

Topics On January Mathematics Final

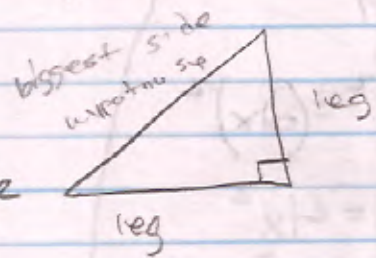
(Notes By: Michal Aiash/Compilation By: Allen Shalam)

- Laws of Algebra (Packet 1-Chertok)
 - Commutative, Associative, Distributive, Identity Element, Multiplicative Inverse, Math Systems, Evaluating Expressions
- Monomials + Polynomials (Packet 2-Chertok)
 - Add, Subtract, Multiply, Divide
 - Zero, Negative Exponents (Exponential Rules)
 - Scientific Notation
- Equations + Verbal Equations (Packet 3-Chertok)
 - Solving All Equations-Including Parentheses
 - Verbal Problems including
 - Number Problems
 - Consecutive Integers
 - Coin
 - Motion
 - Perimeter-Numerical + Verbal Problems (Equations)
 - Area-Numerical (Shaded Area) + Verbal Problems (Equations)
- Inequalities (Packet 4-Chertok)
 - Graphing On A Number Line
 - Interval Notation- e.g. (), [], (], [)
 - Verbal Problems → at most, at least, maximum, minimum, etc.
- Ratios and Proportions w/ Verbal Problems (Packet 5-Chertok)
- Circles/3D-Shapes Perimeter, Volume, Surface Area (Packet 6-Chertok)
 - Circumference/Area/Mixed W/ Other Geometric Figures + Shaded Area
 - Surface Area-Rectangular Solid, Cube, Cylinder
 - Volume-All Shapes
- Factoring (Packet 7-Chertok)

- Fractions (Packet 8-Chertok)
 - Reducing
 - Add
 - Subtract
 - Divide
 - Multiply
- Verbal Quadratic Equations (Packet 9-Chertok)
- Radicals And Square Roots (Packet 10-Chertok)
- Triangles (Packet 11-Chertok)

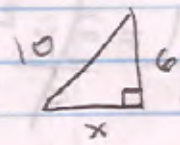
118

Aim: Pythagorean theorem Right Triangle



$$(\text{leg})^2 + (\text{leg})^2 = (\text{hyp})^2$$

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



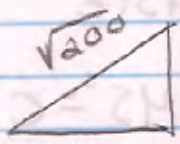
$$x^2 + 6^2 = 10^2$$

$$x^2 + 36 = 100$$

$$\begin{array}{r} -36 \quad -36 \\ \hline \end{array}$$

$$\sqrt{x^2} = \sqrt{64}$$

$$x = 8$$



$$3x \rightarrow 3 \cdot 2\sqrt{a} = 6\sqrt{a}$$

$$4 \cdot 2\sqrt{a} = 8\sqrt{a}$$

$$(3x)^2 + (4x)^2 = \sqrt{200}$$

$$9x^2 + 16x^2 = 200$$

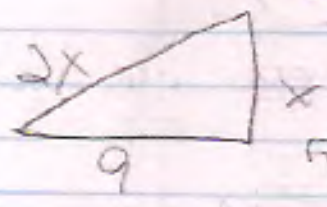
$$\begin{array}{r} 25x^2 = 200 \\ \hline 25 \quad 25 \end{array}$$

$$x^2 = 8$$

$$x = \sqrt{8}$$

$$x = \sqrt{8} = \sqrt{4} \sqrt{2}$$

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



$$x^2 + 9^2 = (2x)^2$$

$$\begin{array}{r} x^2 + 81 = 4x^2 \\ -x^2 \quad -x^2 \\ \hline 81 = 3x^2 \end{array}$$

$$\frac{81}{3} = \frac{3x^2}{3}$$

$$\begin{array}{l} \sqrt{27} = \sqrt{x^2} \\ \sqrt{9 \cdot 3} = x \\ \boxed{3\sqrt{3} = x} \end{array}$$

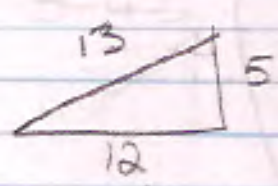
Find the diagonal of a rectangle whose sides are 28 ft. + 45 ft.



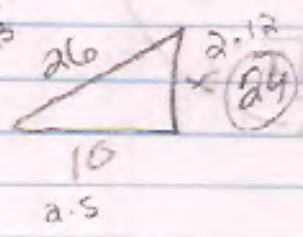
$$\begin{array}{l} 28^2 + 45^2 = c^2 \\ 784 + 2025 = x^2 \\ \sqrt{2809} = \sqrt{x^2} \\ \boxed{53 = x} \end{array}$$

trick → Pythagorean Triples

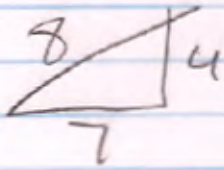
$$5 - 12 - 13$$



$$5x - 12x - 13x$$



is a Δ whose sides measure 8cm, 7cm, 4cm, a right Δ ?



$$4^2 + 7^2 = 8^2$$

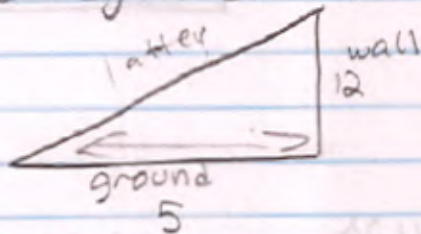
$$16 + 49 = 64$$

$$65 \neq 64$$

?

