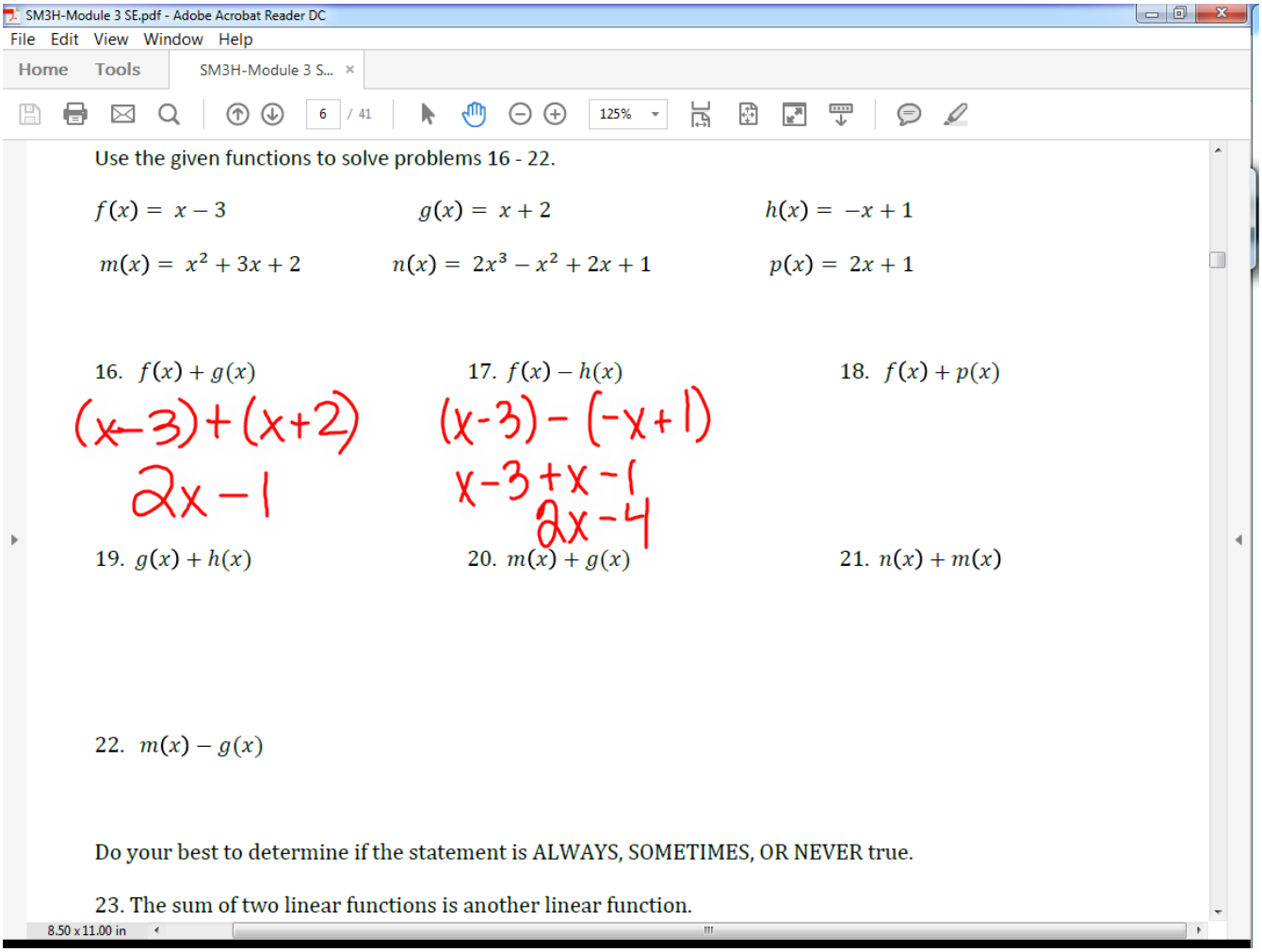
No quiz today, and no HW to check, so get out your books so we can begin lesson 3.2!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Use the given functions to solve problems 16 - 22.

