Homework 3 - Math 140 **Name:** _____

Simplify each expression.

1. $x^2(5x^7)$.
2. $(4x^3)^2$.
3. $\dfrac{(2x)^3}{6x^2}$.

Simplify and rewrite without negative exponents.

4. $\frac{1}{2}(x^{-3})$.
5. $\left(\dfrac{x^3}{2}\right)^{-3}$.
6. $\dfrac{8\,x^{-5}}{6\,x^{-3}}$.

Rewrite using negative and/or fractional exponents, so there are no radical symbols.

7. $\dfrac{3}{\sqrt{x}}$.
8. $x\sqrt[4]{x}$.
9. $\dfrac{x}{\sqrt[3]{x}}$.

10. A clothing business finds there is a linear relationship between the number of shirts, n, it can sell and the price, p, it can charge per shirt. In particular, historical data shows that 1000 shirts can be sold at a price of \$30, while 3000 shirts can be sold at a price of \$22 . Find a linear equation in the form $p = mn + b$ that gives the price p they can charge for n shirts.

11. How many shirts would the business be able to sell if the price was \$20?

12. If the average cost per shirt is $C = \frac{1}{250}n + 6$, then for what production level n is the price per shirt equal to the average cost?

Solve the systems of equations below.

13. $\begin{aligned} 2x - 3 &= 1 \\ 3 - x &= -2 \end{aligned}$

14. $\begin{aligned} x + 3 &= 0 \\ 2x + 4 &= 8 \end{aligned}$