

Cumulative Review A

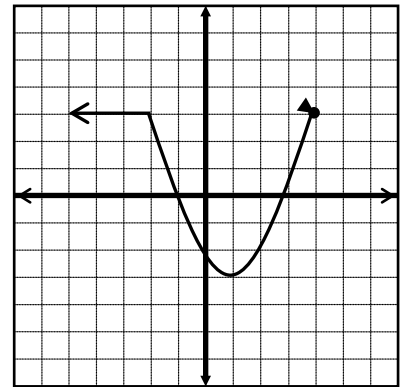
Find and simplify the difference quotient $\frac{f(x+h) - f(x)}{h}$ for the given functions.

1) $f(x) = -4x^2 + 2x - 1$

2) $f(x) = 3x^2 - 2x - 5$

Use the graph of f to the right to answer the following problems. Use interval notation where appropriate. (Assume that all tick marks on the graph are 1 unit apart.)

3. Domain _____
4. Range _____
5. x -intercept(s) _____
6. y -intercept(s) _____
7. Interval(s) at which f is increasing _____
8. Interval(s) at which f is decreasing _____
9. Interval(s) at which f is constant _____
10. What is the relative minimum of f ? _____
11. At what number does f have a relative minimum? _____
12. $f(-6) =$ _____
13. At what values of x is $f(x) < 0$? _____
14. Is f even, odd, or neither? _____



Given functions f and g , perform the indicated operations and find the domain of the resulting function.

15) $f(x) = \frac{7}{x+1}$, $g(x) = \frac{x}{2x+1}$

16) $f(x) = x^2 + 2x$, $g(x) = x^2 - 2x - 8$

Find $(f \circ g)(x)$.

Find $\left(\frac{f}{g}\right)(x)$.

Given functions f and g , perform the indicated operation.

17) $f(x) = 3x^2 - x + 5$, $g(x) = -x - 6$

Find $(fg)(x)$.

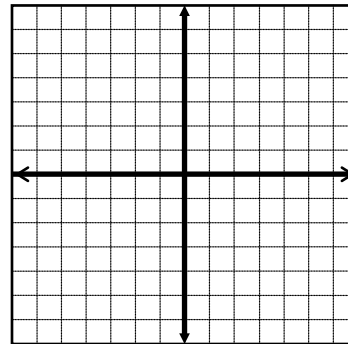
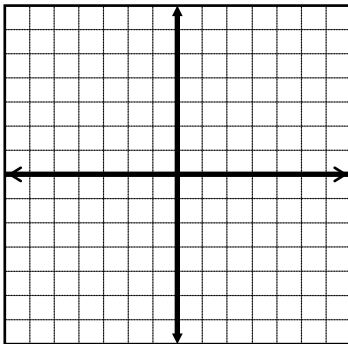
18) $f(x) = \sqrt{4x+3}$

Find $f^{-1}(x)$.

Graph the following functions.

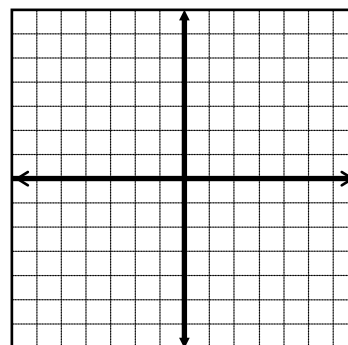
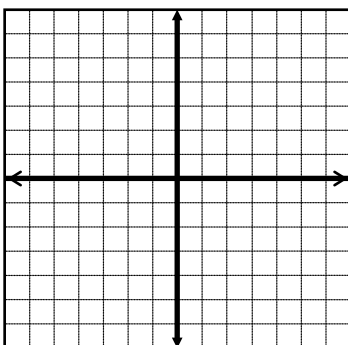
19) $f(x) = -\sqrt[3]{x+1}$

