# Math 2 Final Review
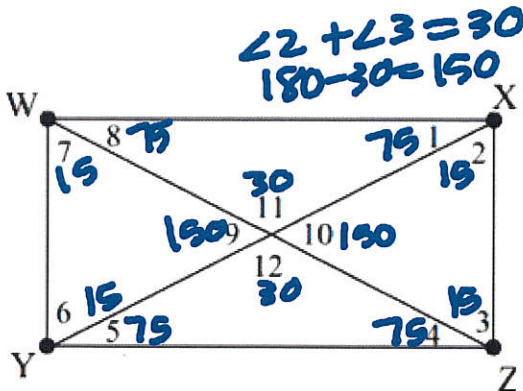
Name: _____

**1. WXYZ is a rectangle. Find each measure if $m\angle 1 = 75°$.**

$\angle 2 + \angle 3 = 30$
$180 - 30 = 150$

(figure: rectangle WXYZ with diagonals, angle labels: W corner has 8=75, 7=15; X corner has 75 1, 2=15; center angles 30, 11, 9=150, 10=150, 12, 30; Y corner 6=15, 5=75; Z corner 75 4, 13 3)

| | |
|---|---|
| $m\angle 2 = $ 15 | $m\angle 7 = $ 15 |
| $m\angle 3 = $ 15 | $m\angle 8 = $ 75 |
| $m\angle 4 = $ 75 | $m\angle 9 = $ 150 |
| $m\angle 5 = $ 75 | $m\angle 10 = $ 150 |
| $m\angle 6 = $ 15 | $m\angle 11 = $ 30 |

**Find the value of the variables.**

**2.**

$\dfrac{3x}{3} = \dfrac{90}{3}$   $\boxed{x = 30}$

$2(30) = 60$

$\boxed{y = 30}$

(figure: triangles with $y°$, $3x°$, $2x°$, 20, 60)

**3.**

(figure: parallelogram ABCD with $A$ $3x+15$ $B$, $y+5$, $2y-10$, $C$ $6x$ $D$)

$y + 5 = 2y - 10$
$-y \quad -y$
$5 = y - 10$
$+10 \qquad +10$
$\boxed{y = 15}$

$6x = 3x + 15$
$-3x \quad -3x$
$\dfrac{3x}{3} = \dfrac{15}{3}$
$\boxed{x = 5}$

**4.**

(triangle figure with sides marked, $2(x+3)$, $3x-1$)

$2x + 6 = 3x - 1$
$-2x \qquad -2x$
$6 = x - 1$
$+1 \qquad +1$
$\boxed{7 = x}$

**5.**

(triangle figures: 10, Big, $3x-17$; 5, $2x-13$)

$10(2x-13) = 5(3x-17)$
$20x - 130 = 15x - 85$
$-15x \qquad -15x$
$5x - 130 = -85$
$+130 \qquad +130$
$\dfrac{5x}{5} = \dfrac{45}{5}$
$\boxed{x = 9}$

(other figure: 5, $2x-13$, 10, $x-4$)
$\dfrac{10}{5} \times \dfrac{3x-17}{2x-13}$

**6.**

$4x + 6 = 6x - 3$

(triangle figure with $4x+6$ and $6x-3$ sides)

$\boxed{x = 4.5}$

**7.**

(figure: triangles with $y° = 90$, 45 $x°$, 45 135°)

**8.**

(two triangles: small triangle with $x$, $x+1$; big triangle with $x$, $x+16$, $x+12$; another with 12, 15, $x+1$)

Sm: $x$, $x+1$
Big: $x+12$, $x+16$

$\dfrac{x}{x+12} \times \dfrac{x+1}{x+16}$

$x(x+16) = (x+12)(x+1)$
$x^2 + 16x = x^2 + x + 12x + 12$
$x^2 + 16x = x^2 + 13x + 12$
$-x^2 \qquad -x^2$
$16x = 13x + 12$
$-13x \quad -13x$
$\dfrac{3x}{3} = \dfrac{12}{3}$

$\boxed{x = 4}$

9. Give the value of the scale factor and find the value of the variable.

ABCD ~ TSVU

$$\frac{17}{25.5} = .66$$

or

$$\frac{25.5}{17} = 1.5$$

A _____17_____ B

$3y - 3.5$     $3y - 3.5$

D _____17_____ C

S _____25.5_____ T

$3y + 6$     $3y + 6$

V _____25.5_____ U
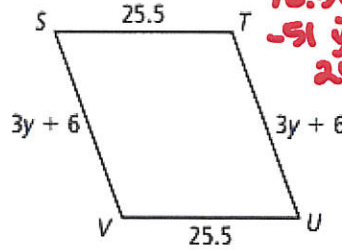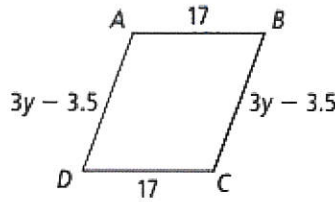
$$\frac{3y-3.5}{3y+6} = \frac{17}{25.5}$$

