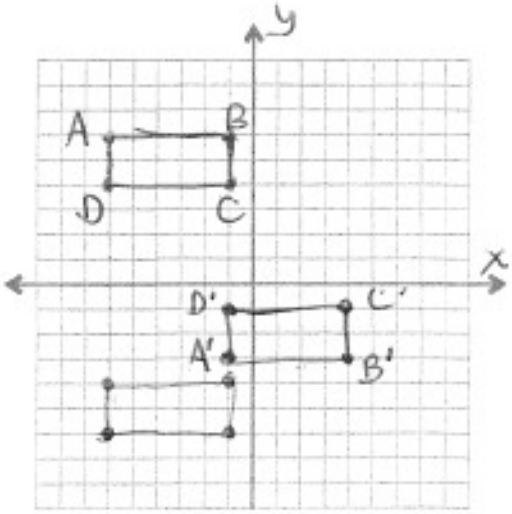
Name: Key Number:_____ Period:_____ Date:_____

Unit 11 Study Guide

Transformations

Use for 1 & 2: On the graph at right, plot, label, and connect in order the following points and connect D to A:

$A(-6,6)$ $B(-1,6)$ $C(-1,4)$ $D(-6,4)$



1.)Reflect figure ABCD across the x-axis, translate it 5 units right and 3 units up. Label the new figure A'B'C'D'

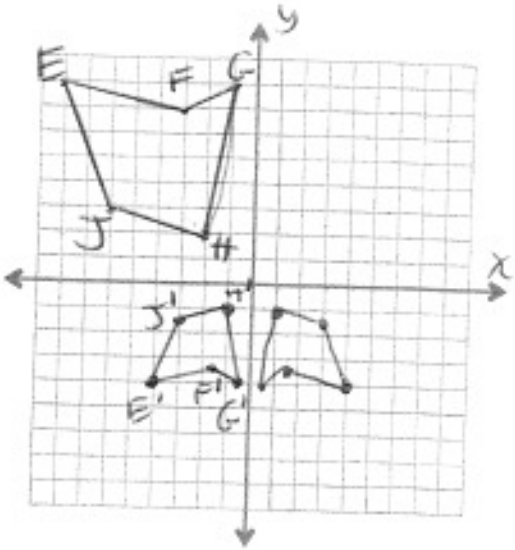
2.)Are figure ABCD and figure A'B'C'D' similar and/or congruent? Explain completely, Justifying your answer.

Similar and congruent.
angles are the same, scale factor of 1, ∴ similar
angles are the same, sides are the same ∴ congruent

Use for 3 & 4: On the graph at right, plot, label, and connect in order the following points and connect J to E:

$E(-8,8)$ $F(-3,7)$ $G(-1,8)$ $H(-2,2)$ $J(-6,3)$

$(4,-4)$ $(\frac{3}{2},-\frac{7}{2})$ $(\frac{1}{2},-4)$ $(1,-1)$ $(3,-\frac{3}{2})$



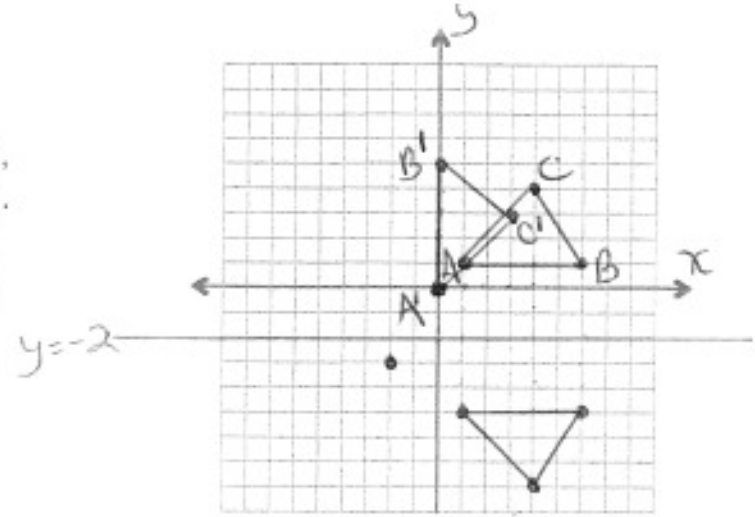
3.)Multiply each coordinate of figure EFGHJ by $-\frac{1}{2}$, Reflect across the y-axis. Label the new figure E'F'G'H'J'

4.)Is figure E'F'G'H'J' similar and/or congruent to the original figure EFGHJ? Explain why or why not, being clear and complete.

