Junior High Math League

Sample Questions by Meet and Topic

Meet 4

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Meet 4

4.1 Sequence and Series

4.2 Simplifying Radical Expressions

4.3 Proportional Scale Models (3-D)

4.4 Modeling with Linear Equations and Graphs

4.5 Parallel and Perpendicular Lines

4.6 Analyzing Scatter Plots

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4.1 Sequences and Series

_____2. What is the next term in this sequence: $16, 4, 1, \underline{\quad}$

Answer =

$\frac{1}{4}$ or 0.25

_____2. Division by 4.

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4.1 Sequences and Series

_____9. What number is next: $-1, 2, 7, 14, \underline{\quad}$?

Answer =

_____23_____9. The generating expression is $x^2 - 2, \ 5^2 - 2 = 23$

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4.1 Sequences and Series

_____5. What number is next?   24352, 24461, 24570, _____

Answer =

____24679____5. Add 109 to get the next term.

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4.1 Sequences and Series

Simplify: $\displaystyle\sum_{n=1}^{5} n$

Answer = 15

$1 + 2 + 3 + 4 + 5$

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4.1 Sequences and Series

Simplify: $\displaystyle\sum_{n=3}^{5} n^3$

Answer = 216 (27 + 64 + 125)

$3^3 + 4^3 + 5^3$

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4.1 Sequences and Series

Simplify: $\displaystyle\sum_{i=1}^{4} \frac{1}{i}$

Answer = 2 1/12

$1 + \dfrac{1}{2} + \dfrac{1}{3} + \dfrac{1}{4}$

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4.2 Simplifying Radical Expressions

_____1. Solve for x if $\sqrt{x} = 3\sqrt{5}$.

Answer =

_____45_____1. $3\sqrt{5} = \sqrt{9 \cdot 5} = \sqrt{45}$, so $x = 45$

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4.2 Simplifying Radical Expressions

_____3. Simplify: $\sqrt{9800}$.

Answer =

_____$70\sqrt{2}$_____3. $\sqrt{2 \cdot 4900} = 70\sqrt{2}$

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4.2 Simplifying Radical Expressions

_____6. Simplify: $4\sqrt{200}$

Answer =

____$40\sqrt{2}$____ 6. $4\sqrt{100\cdot 2} = 4\cdot 10\sqrt{2} = 40\sqrt{2}$

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4.3 Proportional Scale Models (3-D)

A remote sensing map shows that 18 square inches of land is submerged in water due to floods. Find the actual area submerged in water, if the scale of the map is 1 square inch : 12 square miles.

Answer = 216 square miles

Let n be the actual area of the land submerged in water.

112 = 18n
[Write the proportion.]

n x 1 = 18 x 12
[Write the cross products.]

n = 216
[Simplify.]

The actual area of the land submerged in water is 216 square miles.

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4.3 Proportional Scale Models (3-D)

In an archaeology atlas, it is shown that 25 square inches of land is affected by a tornado. Find the actual area affected, if the scale of the map is 1 square inch : 15 square miles.

Answer = 375 square miles

Let n be the actual area of the land submerged in water.

115 = 25n
[Write the proportion.]
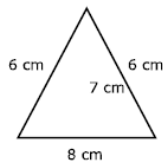
n x 1 = 25 x 15
[Write the cross products.]

n = 375
[Simplify.]

The actual area of the land submerged in water is 375 square miles.

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4.3 Proportional Scale Models (3-D)

Olivia goes to Egypt and saw a model of triangle shaped pyramid. She

enlarged it using a scale factor of 1.2. What will be the area
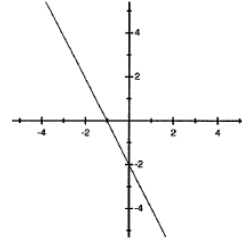
of the new triangle pyramid?

6 cm   6 cm
7 cm
8 cm

Answer = 56 square centimeters

4.4 Modeling with Linear Equations and Graphs

_____4. Write the equation of this line in $y = mx + b$ format.

Answer =

_$y = -2x - 2$_ 4. The intercepts are $(-1,0)$ and $(0,-2)$, so $m = \dfrac{^-2 - 0}{0 - ^-1} = \dfrac{^-2}{1} = {^-}2$,

$b = {^-}2, \quad y = -2x - 2$

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4.4 Modeling with Linear Equations and Graphs

_____3. If two points on a line are (4, 0) and (0, 5), what is the equation of the line, in slope-intercept form?

Answer =

$y = -\dfrac{5}{4}x + 5$
_____3. Slope=$\dfrac{5 - 0}{0 - 4} = -\dfrac{5}{4}$, y-intercept=5, $y = -\dfrac{5}{4}x + 5$