$76.5y - 89.25 = 51y + 102$
$-51y \qquad -51y$
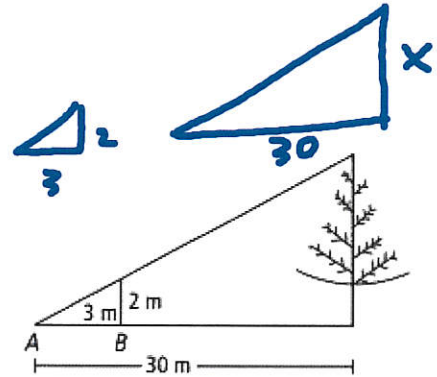
$25.5y - 89.25 = 102$
$\qquad +89.25 \quad +89.25$

$$\frac{25.5y}{25.5} = \frac{191.25}{25.5}$$

$y = 7.5$

10. A stick is 2 m long is placed vertically at point B. The top of the stick is in line with the top of a tree as seen from point A, which is 3 m from the stick and 30 m from the tree. How tall is the tree?

$$\frac{Sm}{Big} \quad \frac{2}{x} = \frac{3}{30}$$

$$x = 20$$

(diagram: right triangles, 2, 3, 30, X)

3 m | 2 m

A    B

30 m

11. A 1.4 meter tall child is standing next to a flagpole. The child's shadow is 1.2 meters long. At the same time, the shadow of the flagpole is 7.5 meters long. How tall is the flagpole (round to the nearest tenth if necessary)?

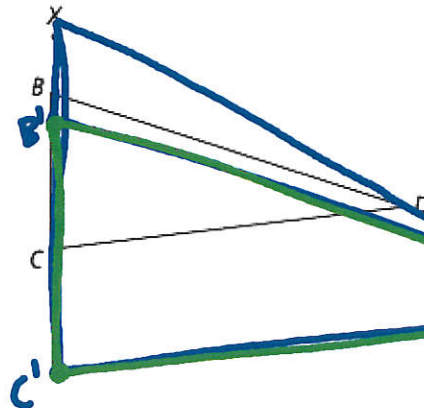1.4 (child) 1.2

x (flagpole) 7.5

$$\frac{1.2}{1.4} = \frac{7.5}{x}$$

$$x = 8.75$$

12. Dilate the triangle $M(2,3), A(1,-4)$ and $T(-1,3)$ by a scale factor of 2.

Center at zero, zero

$M'(4,6) \ A'(2,-8) \ T'(-2,6)$
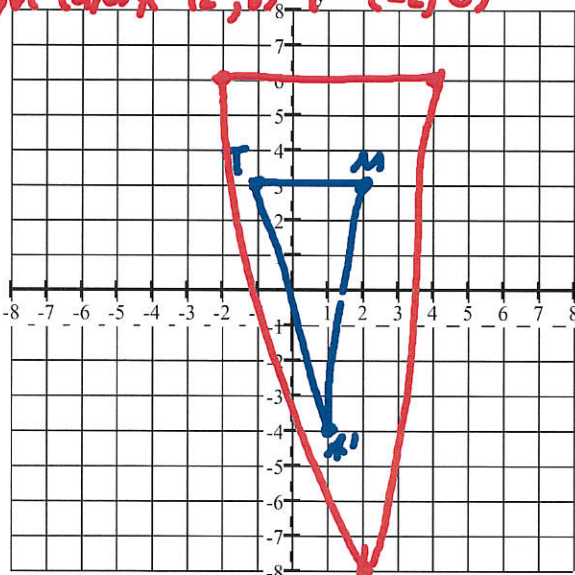


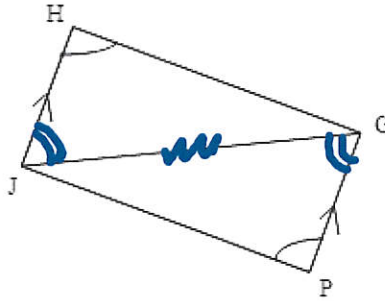13. Dilate through X by a factor of 1.5

$XB = 3$
$XC = 10$
$XD = 17.5$

$XB' = 4.5$
$XC' = 15$
$XD' = 26.5$

14.

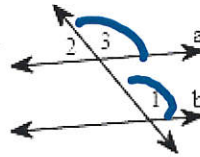Given: ∠H ≅ ∠P, $\overline{HJ} \parallel \overline{GP}$
Prove: ΔHJG ≅ ΔPGJ



| Statements | Reasons |
|---|---|
| a. ∠H ≅ ∠P | a. Given |
| b. HJ ∥ GP | b. Given |
| c. ∠HJG ≅ ∠JGP | c. if ∥ line, then Alternate Interior Angle are ≅. |
| d. JG ≅ JG | d. Reflexive Property |
| e. ΔHJG ≅ ΔPGJ | e. AAS |

15.

