ since $\sqrt{4} = 2$ (since $2^2 = 4$)

$x = -2, 2$

$x = -2, -2$

$x = 2$ OR -2

(13.) $3t^2 = 6$

$\frac{3t^2}{3} = \frac{6}{3}$ ← Isolate t^2 to use the RULE.

$t^2 = 2$ ← RULE.

All Acceptable answers (don't say AND)

$t = \pm\sqrt{2}$

$t = -\sqrt{2}, \sqrt{2}$

$t = -\sqrt{2}$ OR $\sqrt{2}$

$t = \sqrt{2}$ OR $t = -\sqrt{2}$

(21.) $(x-1)^2 = 49$

$X^2 = P$

$(X)^2 = P$

$(X) = \pm\sqrt{P}$

$X = \pm\sqrt{P}$

$(x-1) = \pm\sqrt{49}$

$\sqrt{49} = 7$

$(x-1) = \pm 7$

$x - 1 = \pm 7$ isolate x

$$x - 1 = \pm 7$$

$$+1 \quad +1$$

$$x = 1 \pm 7$$

$$x = 1 + 7 \text{ or } 1 - 7$$

$$x = 8 \text{ or } -6$$

23.

$$(t+6)^2 = 4$$

$$(t+6) = \pm\sqrt{4}$$

$$(t+6) = \pm 2$$

$$t + 6 = \pm 2$$

$$-6 \quad -6$$

$$t = -6 \pm 2$$

$$t = -6 - 2 \text{ or } -6 + 2$$

$$t = -8, -4$$

(25.) $(m+3)^2 = 6$

$(m+3) = \pm\sqrt{6}$

$m+3 = \pm\sqrt{6}$

$-3 \quad -3$

$m = -3 \pm \sqrt{6}$

$m = -3-\sqrt{6}$ or $-3+\sqrt{6}$

Do NOT combine

35.

factor the square: (9)

$$x^2 - 10x + 25 = 100$$

$$(x-5)(x-5) = 100$$

$$(x-5)^2 = 100$$

$$(x-5) = \pm\sqrt{100}$$

$$(x-5) = \pm 10$$

$$x - 5 = \pm 10$$

$$+5 \quad +5$$

$$x = 5 \pm 10$$

$$x = 5 - 10 \text{ or } 5 + 10$$

$$x = -5, 15$$

$$x = -5 \text{ OR } 15$$

37.

9.1

Factor the left: (9

$$p^2 + 8p + 16 = 1$$

$$(p+4)(p+4) = 1$$

$$(p+4)^2 = 1$$

$$(p+4) = \pm\sqrt{1}$$

$$(p+4) = \pm 1$$

$$p+4 = \pm 1$$

$$-4 \quad -4$$

$$p = -4 \pm 1$$

$$p = -4-1, -4+1$$

$$p = -5 \text{ OR } -3$$

9.3

IF $ax^2+bx+c=0$,

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

QUADRATIC FORMULA

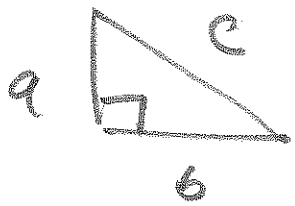
EXAMPLES

$\Sigma x\,1 \rightarrow$ 25, 7, 5

$\Sigma x\,2 \rightarrow$ 45

$\Sigma x\,3 \rightarrow$ 47

$\Sigma x\,4 \rightarrow$ 51 ← review of $a^2+b^2=c^2$



PROBLEMS at End of SECTION

(25.) $4y^2+2y-3=0$

$ay^2+by+c=0$

$\rightarrow y=\dfrac{-b\pm\sqrt{b^2-4ac}}{2\cdot a}$

$a=4,\ b=2,\ c=-3$ *

* $4y^2+2y+(-3)=0$

(49) $y = \dfrac{-2 \pm \sqrt{(2)^2 - 4 \cdot 4 \cdot (-3)}}{2 \cdot 4}$

$= \dfrac{-2 \pm \sqrt{4 + 48}}{8}$

$= \dfrac{-2 \pm \sqrt{52}}{8}$

Note: can be simplified to: $\dfrac{-1 \pm \sqrt{13}}{4}$.

