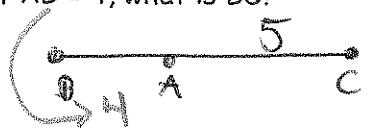
Walden key S'14

Day 12 HW: Cumulative Review after Unit 4 Test

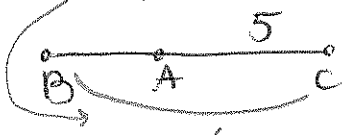
For exercises 1-4, A is between B and C and AC = 5. read carefully!

1) If AB = 4, what is BC?



$BA + AC = BC$
$4 + 5 = BC$
$9 = BC$

2) If BC = 6, what is AB?



$AB + AC = BC$
$AB + 5 = 6$
$AB = 1$

3) If A is the midpoint of $\overline{BC}$, what is AB?

⇒ means $\overline{BA} \cong \overline{AC}$
$\therefore AB = AC$
$AB = 5$

4) If AB = 2(AC), what is AB?

$AB = 2AC$
$AB = 2(5)$
$AB = 10$

Simplify

5) $\dfrac{4ab^2c^{-1}}{(ab^{-2}c^3)^4} = \dfrac{4ab^2c^{-1}}{a^4b^{-2\cdot4}c^{3\cdot4}}$

$= \dfrac{4ab^2c^{-1}}{a^4b^{-8}c^{12}} = 4a^{1-4}b^{2-(-8)}c^{-1-12}$

$= 4a^{-3}b^{10}c^{-13} = \dfrac{4b^{10}}{a^3c^{13}}$

6) $\sqrt[3]{12x^4} \cdot \sqrt[3]{180x}$

$\sqrt[3]{2\cdot2\cdot3\cdot x\cdot x\cdot x} \cdot \sqrt[3]{2\cdot2\cdot3\cdot3\cdot5\cdot x}$

$x\sqrt[3]{2\cdot2\cdot3\cdot x} \cdot \sqrt[3]{2\cdot2\cdot3\cdot3\cdot5\cdot x}$

$x\sqrt[3]{2\cdot2\cdot2\cdot2\cdot3\cdot3\cdot3\cdot5\cdot x\cdot x}$

$2\cdot3\cdot x\sqrt[3]{2\cdot5\cdot x\cdot x} = 6x\sqrt[3]{10x^2}$

7) $\sqrt[3]{135x^4} + x\sqrt[3]{40x}$

$\sqrt[3]{27\cdot5\cdot x^4} + x\sqrt[3]{8\cdot5x}$

$\sqrt[3]{27x^3}\cdot\sqrt[3]{5x} + x\sqrt[3]{8}\cdot\sqrt[3]{5x}$

$3x\sqrt[3]{5x} + 2x\sqrt[3]{5x}$

$5x\sqrt[3]{5x}$

8) Which point lies in the solution set for the system: $2y - x \geq -6$, $2y - 3x < -6$

A. (-4, -1) — $2(-1) = 4 \geq -6$ ✓; $2(-1) - 3(-4) < -6$; $-2 + 12 < -6$; $10 < -6$ ✗ (false, not ok)

B. (3, 1) — $2(1) - 3 \geq -6$; $-1 \geq -6$ ✓; $2(1) - 3(3) < -6$; $-7 < -6$ ✓

C. (0, -3) — $2(-3) - 0 \geq -6$; $-6 \geq -6$ ✓; $2(-3) - 3(0) < -6$; $-6 < -6$ ✗

D. (4, 3) — $2(3) - 4 \geq -6$; $2 \geq -6$ ✓; $2(3) - 3(4) < -6$; $-6 < -6$ ✗

$2y \geq x - 6 \rightarrow y \geq \dfrac{x-6}{2}$

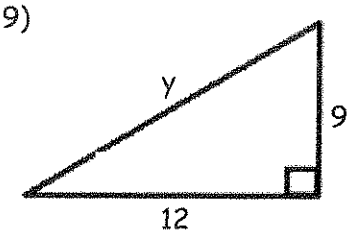
$2y < 3x - 6 \rightarrow y < \dfrac{3x-6}{2}$

then use calc BUT hard to see with ✓

☐ Fix

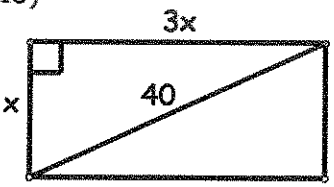
Find the value of the variables. (Hint: Pythagorean Theorem! ☺) Give exact answers.

9)



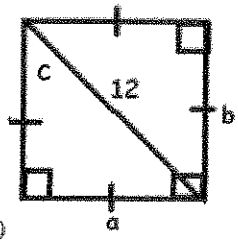
$9^2 + 12^2 = y^2$
$225 = y^2$
$\sqrt{225} = \sqrt{y^2}$
$y = 15$

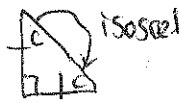
10)



$x^2 + (3x)^2 = 40^2$
$x^2 + 9x^2 = 1600$
$10x^2 = 1600$
$x^2 = 160$
$\sqrt{x^2} = \sqrt{160}$
$x = \sqrt{16}\sqrt{10}$
$x = 4\sqrt{10}$

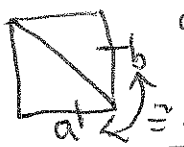
11)





$c + C + 90 = 180$
$2C = 90$
$C = 45°$

$a^2 + a^2 = 12^2$
$2a^2 = 144$
$\sqrt{a^2} = \sqrt{72}$
$a = \sqrt{36}\sqrt{2}$
$a = 6\sqrt{2}$



$b = 6\sqrt{2}$

Find the intersection of the two lines.

