**Identify the parent function, sketch the graph, and find the domain and the range for each function.**

|  |  |  |  |
| --- | --- | --- | --- |
| **1.** | $$f\left(x\right)=x^{2}$$ | **2.** | $$f\left(x\right)=-3$$ |
|  | **Domain**$ $**Range** $ $ |  | **Domain**$ $**Range**  |
| **3.** | $$f\left(x\right)=x^{3}$$ | **4.** | $$f\left(x\right)=\frac{1}{x}$$ |
|  | **Domain**$ $**Range**  |  | **Domain**$ $**Range** $ $ |

**Identify the parent function and describe the transformations.**

|  |  |  |
| --- | --- | --- |
| **5.** | $$f\left(x\right)=(x+4)^{3}$$ | **Parent :** **Transformation:**   |
| **6.** | $$f\left(x\right)=-2\left|x-4\right|$$ | **Parent :**$ $**Transformation:**   |
| **7.** | $$f\left(x\right)=\frac{1}{x}-18$$ | **Parent:****Transformation:**  |
| **8.** | $$f\left(x\right)=-\sqrt{x+1}-6$$ | **Parent :**$ $**Transformation:**   |

**Given the parent function and a description of the transformation, write the equation of the transformed function**$ f\left(x\right)$ **.**

|  |  |  |
| --- | --- | --- |
| **9.** | **Square Root Function**Reflected in the x-axisTranslated 12 units down |  |
| **10.** | **Absolute value-**Translated 12 units up Translated 23 units left |  |
| **11.** | **Reciprocal Function**Expanded vertically by a factor of 4Reflected in the x-axis and translated 2 units up |  |
| **12.** | **Greatest Integer Function**Reflected in the y -axis and translated 16 units up |  |

**Use the graph of parent function to graph each function. Find the domain and the range of the new function.**

|  |  |  |  |
| --- | --- | --- | --- |
| **13.**  | $$h\left(x\right)=3\left(x+3\right)^{3}-1$$ |  |  |
|  |  |  |  |
| **14.**  | $$h\left(x\right)=\frac{1}{x-2}+4$$ |  |  |
|  |  |  |  |
| **15.**  | $$h\left(x\right)=-\sqrt{x-5}-2$$ |  |  |
|  |  |  |  |
| **16.**  | $$h\left(x\right)=\left|x-4\right|+2$$ |  |  |
|  |  |  |  |

**Graph each function.**

|  |  |  |  |
| --- | --- | --- | --- |
| **17.**  | $$f\left(x\right)=x^{4}-2 Graph h\left(x\right)=\left|x^{4}-2\right|$$ |  |  |
|  |  |  |  |
| **18.** | $$f\left(x\right)=-\frac{1}{x+1} Graph h\left(x\right)=-\frac{1}{\left|x+1\right|}$$ |  |  |
|  |  |  |  |

**Graph each piecewise function.**

|  |  |  |
| --- | --- | --- |
| **19.** | $$f\left(x\right)=\left\{\begin{array}{c}-\frac{1}{x+2} if x<-3\\2 if -3<x<2\\x-1 if x\geq 2\end{array}\right.$$ |  |
| **20.** | $$f\left(x\right)=\left\{\begin{array}{c}3 if x\leq -1\\x^{2}+2 if -1\leq x<1\\\left|x-1\right| if x\geq 1\end{array}\right.$$ |  |

**ANSWERS**

**Identify the parent function, sketch the graph, and find the domain and the range for each function.**

|  |  |  |  |
| --- | --- | --- | --- |
| **1.** | $$f\left(x\right)=x^{2}$$ | **2.** | $$f\left(x\right)=-3$$ |
|  | **Quadratic Function****Domain**$ =(-\infty ,\infty )$**Range** $=[0,\infty )$ |  | **Constant Function****Domain**$= (-\infty ,\infty )$**Range** $=[-3]$ |
| **3.** | $$f\left(x\right)=x^{3}$$ | **4.** | $$f\left(x\right)=\frac{1}{x}$$ |
|  | **Cubic Function****Domain**$=(-\infty ,\infty )$**Range** $=\left(-\infty ,\infty \right)$ |  | **Reciprocal Function****Domain**$= (-\infty ,0)∪(0,\infty )$**Range**$ =(-\infty ,0)∪(0,\infty )$ |

