Practice Final KEY

① Simplify $-3x(2x+4) - 4x + 8$

$$= -6x^2 - 12x - 4x + 8$$

$$= \boxed{-6x^2 - 16x + 8}$$

② Simplify each expression:

a) $y^3 \cdot y \cdot y^4 = \boxed{y^8}$

b) $\dfrac{8y^5z^3}{6yz^7} = \boxed{\dfrac{4y^4}{3z^4}}$

③ Solve for a:

$$4a - 3b = c$$
$$\dfrac{4a}{4} = \dfrac{c+3b}{4}$$

$$\boxed{a = \dfrac{c+3b}{4}}$$

④ Solve for x:

$$3x^2 - 2y = 8$$
$$\dfrac{3x^2}{3} = \dfrac{8+2y}{3}$$

$$\sqrt{x^2} = \sqrt{\dfrac{8+2y}{3}}$$

$$\boxed{x = \sqrt{\dfrac{8+2y}{3}}}$$

⑤ Factor: $x^2 - 5x - 24$

$$= \boxed{(x-8)(x+3)}$$

⑥ Factor: $14x^3y^2 - 21x^2y^5 + 28x^3y^3$

$$= \boxed{7x^2y^2(2x - 3y^3 + 4xy)}$$

Solve for x:

⑦ $\dfrac{x}{2} = \dfrac{5}{4}$

$10 = 4x$

$\boxed{\dfrac{5}{2} = x}$

⑧ $\dfrac{x-1}{8} = \dfrac{x+2}{6}$

$6(x-1) = 8(x+2)$

$6x - 6 = 8x + 16$

$-22 = 2x$

$\boxed{-11 = x}$

⑨ Find the slope of a line given two points on the line: $(4, -1)$ & $(2, -9)$

$$\dfrac{\Delta y}{\Delta x} = \dfrac{-9 - (-1)}{2 - 4} = \dfrac{-8}{-2} = \boxed{4}$$

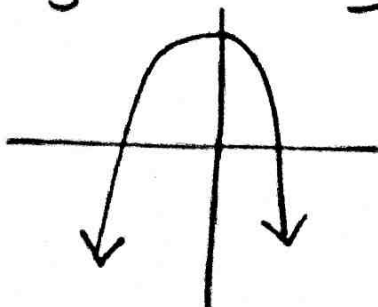⑩ Find the equation of the line in problem #9.

$y = 4x + b$ $b = -17$

$-1 = 4(4) + b$

$-1 = 16 + b$ $\boxed{y = 4x - 17}$

⑪ Convert 422 yards into inches.

$\dfrac{422 \text{ yds}}{x \text{ inches}} = \dfrac{1 \text{ yd}}{36 \text{ inches}}$ $x = 422(36)$

$x =$

⑫ Sketch a graph of a quadratic function that has a negative leading coefficient.

⑬ Find the vertex of the parabola graphed using the equation $y = -4x^2 - 12x + 3$

$$x = \frac{-b}{2a} = \frac{-(-12)}{2(-4)} = \frac{12}{-8} = \frac{3}{-2}$$

vertex is @

(   )

$$y = -4\left(-\frac{3}{2}\right)^2 - 12\left(-\frac{3}{2}\right) + 3$$

$$y =$$

✱ Solve the systems:

⑭ $\begin{cases} y = 3x - 8 \\ y = 2x + 2 \end{cases}$

$3x - 8 = 2x + 2$

$x = 10$

$\boxed{(10, 22)}$

$y = 3(10) - 8$

$y = 22$

⑮ $\begin{cases} y = -3x + 2 \\ 2x + 2y = 36 \end{cases}$

$2x + 2(-3x + 2) = 36$

$2x + -6x + 4 = 36$

$-4x + 4 = 36$

$-4x = 32$

$x = -8$

$y = -3(-8) + 2$

$y = 26$

$\boxed{(-8, 26)}$

⑯ $\begin{cases} (5) -2x + 4y = 14 \\ (2)\ 5x - 3y = -7 \end{cases}$

$\begin{cases} -10\cancel{x} + 20y = 70 \\ 10\cancel{x} - 6y = -14 \end{cases}$

$\overline{}$

$14y = 56$

$y = 4$

$-2x + 4(4) = 14$

$-2x + 16 = 14$

$-2x = -2$

$x = 1$

$\boxed{(1, 4)}$

⑰ Solve: $x^2 + 4x - 32 = 0$

$(x+8)(x-4) = 0$

$\boxed{x = -8 \text{ or } x = 4}$

⑱ Solve: $8x^2 + 19x + 2 = 2x^2 - 8$

$6x^2 + 19x + 10 = 0$

$(3x + 2)(2x + 5) = 0$

$3x + 2 = 0 \qquad 2x + 5 = 0$

$\boxed{x = -\dfrac{2}{3} \quad \text{or} \quad x = \dfrac{-5}{2}}$

⑲ Solve using the Quadratic Formula: $3x^2 + 2x - 2 = 0$

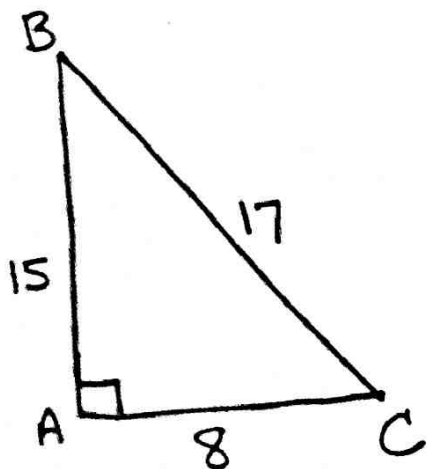$x = \dfrac{-2 \pm \sqrt{2^2 - 4(3)(-2)}}{2(3)} \qquad x = \dfrac{-2 \pm 2\sqrt{7}}{6}$