(50) $x^2 - 8x = 20$

$-20 \quad -20$

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

$1 \cdot x^2 + (-8) \cdot x + (-20) = 0$

$a = 1$

$b = -8$

$c = -20$

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

(3

$$x = \frac{-(b) \pm \sqrt{(b)^2 - 4 \cdot a \cdot c}}{2 \cdot a}$$

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

$$x = \frac{8 \pm \sqrt{64 + 80}}{2 \cdot 1}$$

$$x = \frac{8 \pm \sqrt{144}}{2}$$

$$x = \frac{8 \pm 12}{2} = \frac{8+12}{2}, \frac{8-12}{2}$$

$$x = \frac{20}{2}, \frac{-4}{2}$$

$$x = 10, -2$$

Check by Factoring

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

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

$$x + 2 = 0 \text{ or } x - 10 = 0$$

$$x = -2 \text{ or } x = 10$$

q. 3

(2.) $t^2 = 2t - 1$

$-2t \quad -2t$

$t^2 - 2t = -1$

$+1 \quad +1$

$t^2 - 2t + 1 = 0$

$a = 1, \; b = -2, \; c = 1$

$$t = \frac{(b) \pm \sqrt{(b)^2 - 4 \cdot a \cdot c}}{2 \cdot a}$$

$$t = \frac{-(-2) \pm \sqrt{(-2)^2 - 4 \cdot 1 \cdot 1}}{2 \cdot 1}$$

$$t = \frac{2 \pm \sqrt{0}}{2} = \frac{2 \pm 0}{2} = \frac{2}{2} = 1$$

(10

yellow pages Q16 (Test 9)

answer is (a.)

(24.) $x^2 - 3x = 8$

$-8 \quad -8$

$x^2 - 3x - 8 = 0$

$x^2 + (-3)x + (-8) = 0$

$a = 1$

$b = -3$

$c = (-8)$

$$x = \frac{-(b) \pm \sqrt{(b)^2 - 4ac}}{2 \cdot a}$$

$$x = \frac{-(-3) \pm \sqrt{(-3)^2 - 4 \cdot 1 \cdot (-8)}}{2 \cdot 1}$$

(a.)

$$= \frac{3 \pm \sqrt{9 + 32}}{2} = \frac{3 \pm \sqrt{41}}{2}$$

Make up:

$$x^2 + 3x = -1$$
$$+1 \quad +1$$

$$x^2 + 3x + 1 = 0$$

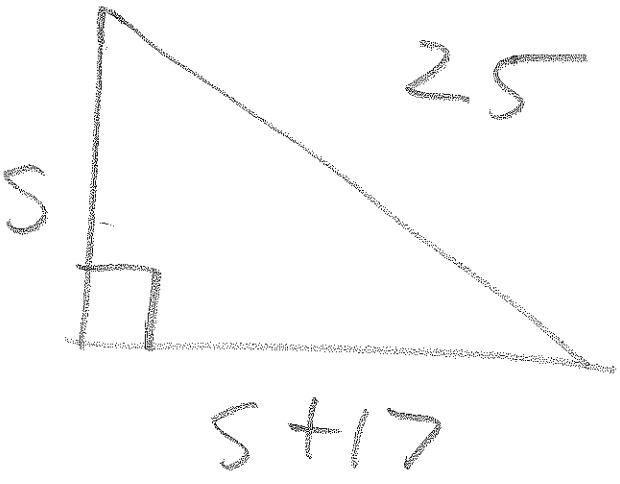
$$a = 1, b = 3, c = 1$$

$$x = \frac{-(b) \pm \sqrt{(b)^2 - 4 \cdot a \cdot c}}{2 \cdot a}$$

$$x = \frac{-(3) \pm \sqrt{(3)^2 - 4 \cdot 1 \cdot 1}}{2 \cdot 1}$$

$$x = \frac{-3 \pm \sqrt{9-4}}{2} = \frac{-3 \pm \sqrt{5}}{2}$$

51.