**Identify the parent function and describe the transformations.**

|  |  |  |
| --- | --- | --- |
| **5.** | $$f\left(x\right)=(x+4)^{3}$$ | **Parent :**$ f\left(x\right)=x^{3}$**Transformation:** Translated 4 units left |
| **6.** | $$f\left(x\right)=-2\left|x-4\right|$$ | **Parent :**$ f\left(x\right)=\left|x\right|$**Transformation:**  Reflected in the x-axis Expanded vertically by a factor of 2 Translated 4 units right |
| **7.** | $$f\left(x\right)=\frac{1}{x}-18$$ | **Parent :**$ f\left(x\right)=\frac{1}{x}$**Transformation:** Translated 18 units down |
| **8.** | $$f\left(x\right)=-\sqrt{x+1}-6$$ | **Parent :**$ f\left(x\right)=\sqrt{x}$**Transformation:**  Reflected in the x-axis Translated 6 units down Translated 1 unit left |

**Given the parent function and a description of the transformation, write the equation of the transformed function**$ f\left(x\right)$ **.**

|  |  |  |
| --- | --- | --- |
| **9.** | **Square Root Function**Reflected in the x-axisTranslated 12 units down | $$f\left(x\right)=-\sqrt{x}-12$$ |
| **10.** | **Absolute value-**Translated 12 units up Translated 23 units left | $$f\left(x\right)=\left|x+23\right|+12$$ |
| **11.** | **Reciprocal Function**Expanded vertically by a factor of 4Reflected in the x-axis and translated 2 units up | $$f\left(x\right)=-\frac{4}{x}+2$$ |
| **12.** | **Greatest Integer Function**Reflected in the y -axis and translated 16 units up | $$f\left(x\right)=\left⟦-x\right⟧+16$$ |

**Use the graph of parent function to graph each function. Find the domain and the range of the new function.**

|  |  |  |  |
| --- | --- | --- | --- |
| **13.**  | $$h\left(x\right)=3\left(x+3\right)^{3}-1$$ |  |  |
|  | $h\left(x\right)=3\left(x+3\right)^{3}-1 $**Parent function** $f\left(x\right)=x^{3}$**Transformation:**Expanded vertically by a factor of 3Translated 1 unit downTranslated 3 units left$$D=\left(-\infty ,\infty \right)$$$$R=\left(-\infty ,\infty \right)$$ |  |  |
| **14.**  | $$h\left(x\right)=\frac{1}{x-2}+4$$ |  |  |
|  | $h\left(x\right)=\frac{1}{x-2}+4 $**Parent function** $f\left(x\right)=\frac{1}{x}$**Transformation:**Translated 4 units upTranslated 2 units right$$D=\left(-\infty ,2)∪(2,\infty \right)$$$$R=\left(-\infty ,4)∪(4,\infty \right)$$ |  |  |
| **15.**  | $$h\left(x\right)=-\sqrt{x-5}-2$$ |  |  |
|  | $h\left(x\right)=-\sqrt{x-5}-2 $**Parent function** $f\left(x\right)=\sqrt{x}$**Transformation:**Reflected in the x-axisTranslated 2 units downTranslated 5 units right$$D=[-5,\infty )$$$$R=\left(-\infty ,-2\right)$$ |  |  |
| **16.**  | $$h\left(x\right)=\left|x-4\right|+2$$ |  |  |
|  | $h\left(x\right)=\left|x-4\right|+2 $**Parent function** $f\left(x\right)=\left|x\right|$**Transformation:**Translated 2 units upTranslated 4 units right$$D=\left(-\infty ,\infty \right)$$$$R=[2,\infty )$$ |  |  |

**Graph each function.**

|  |  |  |  |
| --- | --- | --- | --- |
| **17.**  | $$f\left(x\right)=x^{4}-2 Graph h\left(x\right)=\left|x^{4}-2\right|$$ |  |  |
|  | $f\left(x\right)=x^{4}-2 $$h\left(x\right)=\left|x^{4}-2\right|$ |  | $$D=(-\infty .\infty )$$$$R=[0,\infty )$$ |
| **18.** | $$f\left(x\right)=-\frac{1}{x+1} Graph h\left(x\right)=-\frac{1}{\left|x+1\right|}$$ |  |  |
|  | $f\left(x\right)=-\frac{1}{x+1}$$h\left(x\right)=-\frac{1}{\left|x+1\right|}$ |  | $$D=(-\infty .-1)∪(-1,\infty )$$$$R=(-\infty ,0)$$ |

**Graph each piecewise function.**

|  |  |  |
| --- | --- | --- |
| **19.** | $$f\left(x\right)=\left\{\begin{array}{c}-\frac{1}{x+2} if x<-3\\2 if -3<x<2\\x-1 if x\geq 2\end{array}\right.$$ |  |
| **20.** | $$f\left(x\right)=\left\{\begin{array}{c}3 if x\leq -1\\x^{2}+2 if -1\leq x<1\\\left|x-1\right| if x\geq 1\end{array}\right.$$ |  |