NO

A ladder is placed 5ft. from the foot of a wall. The top of the ladder reaches a point 12ft above the ground. Find the length of the ladder



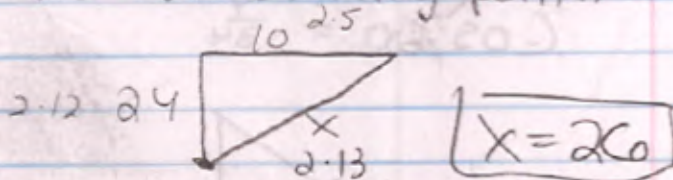
$$5^2 + 12^2 = C^2$$

$$25 + 144 = C^2$$

$$\sqrt{169} = C$$

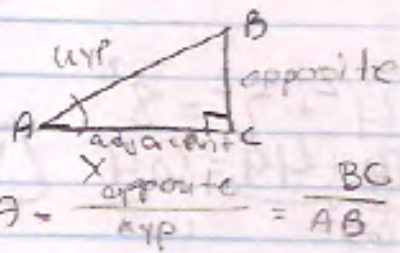
$$13 = C$$

Mrs. Smith travels 24 km North, 10 km east. How far was she from her starting point?



x = 26

Trigonometry

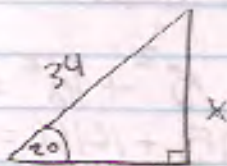


$$\textcircled{1} \sin A = \frac{\text{opposite}}{\text{hyp}} = \frac{BC}{AB}$$

$$\textcircled{2} \cos A = \frac{\text{adj}}{\text{hyp}} = \frac{AC}{AB}$$

$$\textcircled{3} \tan A = \frac{\text{opposite}}{\text{adj}} = \frac{BC}{AC}$$

S.O.S. A.T.A.



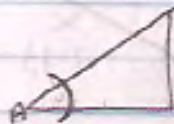
$$\sin 20 = \frac{x}{34} = .3420$$

MINIMUM is 4 places

$$\frac{x}{34} \times \frac{3420}{1}$$

$$x = 11.63$$

$$\cos 20 = \frac{y}{34}$$



$$\tan A = .3640$$

And $\tan^{-1}(.3640)$ Find $A = 20.001 \approx A = 20^\circ$

$$\cos A = .9397$$

And $A = 19.99 \approx 20^\circ$

$$\sin A = .5800$$

$$A = 35.4 = 35^\circ$$

122

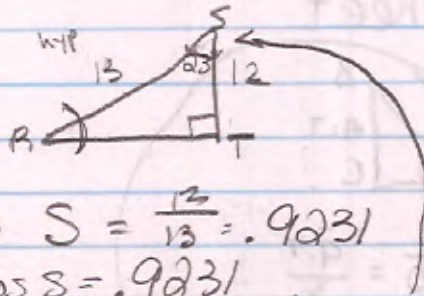
ΔBST

$\angle T = 90^\circ$

$BS = 13$

$ST = 12$

Find $\angle S$



$\cos S = \frac{12}{13} = .9231$

$\cos S = .9231$

yellow $\cos^{-1}(.9231) = 23^\circ$

Find $\angle B = 23 + 90 = 113$

$\frac{180}{-113}$
 07°

ΔABC

$\angle C$ is a right \angle

$AC = 8$

$BC = 15$

$AB = 17$

Find ① $\sin A = \frac{15}{17}$

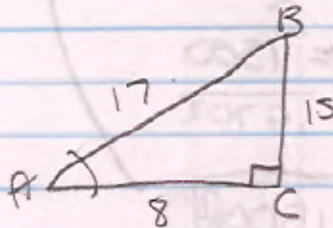
② $\cos A = \frac{8}{17}$

③ $\sin B = \frac{8}{17}$

④ $\cos B = \frac{15}{17}$

⑤ $\angle A = \frac{15}{17} = 62$

⑥ $\angle B = \frac{8}{17} = 28$

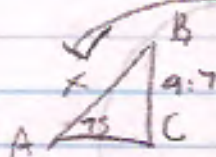


$(\sin = \frac{15}{17}) \text{ NAT } (62)$

$\cos = \frac{8}{17} = 28$

Sheet

①

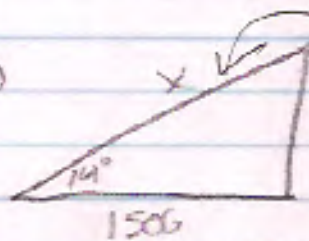


$$\sin 75 = \frac{9.7}{x}$$

$$\cdot \frac{.9659}{1} x = \frac{9.7}{x}$$

$$\cdot \frac{.9659x}{.9659} = \frac{9.7}{.9659} \quad \boxed{x = 10}$$

②

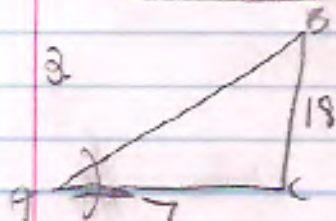


$$\cos 14 = \frac{1500}{x}$$

$$\cdot \frac{.9702}{1} x = \frac{1500}{x}$$

$$\cdot \frac{.9702x}{.9702} = \frac{1500}{.9702}$$

$$\boxed{x = 1500ft}$$



$$\tan A = \frac{18}{7} = 69^\circ$$

(And) $\tan(18 \div 7) = 69^\circ$