$$25^2 = 5^2 + (5+17)^2$$

$$625 = 5^2 + 5^2 + 345 + 289$$

$$(5+17)^2 = (5+17)(5+17) = 5^2 + 345 + 289$$

$$625 = 25^2 + 345 + 289$$

$$0 = 25^2 + 345 - 336$$

$$0 = 5^2 + 175 - 168$$

$a=1, b=17, c=-168$

$$\begin{array}{r} 625 \\ -\ 289 \\ \hline 336 \end{array}$$

(51.) $s = \dfrac{-17 \pm \sqrt{(17)^2 - 4 \cdot 1 (-168)}}{2 \cdot 1}$

$s = \dfrac{-17 \pm \sqrt{289 + 672}}{2}$

$s = \dfrac{-17 \pm \sqrt{961}}{2}$

$s = \dfrac{-17 \pm 31}{2}$

$s = \dfrac{-17+31}{2}, \dfrac{-17-31}{2}$

$s = 7, -24$ reject

$s = 7$, $s + 17 = 7 + 17 = 24$

$168 \times 4 = 672$

$289 + 672 = 961$

$\sqrt{961} = 31$; $31^2 = 961$

Q15 yellow: (10)

Q.1 (5)

$$\frac{x^2-4}{x^2+5x+6} = \frac{x^2-2^2=(x+2)(x-2)}{(x+2)(x+3)}$$

$$= \frac{(x-2)}{(x+3)}$$

(6.)

$$\frac{75a^{50}}{50a^{30}} = \frac{3}{2}a^{(50-30)}$$

$$= \frac{3a^{20}}{2}$$

(b.)

$$\frac{25}{50} = \frac{3 \cdot 25}{2 \cdot 25}$$

(11

(7.) $\dfrac{(x^2-10x+21)}{(x^2-11x+28)} = \dfrac{(x-7)(x-3)}{(x-7)(x-4)}$

$= \dfrac{(x-3)}{(x-4)}$ (a.)

(8.)

$$\frac{x^2+10x-11}{5x} \cdot \frac{x^3}{(x+11)}$$

$$\frac{(x+11)(x-1)}{5x} \cdot \frac{x^3}{(x+11)}$$

$$= \frac{(x-1)\cdot x^{3^2}}{5x} = \frac{x^2\cdot(x-1)}{5}$$ (b.)

(9.) $\dfrac{5x^2}{x^2+10x-11} \div \dfrac{x^3}{x+11}$

$\dfrac{5x^2}{x^2+10x-11} \cdot \dfrac{x+11}{x^3}$

$\dfrac{5x^2}{(x+11)(x-1)} \cdot \dfrac{(x+11)}{x^3}$

$\dfrac{5x^2}{x^3(x-1)} = \dfrac{5}{x\cdot(x-1)}$

(a.)

(13

(10.

$12a^2b^7,\ 18a^5b^2$

FIND LCM $= 36a^5b^7$

(b.

LCM $= \square \cdot a^5 \cdot b^7$

LCM of 12, 18 $= 36$

F	G
2	2
3	2

LCM $= 2^2 \cdot 3^2$
$= 4 \cdot 9$
$= 36$

$12 = 2 \cdot 3 \cdot 2$

$18 = 2 \cdot 3 \cdot 3$

11.

$$\frac{(x-y)}{xy^2} + \frac{(3x-y)}{x^2y}$$

LCD $= x^2y^2$

$$\frac{(x-y)}{xy^2}\cdot\frac{x}{x} + \frac{(3x-y)}{x^2y}\cdot\frac{y}{y}$$

$$= \frac{x(x-y)}{x^2y^2} + \frac{y\cdot(3x-y)}{x^2y^2}$$

$$= \frac{x(x-y)+y(3x-y)}{x^2y^2}$$ (c)

$$= \frac{x^2-xy+3xy-y^2}{x^2y^2}$$

$$= \frac{x^2+2xy-y^2}{x^2y^2}$$

steps not needed.

14

6.4

MADE up

very likely on TEST!

$$\frac{2}{xy^2} + \frac{3}{x^2y}$$

$$LCD = x^2y^2$$

$$\frac{2}{xy^2} \cdot \frac{x}{x} + \frac{3}{x^2y} \cdot \frac{y}{y}$$

$$= \frac{2x}{x^2y^2} + \frac{3y}{x^2y^2}$$

$$= \frac{2x+3y}{x^2y^2}$$

6.5

$$\frac{1+\frac{1}{x}}{2-\frac{3}{x}} = \frac{\frac{1}{1}+\frac{1}{x}}{\frac{2}{1}-\frac{3}{x}}$$

LCD $= 1, x, 1, x = x$

clear fraction with x.

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

L.C.F.

$$= \frac{x+1}{2x-3}$$

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