Similar
angles are the same, scale factor of $-\frac{1}{2}$ ∴ similar
to be congruent the sides would have to be the same

Use for 5 & 6: On the graph at right, plot, label, and connect in order the following points and connect C to A:

$A(1,1)$ $B(6,1)$ $C(4,4)$



5.)Reflect figure ABC across the line $y = -2$, rotate it $90°$ counter clockwise about $(-2,-3)$. Label the new figure A'B'C'.

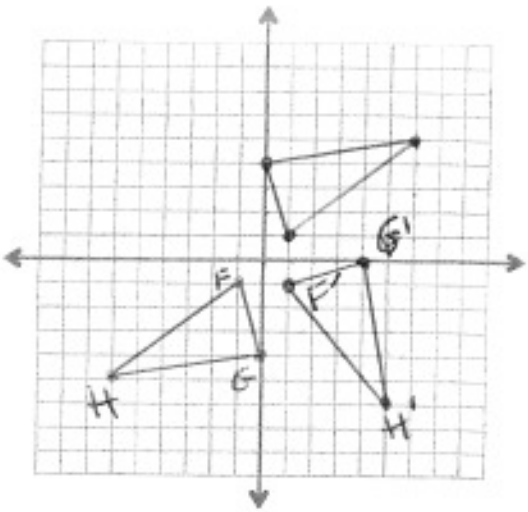
6.)Are figure ABC and figure A'B'C' similar and/or congruent? Explain completely, Justifying your answer.

Similar and congruent angles are the same, scale factor of 1 ∴ similar angles are the same, sides are the same ∴ congruent

Use for 7 & 8: On the graph at right, plot, label, and connect in order the following points and connect H to F:

$F(-1,-1)$ $G(0,-4)$ $H(-6,-5)$

(1, 1) (0, 4) (6, 5)



7.)Multiply each coordinate of figure FGH by -1, rotate it $90°$ clockwise about the origin. Label the new figure F'G'H'.

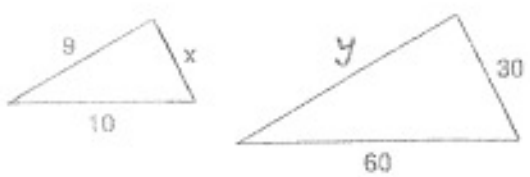
8.)Is figure F'G'H' similar and/or congruent to the original figure FGH? Explain why or why not, being clear and complete.

Similar and congruent angles are the same, scale factor of 1 ∴ similar angles are the same, sides are the same ∴ congruent

Similar Figures

For 9 & 10, the 2 figures are similar. Solve for both x and y. Show all work!

9.)

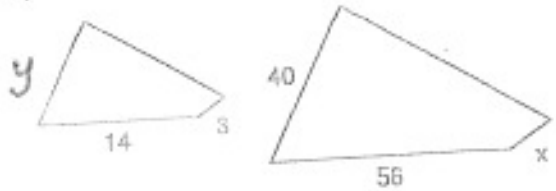


Scale factor $\frac{6}{1}$ or $\frac{1}{6}$

$9 \cdot \frac{6}{1} = y$ $\quad$ $30 \cdot \frac{1}{6} = x$

$\boxed{54 = y}$ $\quad$ $\boxed{5 = x}$

10.)



scale factor $\frac{4}{1}$ or $\frac{1}{4}$

$3 \cdot \frac{4}{1} = x$ $\quad$ $40 \cdot \frac{1}{4} = y$

$\boxed{12 = x}$ $\quad$ $\boxed{10 = y}$

11.) solve for x: $\frac{x}{5} = \frac{4}{30}$

$\frac{30x}{30} = \frac{20}{30}$

$x = \frac{20}{30}$

$\boxed{x = \frac{2}{3}}$

12.) solve for x: $\frac{x}{3.5} = \frac{4}{8}$

$\frac{8x}{8} = \frac{14.0}{8}$

$x = \frac{14}{8} = 1\frac{6}{8}$

$\boxed{x = 1\frac{3}{4}}$

13.) Solve for x: $\left[\frac{4x}{5} + \frac{3}{2} = \frac{3x+5}{4}\right]^{20}$