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4.4 Modeling with Linear Equations and Graphs

_____7. What is the slope of this line: $\frac{3}{4}x - \frac{2}{5}y = 8$?

Answer =
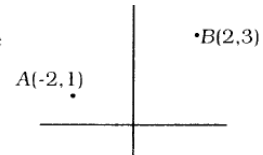
$\dfrac{15}{8}$ ___7. $20\left(\dfrac{3}{4}x - \dfrac{2}{5}y\right) = 20 \bullet 8, 15x - 8y = 160, \dfrac{-8}{-8}y = \dfrac{-15}{-8}x + \dfrac{160}{-8}, y = \dfrac{15}{8}x - 20$
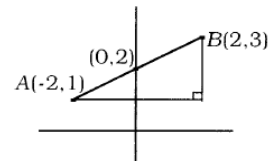
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4.4 Modeling with Linear Equations and Graphs

_____4. If point A is at (-2, 1) and B is at (2, 3), what is the y-intercept of the line containing A and B?

$\cdot B(2,3)$

$A(-2,1)$

Answer =

___2___4. Slope$= \dfrac{3-1}{2--2} = \dfrac{2}{4} = \dfrac{1}{2}$ So when x increases from -2
or (0, 2)   to 0, y increases from 1 to 2.

$B(2,3)$

$(0,2)$

$A(-2,1)$

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4.4 Modeling with Linear Equations and Graphs

_____2. What is the slope of $3x - 4y = 6$?

Answer =

_____$\dfrac{3}{4}$_____2. $3x - 4y = 6, 3x = 4y + 6, 3x - 6 = 4y, y = \dfrac{3}{4}x - \dfrac{6}{4}$

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4.5 Parallel and Perpendicular Lines

_____4.   What is the equation of the line parallel to $y = \dfrac{3}{4}x - 2$ that passes through the point (8, 1)?

Answer =

_$y = \dfrac{3}{4}x - 5$_____4.   Parallel lines have the same slope, so $y = \dfrac{3}{4}x + b$. Put in (8, 1).

$1 = \dfrac{3}{4}(8) + b, 1 = 6 + b, b = -5$

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4.5 Parallel and Perpendicular Lines

_____3. What is the equation of the line perpendicular to $y = \frac{3}{4}x - 2$ .that passes

through (9, 1)?

Answer =

$\underline{\,y = -\frac{4}{3}x + 13\,}$3.   Slope$=-\frac{4}{3}, 1 = -\frac{4}{3} \bullet 9 + b, 1 = -12 + b, b = 13$.

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4.5 Parallel and Perpendicular Lines

_____3. What is the equation of a line through (3, 4) and perpendicular
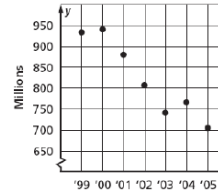
to $y = \frac{1}{3}x - 2$?

Answer =

$\underline{\,y = -3x + 13\,}$ 3.   Slope$= -3$, so $4 = -3 \bullet 3 + b, b = 13$.

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4.6 Analyzing Scatter Plots

MUSIC The scatter plot shows the number of CDs (in millions)   that were sold from 1999 to 2005. If the trend continued, about how many CDs were sold in 2006?
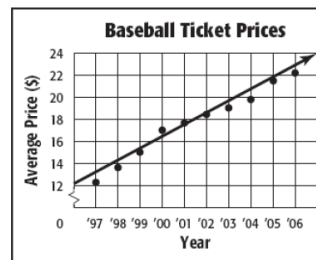
Answer = Between 650 and 700

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4.6 Analyzing Scatter Plots

BASEBALL   The scatter plot shows the average price of a major-league baseball ticket from 1997 to 2006.

a. Use the points (2001, 17.60) and (2002, 18.75) to write the slope-intercept form of equation for the line of fit shown in the scatter plot.

b. Use your equation to tell the price of a ticket in 2009. Is this extrapolation or interpolation?

Baseball Ticket Prices

Source: Team Marketing Report, Chicago

Answer = a) y=x+12 b) $25; extrapolation

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4.6 Analyzing Scatter Plots

_____4. What point is not on the line that the others are on?
                    (2, 5), (3, 8), (4, 11), (6, 17), (8, 20)

Answer =

____(8, 20)____4. As x increases by 1, y increases by 3 except (6, 17) to (8, 20) has x
                    increases by 2 as y increases by 3.

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