Given: ∠2 and ∠1 are supplementary.
Prove: a ∥ b



| Statements | Reasons |
|---|---|
| a. ∠2 and ∠1 are supplementary | a. Given |
| b. ∠2 & ∠3 are supp | b. Linear pairs are supplementary |
| c. ∠1 ≅ ∠3 | c. If two angles are supplementary to the same angle then they are ≅. |
| d. a ∥ b | d. if corresp ∠'s are ≅ lines are ∥ |

16. Given: $\overline{AC} \cong \overline{BC}$
Prove: ∠4 ≅ ∠5
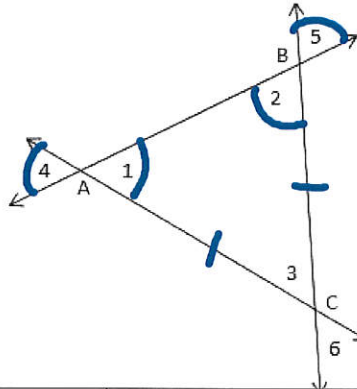


| Statements | Reasons |
|---|---|
| a. $\overline{AC} \cong \overline{BC}$ | a. Given |
| b. ΔABC is isosceles | b. def of Isosc. |
| c. ∠1 ≅ ∠2 | c. Base angle of an isosceles triangle are ≅. |
| d. ∠1 ≅ ∠4 | d. vertical ∠'s are ≅ |
| e. ∠2 ≅ ∠4 | e. Transitive Property |
| f. ∠2 ≅ ∠5 | f. Vertical angles are ≅, |
| g. ∠4 ≅ ∠5 | g. Transitive P. |

17. Graph the piecewise function, then evaluate for the given function values.
**Graph the piecewise function, then evaluate for the given function values.**

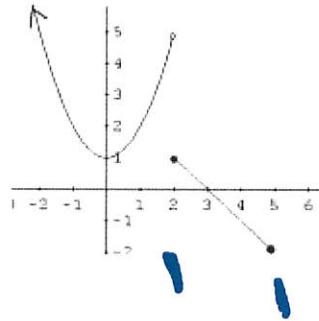$$f(x) = \begin{cases} -x, & -4 \le x < -2 \\ x-3, & -2 \le x < 1 \\ x^2 - 2, & x \ge 1 \end{cases}$$

$$\sqrt{} \ (9 - 2)$$
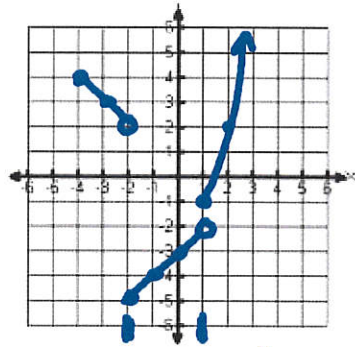
Evaluate:

18. $f(1) =$ $(1)^2 - 2 = \boxed{-1}$

19. $f(-4) =$ $-(-4) = \boxed{4}$

20. $f(0) =$ $0 - 3 = \boxed{-3}$

21. Write the piecewise function for the graph below. $a(x - h)^2 + k$

$$f(x) = \begin{cases} x^2 + 1 & x < 2 \\ -x + 3 & 2 \le x \le 5 \end{cases}$$

Pemdas
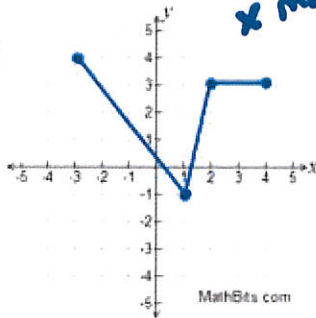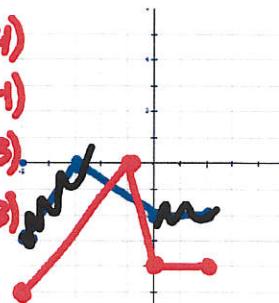
Let $f(x)$ be the function represented by the graph below. Perform each indicated transformation and graph the new function on the graph provided.