12) $x + 2y = 5$
$+\ 4x - 2y = 10$
$5x = 15$
$x = 3$

$3 + 2y = 5$
$2y = 2$
$y = 1$

(3, 1)

13) $(5x - 2y = -23) \cdot 3$
$(9x + 3y = -15) \cdot 2$

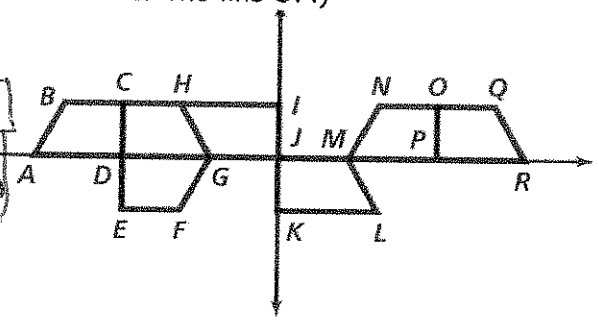
$15x - 6y = -69$
$+\ 18x + 6y = -30$
$33x = -99$
$x = -3$

$5(-3) - 2y = -23$
$-15 - 2y = -23$
$-2y = -8$
$y = 4$

(-3, 4)

State whether each mapping is a reflection, rotation, translation, or glide reflection. Specifically describe each transformation. (Example: △MNOP -> △RQOP is a reflection over the line OP.)

14. $\triangle ABCD \rightarrow \triangle GHCD$ reflection over line CD
15. $\triangle HGJI \rightarrow \triangle LMJK$ rotation 180° about origin
16. $\triangle GFED \rightarrow \triangle RQOP$ translation right DP units, reflection over x-axis
17. $\triangle MNOP \rightarrow \triangle ABCD$ translation left AM units



Solve using the appropriate method. Give exact answer(s).

18) $-36 = 3m^2 - 31m$

$0 = 3m^2 - 31m + 36$

$-4 \cdot -27 = 108$, $-4 + -27 = -31$

$0 = 3m^2 - 4m - 27m + 36$

$0 = m(3m-4) - 9(3m-4)$

$0 = (m-9)(3m-4)$

$m = 9, 4/3$

19) $2x^2 - 6x - 2 = 0$

$a=2$ $b=-6$ $c=-2$ use QF

$x = \frac{6 \pm \sqrt{(-6)^2 - 4(2)(-2)}}{2(2)}$

$x = \frac{6 \pm \sqrt{36+16}}{4} = \frac{6 \pm \sqrt{52}}{4} = \frac{6 \pm 2\sqrt{13}}{4}$

$\frac{3 \pm \sqrt{13}}{2}$

$\cdot = -4$, $+ = -6$ not possible ... so can't factor

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

20) Solve for x: $4^{5x} = 48$

A. $x = 3\log 12$ B. $\log 48 - 5\log 4$ C. $x = \frac{\log 48}{5\log 4}$ D. $x = \frac{\log 12}{\log 4}$

$\log 4^{5x} = \log 48$

$\frac{5x \log 4}{5 \log 4} = \frac{\log 48}{5 \log 4}$

21) Which is the inverse of the function $f(x) = x - 5$?

A. $f^{-1}(x) = \frac{1}{x+5}$ B. $f^{-1}(x) = x + 5$ C. $f^{-1}(x) = 5 - x$ D. $f^{-1}(x) = \frac{1}{x-5}$

$y = x - 5$ switch x & y then solve for y $x = y - 5$ $x + 5 = y$

* f^{-1} means inverse of function f

22) Find the discriminant to determine the number and nature of the roots. $2x^2 + 3x = 5$

A. Two real rational roots B. One real rational root C. Two imaginary roots D. Two real irrational roots

$b^2 - 4ac$ $(3)^2 - 4(2)(-5)$

49 ← positive perfect square discriminant ⇒ 2 real rational solutions

$2x^2 + 3x - 5 = 0$

$a=2$ $b=3$ $c=-5$

$\frac{-3 \pm \sqrt{(3)^2 - 4(2)(-5)}}{2(2)}$

$\frac{-3 \pm \sqrt{9+40}}{4} = \frac{-3 \pm \sqrt{49}}{4}$

$\frac{-3 \pm 7}{4}$

$\frac{-3+7}{4}$ $\frac{-3-7}{4}$

$1, -5/2$

23) In which direction is the graph of $f(x) = \frac{3}{x+b}$ translated when b increases?

A. down B. up C. right D. left

24) The bacteria in a petri dish double every 4 hours. Initially there were 65 bacteria in the sample.

a) Write an equation to represent this scenario. $y = 65(2)^{x/4}$

b) How many bacteria will there be after 24 hours? $y = 65(2)^{24/4} = 65(2)^6$ 4160

25) Maria purchased a commercial property four years ago for $125,000. The property is now worth $192,000. Assuming a steady annual percentage growth rate, what is the approximate yearly rate of appreciation?

A. 1.0% B. 11.3% C. 13.4% D. 34.9%

$(0, 125000)$ $(4, 192000)$

(x_1, y_1) (x, y)

then point ratio $y = y_1 \cdot b^{x-x_1}$

$\frac{192000}{125000} = \frac{125000(b)^{4-0}}{125000}$

$\sqrt[4]{192/125} = b$

$b \approx 1.1133$

$1 + r \approx 1.1133$