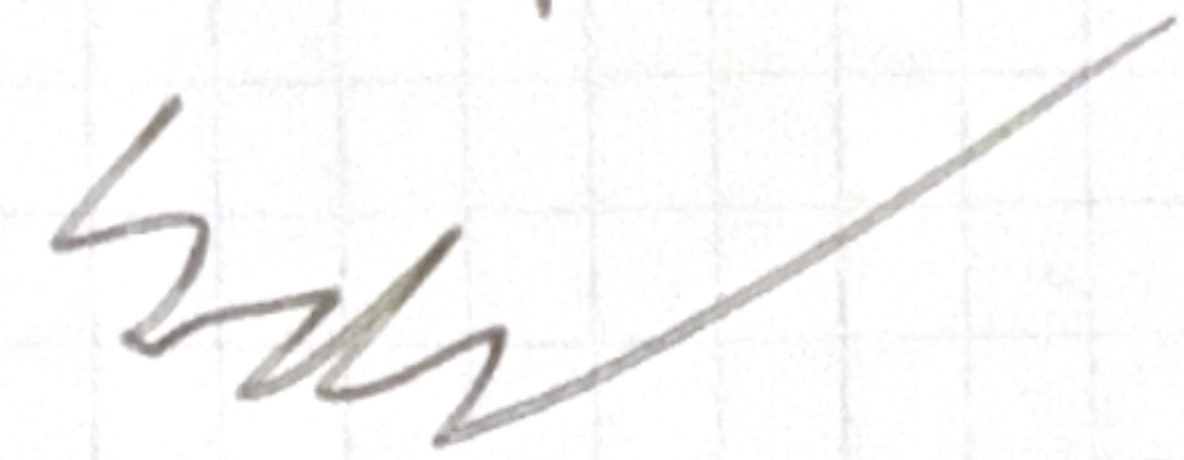


Kyle Schwarze

I acknowledge that I understand the information on the Exam template cover page.