22. $-f(x+2) - 1$

2nd flip over x
1st left 2
3rd down 1

1st minus 2
$-3, 4 \to (-5, 4)$
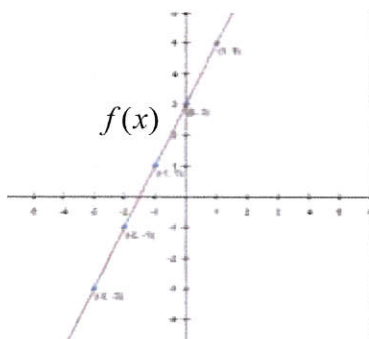$+1, -1 \to (-1, -1)$
$2, 3 \to (0, 3)$
$4, 3 \to (2, 3)$

2nd y's neg then y's-1

$(-5, -4)$  $(-5, -5)$
$(-1, 1)$  $(-1, 0)$
$(0, -3)$  $(0, -4)$
$(2, -3)$  $(2, -4)$

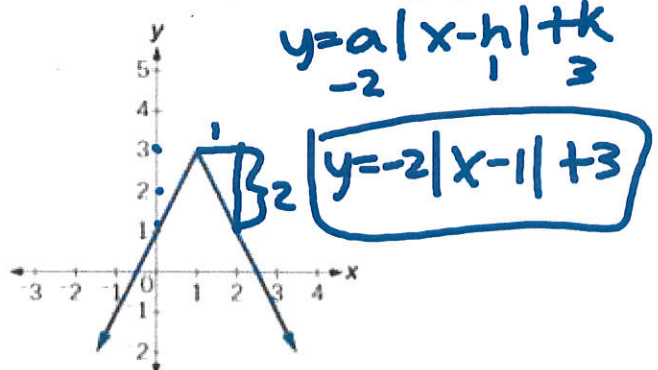red graph is correct

MathBits.com

Perform the indicated operation if $g(x) = 5 - 2x$.

23. $f + g$   $f(x) = 2x + 3$

$\boxed{8}$

$f(x)$

24. Write the equation of the graph below.

$y = a|x - h| + k$
$-2 \quad 1 \quad 3$

$\boxed{y = -2|x - 1| + 3}$

25. Write the equation of a quadratic function that is reflected across the x axis, has a horizontal shift right 1, and a vertical shift down 4.

$$y = \underset{-1}{a} \left(x - \underset{-1}{h}\right)^2 + \underset{-4}{k}$$    $$\boxed{y = -(x-1)^2 - 4}$$

Given:  $f(x) = 2x+3$    $g(x) = -3x^2$    $k(x) = x^2 - 3x + 1$

Find the following:

26. $f(-4)$

$2(-4)+3$
$-8+3$
$\boxed{-5}$

27. $(f \circ g)(-1)$    $g(-1) = -3(-1)^2$
                                        $-3(1)$
                                        $-3$

$2(-3)+3$
$-6+3$
$\boxed{-3}$

28. $\left(\dfrac{g}{k}\right)(0)$

$\dfrac{-3(0)^2}{(0)^2 - 3(0) + 1}$    $\boxed{0}$

29. $(k-f)(x)$

$x^2 - 3x + 1 - (2x+3)$
$x^2 - 3x + 1 - 2x - 3$
$\boxed{x^2 - 5x - 2}$
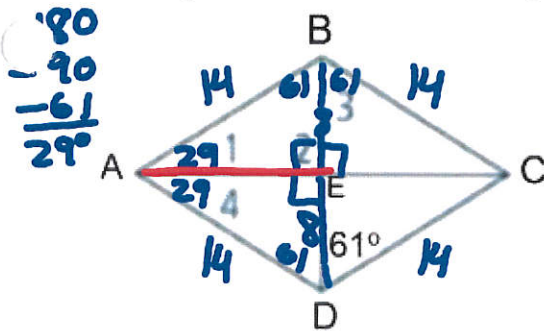
30. $(f \cdot g)(6)$

$2(6)+3$    $-3(6)^2$
$15 \cdot -108$
$\boxed{-1620}$

31. $f(g(x))$

$2(-3x^2) + 3$
$\boxed{-6x^2 + 3}$

32. The quadrilateral is a Rhombus, find the measurements below given $\overline{EB} = 8$ and $\overline{AB} = 14$.

°80
-90
-61
29°

B

14   6) | 6)   14

A   29 |   29   E   C
    29 | 4

14   6) | 61°   14

D

a) $\overline{DC} =$ 14
b) $m\angle 3 =$ 61°
c) $\overline{AE} =$ $\sqrt{132}$
d) $m\angle 1 =$ 29°

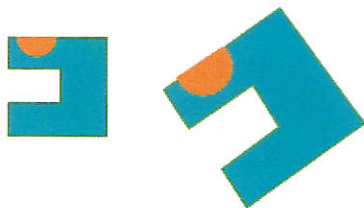e) $m\angle 2 =$ 90°
f) $m\angle 4 =$ 29°
g) $\overline{DE} =$ 8
h) $\overline{AD} =$ 14

$14^2 = 8^2 + b^2$
$196 = 64 + b^2$
$\sqrt{132} = \sqrt{b^2}$

33. Are the figures similar? If so, describe the similarity transformation(s) that maps one to the other. If not, explain why they are not similar.

Rotation of about 45°
dilate about 1.5
translate to the right