$\frac{\overset{4}{20} \cdot 4x}{5} + \frac{\overset{10}{20}(3)}{2} = \frac{\overset{5}{20}(3x+5)}{4}$

$16x + 30 = 15x + 25$

$-15x \quad -30 \quad -15x \quad -30$

$\boxed{x = -5}$

14.) Solve for x: $\left[\frac{x}{2} + \frac{3}{4} = \frac{2x+1}{4}\right]^{4}$

$2x + 3 = 2x + 1$

$-2x \quad -2x$

$3 \neq 1$ $\boxed{\text{No solution}}$

15.) Solve for a: $u = 3b - 2a + 2$

$+2a$

$2a + u = 3b + 2$

$-u \quad -u$

$\frac{2a}{2} = \frac{3b + 2 - u}{2}$

$\boxed{a = \frac{3b + 2 - u}{2}}$

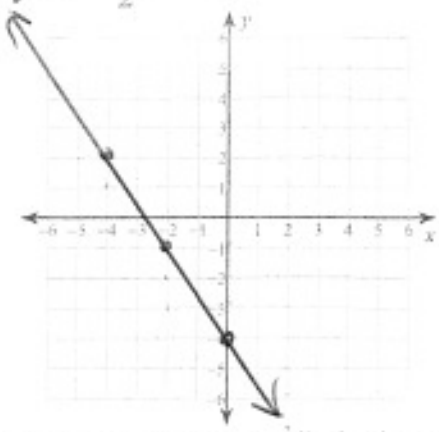
16.) Solve for a: $-3a - 3 = -2n + 3p$

$+3 \quad +3$

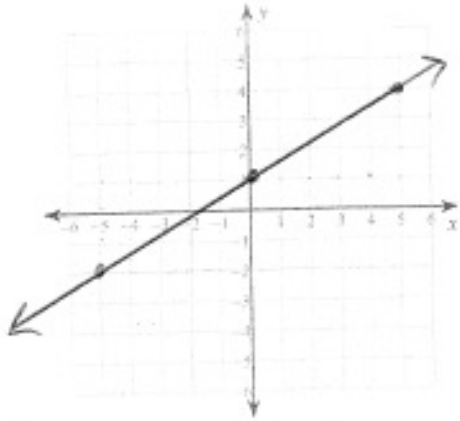
$\frac{-3a}{-3} = \frac{-2n}{-3} + \frac{3p}{-3} + \frac{3}{-3}$

$\boxed{a = \frac{2}{3}n - p - 1}$

17.) Graph: $y = -\frac{3}{2}x - 4$

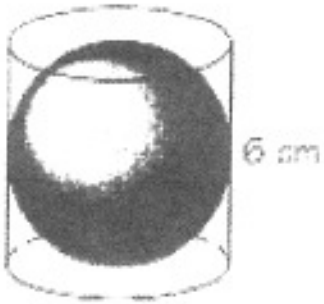


18.) Graph: $y = \frac{3}{5}x + 1$



Volume

19.) Find the volume inside the cylinder but outside the sphere.