20) $f(x) = -2\log_3(x-2) + 1$



21) $f(x) = 2e^x + 1$

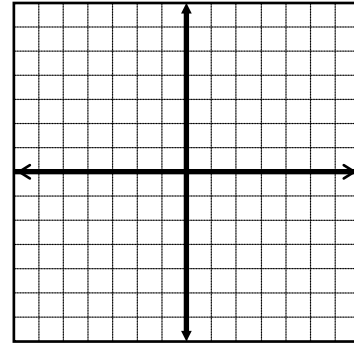
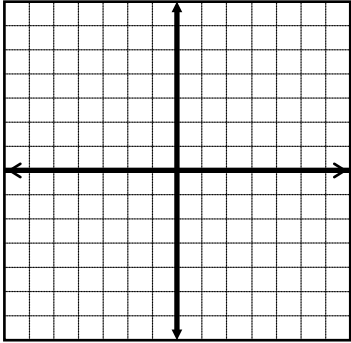
22) $f(x) = -3x^2 + 6x + 5$



Graph the following functions. State the a) symmetry, b) y-intercept, c) x-intercept(s), d) vertical asymptote(s), e) horizontal or slant asymptote, f) hole (if any)

$$23) f(x) = \frac{x}{2x^2 - 1}$$

$$24) f(x) = \frac{x^2 - 3x - 4}{x + 3}$$



Find the exact value of the indicated trigonometry function of θ .

$$25) \text{ If } \cot \theta = -\frac{7}{2}; \sin \theta > 0. \text{ Find } \sec \theta$$

$$26) \text{ If } \sin \theta = -\frac{\sqrt{5}}{4}; \tan \theta < 0. \text{ Find } \cot \theta$$

Find the exact value of the expression if possible. Do not use a calculator.

$$27) \cot^{-1} \left[\sin \left(-\frac{\pi}{2} \right) \right]$$

$$28) \cot \left[\sin^{-1} \left(-\frac{2\sqrt{5}}{5} \right) \right]$$

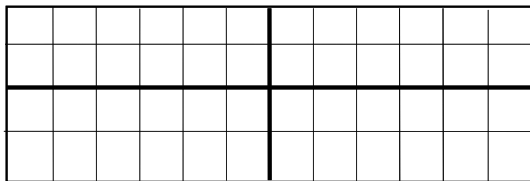
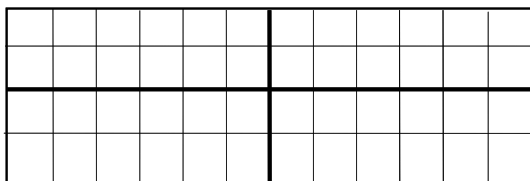
Graph one or more periods. Be sure to label all units.

29) $y = -\csc\left(2x + \frac{\pi}{2}\right) - 1$

amplitude = _____

period = _____

shift = _____

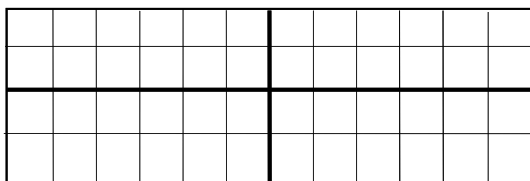
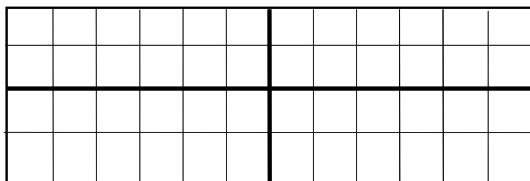


30) $y = \cot\left(\frac{x}{2} - \pi\right) + 1$

amplitude = _____

period = _____

shift = _____



Solve. Round answers to the nearest degree.

31) A plane leaves an airport at a heading of $N20^\circ E$ for 92 miles. It then changes course and heads $S70^\circ E$ for 44 miles and lands at a new airport. What is the bearing from the original airport to the new airport?

32) A 12 foot ladder is attached to a 100 foot building somewhere between the top of the building and the ground. What angle will the ladder need to form with the ground if it needs to rest 10 feet above the ground on the building?

Verify each identity.

$$33) \frac{1 + \tan \theta}{\sin \theta + \cos \theta} = \sec \theta$$

$$34) \frac{\sin \theta}{1 - \cot \theta} + \frac{\cos \theta}{1 - \tan \theta} = \sin \theta + \cos \theta$$

Find the exact value. You may use any of your formulas.

$$35) \tan \frac{7\pi}{12}$$

$$36) \cos 112.5^\circ$$

Find all solutions in the interval $[0, 2\pi)$.

$$37) \sqrt{2} \csc 3x + 1 = 3$$

$$38) 4 \cos x = \sin 2x$$