$x = \dfrac{-2 \pm \sqrt{4 + 24}}{6} \qquad \boxed{x = \dfrac{-1 \pm \sqrt{7}}{3}}$

$x = \dfrac{-2 \pm \sqrt{28}}{6}$

⑳ Write each of the trig ratios given the triangle:

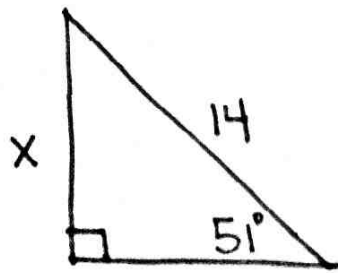
$\sin C = \dfrac{15}{17} \qquad \tan B = \dfrac{8}{15}$

$\cos C = \dfrac{8}{17} \qquad \cot B = \dfrac{15}{8}$

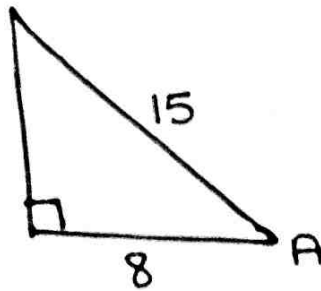$\csc C = \dfrac{17}{15} \qquad \sec B = \dfrac{17}{15}$

(21) Solve for x:

$\sin 51° = \dfrac{x}{14}$
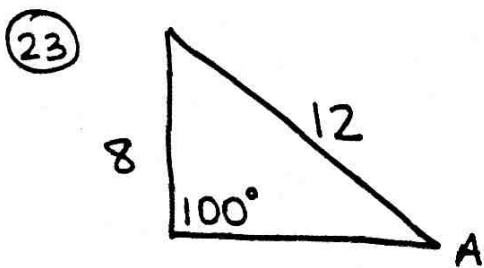
$x = 14 \sin 51$

$x \approx$

(22) Solve for m∡A:

$\cos A = \dfrac{8}{15}$

$A = \cos^{-1}\left(\dfrac{8}{15}\right)$

$A \approx$

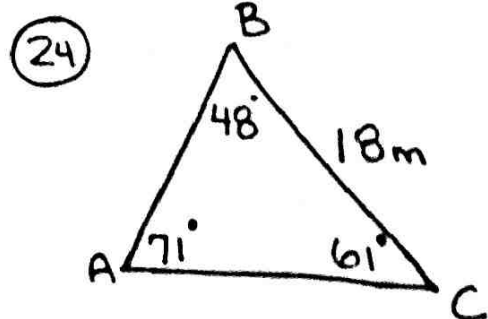(✳) Find all the missing sides & angles in the two triangles.

(23)

$\dfrac{12}{\sin 100°} = \dfrac{8}{\sin A}$

$8 \sin 100° = 12 \sin A$

$\dfrac{8 \sin 100°}{12} = \sin A$

$\sin^{-1}\left(\dfrac{8 \sin 100°}{12}\right) = A$

$\approx A$

(24)

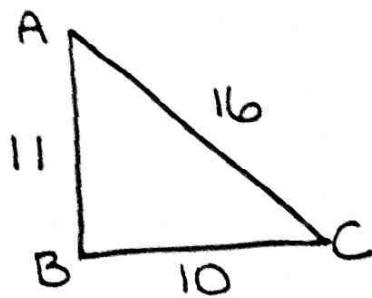$\dfrac{18}{\sin 71°} = \dfrac{b}{\sin 48°}$

$b = \dfrac{18 \sin 48°}{\sin 71°}$

$b \approx$

$\dfrac{18}{\sin 71} = \dfrac{c}{\sin 61}$

$\dfrac{18 \sin 61°}{\sin 71°} = c$

$\approx c$

⑮ Find the measure of ∡ B:

$$16^2 = 11^2 + 10^2 - 2(11)(10)\cos B$$

㉖ Expand $\log_8 \dfrac{4x^3}{y^2}$ = $\boxed{\log_8 4 + 3\log_8 x - 2\log_8 y}$

㉗ Expand $\log_3 \dfrac{y^3}{5x^2}$ = $\boxed{3\log_3 y - \log_3 5 - 2\log_3 x}$

㉘ Write as a single log:

$$\log x + 3\log y - 5\log z = \boxed{\log \dfrac{xy^3}{z^5}}$$

(29) Solve: $2^{3x-1} = 80$ (Round to the nearest tenth)

$$\log_2 80 = 3x - 1$$
$$\approx 3x - 1$$

(30) Solve: $\log_5 (3x+2) = 4$

$$5^4 = 3x + 2$$
$$625 = 3x + 2$$
$$623 = 3x$$
$$\boxed{\frac{623}{3} = x}$$ or $\boxed{x \approx 207.67}$

(31) If you started with \$1000^{00} and were making 6% interest per year, how long would it take (rounded to the nearest year) in order to have a total of \$2000^{00}?

$$\frac{\cancel{1000}(1.06)^x}{\cancel{1000}} = \frac{2000}{1000}$$

$$(1.06)^x = 2$$

$$\log_{1.06} 2 = x$$

$$\frac{\log 2}{\log 1.06} = x$$

$$\approx x$$