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. Has a slope of 5 and crosses the x-axis at $x = 3$.
11. Passes through $(3, 4)$ with slope of -6.

12. Find the slope and y-intercept of the line $4x + 6y = 24$.

13. 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.

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

15. Suppose that the cost for a business to manufacture x widgets is $C(x)$ dollars. Explain in words what the following equation means:

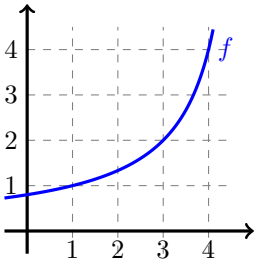
$$C(5{,}000) = 6{,}000.$$

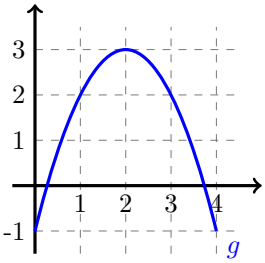
Suppose that $f(x) = \dfrac{1}{x+2}$ *and* $g(x) = 4x + 3$.

16. Calculate $f(g(0))$.

17. Calculate $g(f(0))$.

The following graphs show two different functions $f(x)$ *and* $g(x)$.





Use the graphs to evaluate the following.

18. $f(g(2))$

19. $g(f(1))$

20. $g(f(4))$