$f(x) = x - 3$ $g(x) = x + 2$ $h(x) = -x + 1$

$m(x) = x^2 + 3x + 2$ $n(x) = 2x^3 - x^2 + 2x + 1$ $p(x) = 2x + 1$

16. $f(x) + g(x)$

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

$2x-1$

17. $f(x) - h(x)$

$(x-3)-(-x+1)$

$x-3+x-1$

$2x-4$

18. $f(x) + p(x)$

19. $g(x) + h(x)$

20. $m(x) + g(x)$

21. $n(x) + m(x)$

22. $m(x) - g(x)$

Do your best to determine if the statement is ALWAYS, SOMETIMES, OR NEVER true.

23. The sum of two linear functions is another linear function.

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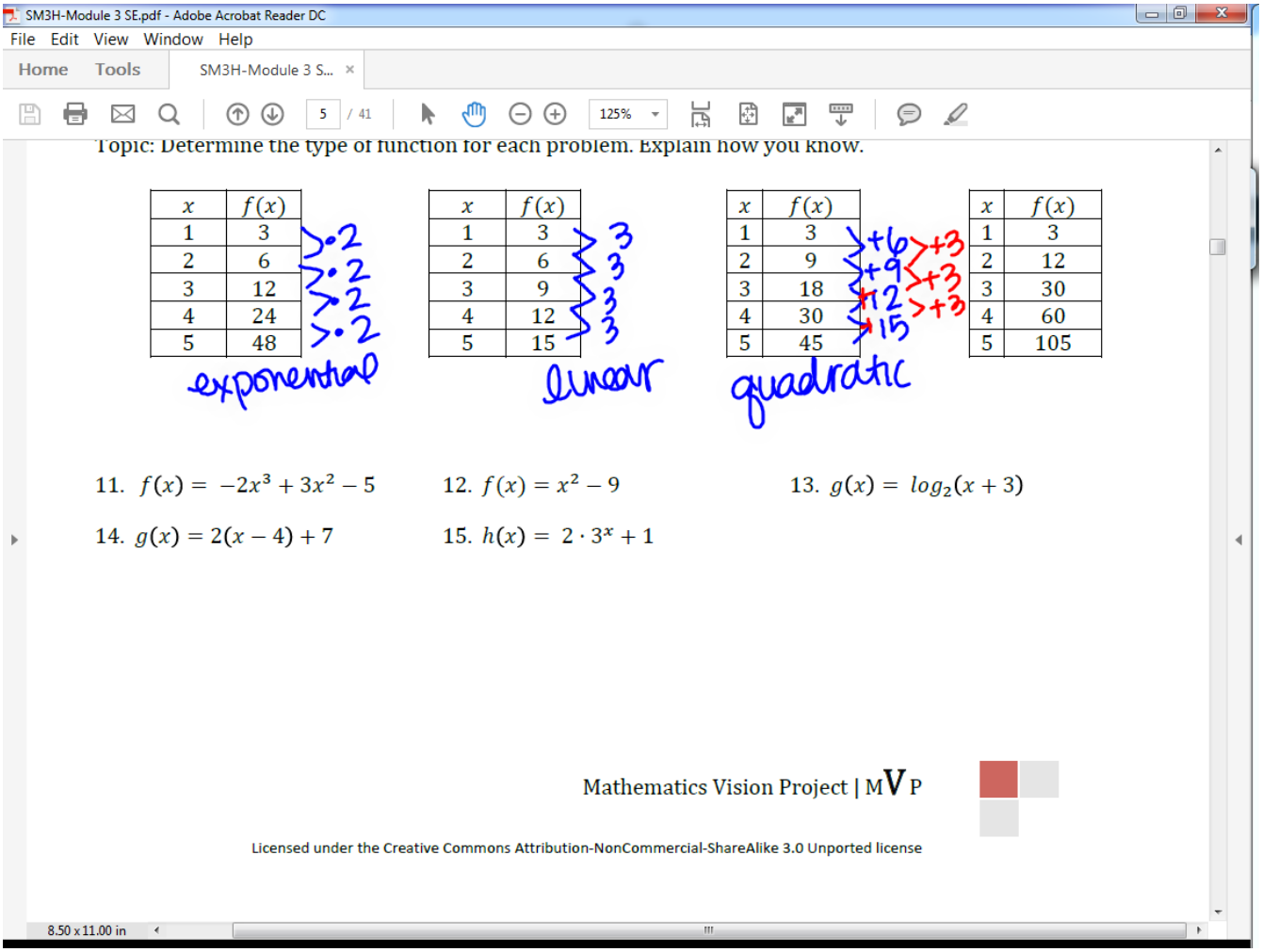
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Topic: Determine the type of function for each problem. Explain how you know.