$V = V_{cyl} - V_{sphere}$

$V = \pi r^2 h - \frac{4}{3}\pi r^3$

$V = \pi 3^2 \cdot 6 - \frac{4}{3}\pi 3^3$

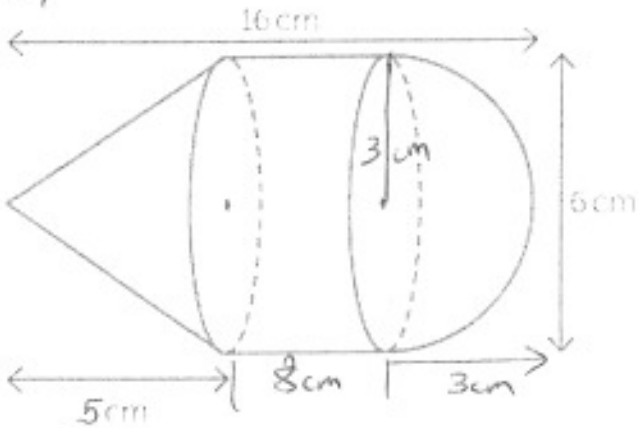
$V = \pi 54 - \frac{4}{3}\pi 27$

$V = 54\pi - 36\pi$

$V = 18\pi$

$\boxed{V = 56.55\ cm^3}$

20.) Find the volume



$V = V_{cone} + V_{cyl.} + \frac{1}{2}V_{sphere}$

$V = \frac{1}{3}\pi r^2 h + \pi r^2 h + \frac{1}{2}\frac{4}{3}\pi r^3$

$= \frac{1}{3}\pi 3^2 \cdot 5 + \pi 3^2 \cdot 8 + \frac{2}{3}\pi 3^3$

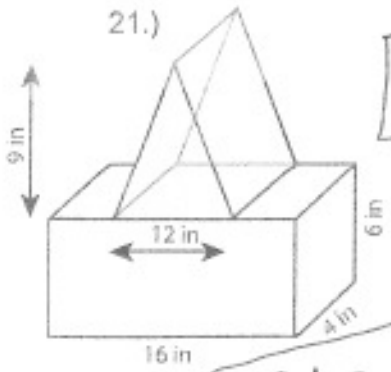
$= 15\pi + 72\pi + 18\pi$

$= 105\pi$

$\boxed{V = 329.87\ cm^3}$

Find the volume and the surface area for 21 & 22

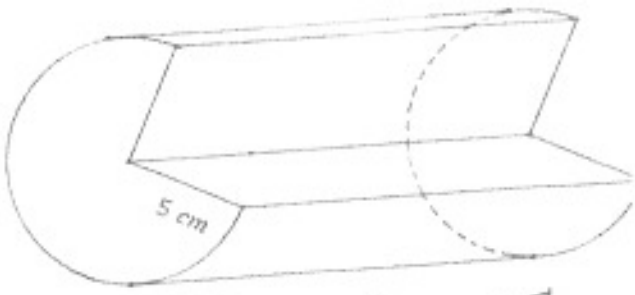
21.)



$\boxed{V = 600\ in^3}$

$\boxed{SA = 514.53\ in^2}$

22.)



$\boxed{V = 706.86\ cm^3}$

$\boxed{SA = 520.55\ cm^2}$

See work on next page

21) $V = V_{rec.\,prism} + V_{tri.\,prism}$

$= 16 \cdot 4 \cdot 6 + \frac{1}{2} 12 \cdot 9 \cdot 4$

$V = 384 + 216$

$\boxed{V = 600 \text{ in}^3}$

$SA = \text{front}_r + \text{back}_r + \text{bottom}_r$

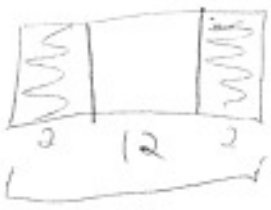
$+ \text{left}_r + \text{right}_r + 2 \text{ triangles}$

$+ \text{left}_{tri.} + \text{right}_{tri.} + \text{top}_{parkal}$

$SA = 16 \cdot 6 + 16 \cdot 6 + 16 \cdot 4$

$+ 4 \cdot 6 + 4 \cdot 6 + 2(\frac{1}{2} 12 \cdot 9)$

$(10.81665)(4) + (10.81665)(4) + 4(4)$



$9^2 + 6^2 = ?^2$

$81 + 36 = ?^2$

$117 = ?^2$

$SA = 96 + 96 + 64$

$+ 24 + 24 + 108$

$86.533 + 16$

514.53

22) $V = \frac{3}{4} \pi r^2 h$

$= \frac{3}{4} \pi 5^2 \cdot 12$

$V = 225\pi$

$V = 706.86 \text{ cm}^3$

$SA = \frac{3}{4}(2\pi r^2) + \frac{3}{4}\pi dh + 2(5 \cdot 12)$

$= \frac{3}{4}(2\pi 5^2) + \frac{3}{4}\pi 10 \cdot 12 + 2(5 \cdot 12)$

$= 37.5\pi + 90\pi + 120$

$= 127.5\pi + 120$

$SA = 520.55 \text{ cm}^2$