Kyle 

1. Simplify the expression. Show all of your work.

$$(-6^2 + 1) \times \frac{4}{5} - 6 \div 2$$

$$(-36 + 1)$$

$$(-35) \times \frac{4}{5}$$

$$\frac{-140}{5}$$

$$-28 - 6 \div 2$$

$$-28 - 3 = -31$$

$$= -31$$

2. Factor by grouping to solve the following equation.

$$4x^2 - 16x + 7 = 0$$

$$4x^2 - 14x - 2x + 7 = 0$$

$$(4x^2 - 14x) + (-2x + 7)$$

$$2x(2x - 7) - 1(2x - 7) = 0$$

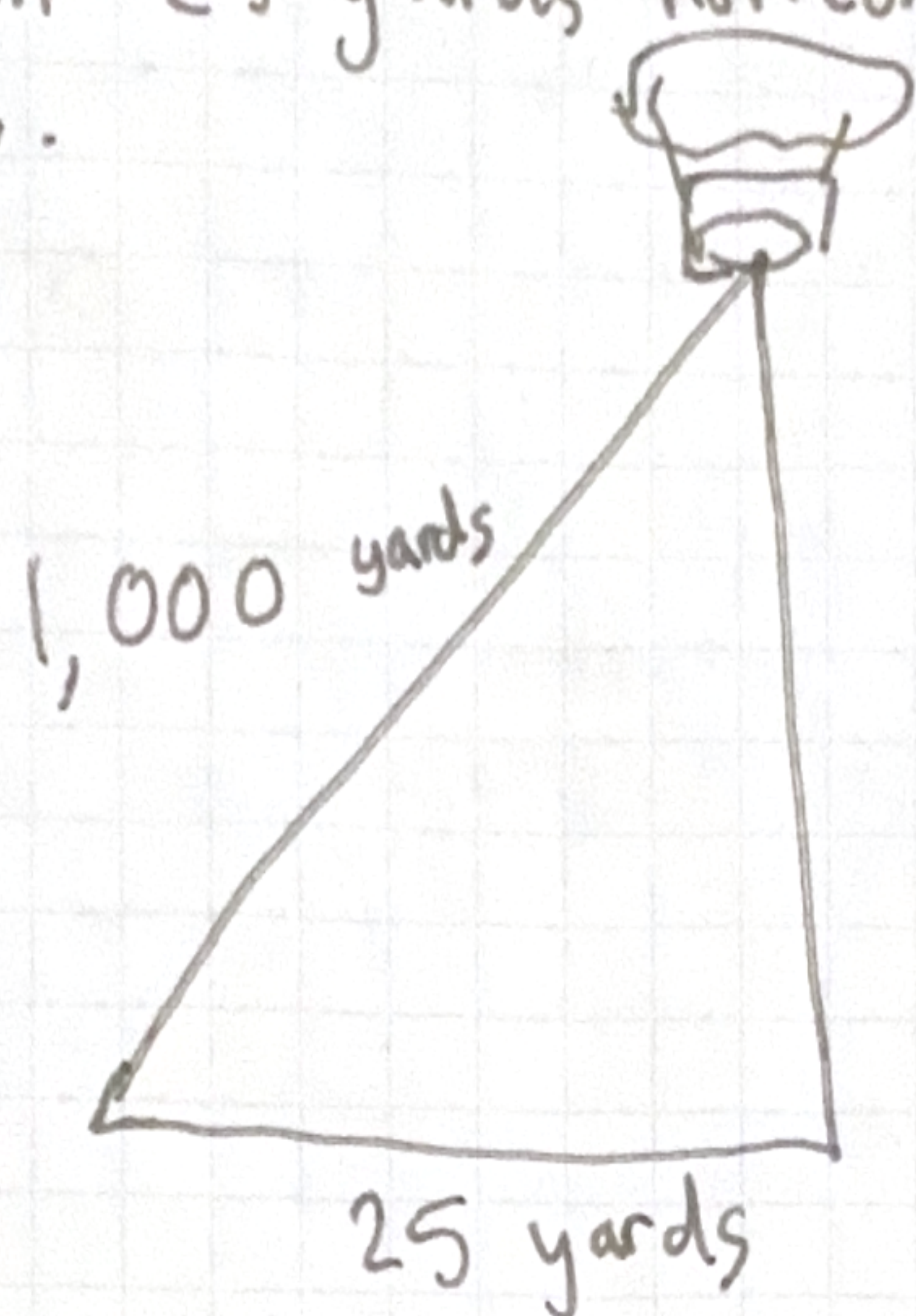
$$(2x - 7)(2x - 1) = 0$$

$$2x - 7 = 0 \quad \times \frac{7}{2}$$

$$= x = \frac{7}{2} \text{ or } x = \frac{1}{2}$$

$$2x - 1 = 0 \quad \times \frac{1}{2}$$

3. A hot air balloon is tethered to the ground with a 1,000 yard rope. A strong westerly wind blows the balloon 25 yards horizontally, shown in the picture below.



- (a) How high is the balloon when it is 25 yards from its tethering point? Include units in your answer.

$$1000^2 = 25^2 + h^2$$

$$1,000,000 = 625 + h^2$$

$$h^2 = 999,375$$

$$h = \sqrt{999,375} = 999.687 \text{ yards}$$

$$h = 999.7 \text{ yards}$$

- (b) Determine the area of the triangle with height h . Include units in your answer.

$$\text{area} = \frac{1}{2} \times 25 \times 999.687$$

$$\text{area} = 12.5 \times 999.687$$

$$\text{area} = 12,496 \text{ yd}^2$$

4. Drew did her Christmas shopping at the mall on Black Friday to take advantage of a day of deals. At the jewelry store, she bought a pair of earrings at a 45% discount and a watch marked down \$150 from its original price. In total, she paid \$310.

(a) Using the variable r for the original price of the earrings and the variable w for the original price of the watch, write an equation that represents Drew's purchase.

$$0.55r + (w - 150) = 310$$

(b) Suppose the original price of the earrings was \$75 less than the original price of the watch. Write an equation for r in terms of w .

$$r = w - 75$$

(c) What was the original price of the watch?

$$0.55(w - 75) + (w - 150) = 310$$

$$\frac{11}{20}(w - 75) + w - 150 = 310$$

$$11(w - 75) + 20w - 3000 = 6200$$

$$11w - 825 + 20w - 3000 = 6200$$

$$31w - 3825 = 6200$$

$$31w = 10025 = 323.3870968$$

$$= \$323.39$$

4.

(d) What was the original price of the earrings.

$$r = w - 75 = \frac{16025}{31} - 75 = \frac{16025 - 2325}{31} = \frac{1100}{31}$$

$$248.3870968$$

$$= \$248.39$$

5. According to the Education Data Initiative, the average annual cost of private school tuition is \$12,790 per child. Roughly 4.7 million children were enrolled in private school during the 2021-2022 school year.

(a)

$$12,790$$

$$1.2790 \times 10^4$$

$$= 1.279 \times 10^4$$

(b)

$$4,700,000$$

$$= 4.7 \times 10^6$$

(c) $12,790 \times 4,700,000$

$$(1.279 \times 10^4)(4.7 \times 10^6)$$

$$1.279 \times 4.7 = 6.0113$$

$$10^4 \cdot 10^6 = 10^{10}$$

$$6.0113 \times 10^{10}$$

$$= 6.0113 \times 10^{10} \text{ dollars}$$

60.1 Billion dollars