x	$f(x)$
1	3
2	6
3	12
4	24
5	48

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exponential

x	$f(x)$
1	3
2	6
3	9
4	12
5	15

3 3 3 3

linear

x	$f(x)$
1	3
2	9
3	18
4	30
5	45

+6 +9 +12 +15 +3 +3 +3

quadratic

x	$f(x)$
1	3
2	12
3	30
4	60
5	105

11. $f(x) = -2x^3 + 3x^2 - 5$

12. $f(x) = x^2 - 9$

13. $g(x) = log_2(x + 3)$

14. $g(x) = 2(x - 4) + 7$

15. $h(x) = 2 \cdot 3^x + 1$

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3.2 Which is greater?

A Solidify Understanding Task

In previous mathematics courses, you have compared and analyzed growth rates of polynomial (mostly linear and quadratic) and exponential functions. In this task, we are going to analyze rates of change and end behavior by comparing various one variable expressions.

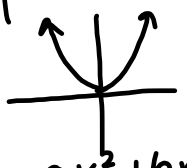
1. Accessing background knowledge: In as many ways as possible, compare and contrast linear, quadratic, and exponential functions.

linear
- constant rate of growth/change/slope
- variable to 1st degree
- straight line
→ $y=mx+b$

exponential
- 1st difference is mult/div. by same #

- variable in exponent
→ $y=a\cdot b^x$

quadratic
- 2nd diff. is constant
- parabola graph



→ $y=ax^2+bx+c$
→ $y=a(x-h)^2+k$
→ $y=a(x-c)(x-d)$

2. Write the following expressions in order from least to greatest when the value of x is zero.

2^x $\quad x^2-20$ $\quad x^5-4x^2+1$ $\quad x+30$ $\quad x^4-1$ $\quad x^3+x^2-4$ $\quad -x^2+3x$

$2^0=1$ $\quad 0^2-20$ $\quad 0^5-4(0)^2+1$ $\quad 0+30$ $\quad 0^4-1$ $\quad 0^3+0^2-4$ $\quad -0^2+3\cdot 0=0$

Do you think this order would change when x represents other numbers?

$x^2-20;\ x^3+x^2-4;\ x^4-1;\ -x^2+3x;\ 2^x;\ x^5-4x^2+1;\ x+30$

yes!

OR

3. Write the same expressions in order from **least to greatest** when x represents a very large number (this number is so large, it is 'close to' or approaching positive infinity).

$-x^2+3x;\ x+30;\ x^2-20;\ x^3+x^2+4;\ x^5-4x^2+1;\ x^4-1;\ 2^x$

OR

4. Write the same expressions in order from **greatest to least** when x represents a number that is approaching negative infinity.

$x^4-1;\ x^2-20;\ 2^x;\ x+30;\ -x^2+3x;\ x^3+x^2-4;\ x^5-4x^2+1;$

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5. When comparing expressions, how does the order change depending on the values of x (close to negative infinity, zero, and positive infinity)?

6. Determine where you would insert add the following expressions in question 3 (go insert these expressions where they belong in your list):

$\left(\frac{1}{2}\right)^x$ x^7 $-x^5$ x^6 x^5

7. Now insert these same expressions to your list in question 4.

8. Write your process for ordering one variable polynomial expressions for both extremes (when x approaches infinity as well as when x approaches negative infinity).

Homework

3.2 "Ready, Set, Go"