

1. (2 points) Evaluate the numerical expression. Simplify your answer completely.

$$5 - 2 \left(\frac{4^0}{|4 - 7|} + \frac{3}{5} \div \frac{2}{15} \right)$$

2. (2 points) Expand and simplify the following algebraic expression.

$$(3x + 1)^2 + 2[5 - (x + 1)(x - 1)]$$

3. Solve for x in the following equations.

(a) (3 points) $\frac{x}{6} - \frac{2x + 3}{2} = \frac{2x}{3}$

(b) (3 points) $2[6 - (5x - 4)] = 2(2x + 5) + 3$

4. Consider the points $A = (-3, 7)$, $B = (9, -1)$, and $C = (-5, 3)$.

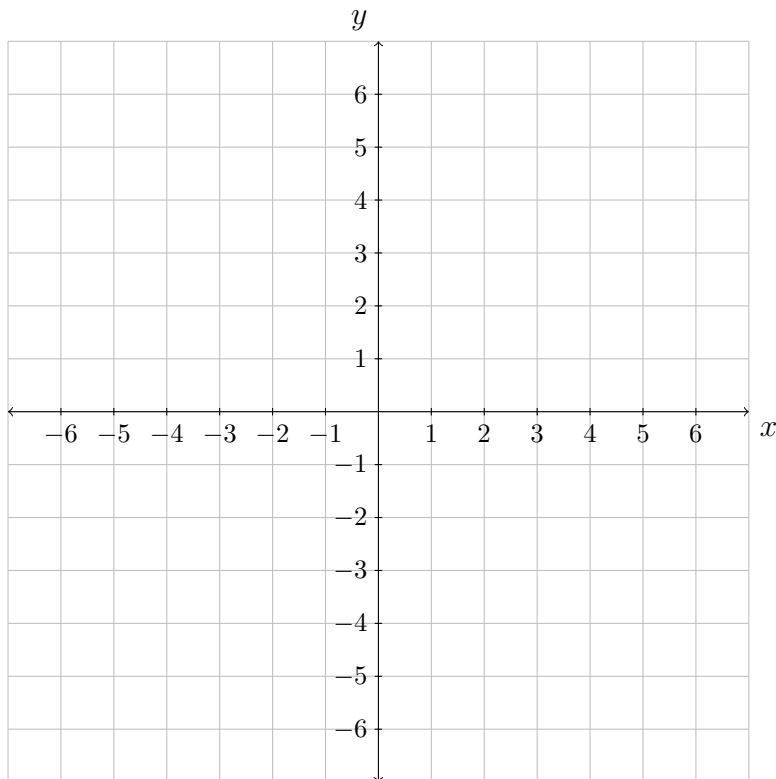
(a) (2 points) Find the equation of the line that passes through A and B .

(b) (1 point) Find the midpoint between the points B and C .

(c) (2 points) Find the distance between the points A and C . Simplify your answer.

5. (3 points) Find an equation of the line that passes through the point $(0, -2)$ and is perpendicular to $3x + 5y = 1$.

6. (2 points) On the given axes, sketch the line $y = \frac{3}{2}x - 6$.



7. (4 points) Solve the following linear system by the method of substitution.

$$\begin{cases} x + 2y = 7 \\ 2x + 3y = 9 \end{cases}$$

8. (4 points) Simplify the following expression and present the result without negative exponents. You may assume that all variables represent positive numbers.

$$\left(\frac{(-2x^5yz)(yz)}{2^2x^7y^{-2}z^2} \right)^3$$

9. Factor each polynomial completely.

(a) (3 points) $6x^2 + 13x - 5$

(b) (2 points) $5x^2 - 500$

10. (4 points) Solve for x by factoring.

$$x^3 - 11x^2 + 28x = 0$$

11. (3 points) Simplify the following expression. You may assume that all variables represent positive numbers.

$$x\sqrt{12x^3y^2} + y\sqrt{27x^5}$$

12. (4 points) Solve the following equation.

$$6 + \sqrt{2x - 2} = 10$$

13. (3 points) By using the Quadratic Formula, find all solutions to $4x^2 - 3x - 1 = 0$. As usual, present your answers in fully simplified form.

14. (2 points) Rationalize the denominator and simplify the result.

$$\frac{6}{\sqrt{5} - \sqrt{3}}$$

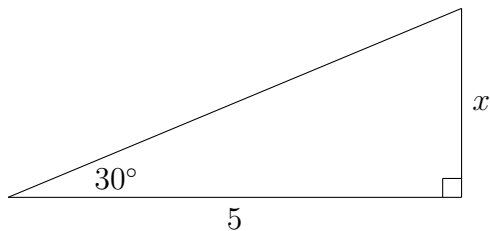
15. (3 points) Evaluate the following expression.

$$\log_3 9 + \log_5 \left(\frac{1}{25} \right) + \ln e$$

16. (3 points) Solve the following equation for x .

$$3^{2x+10} - 80 = 1$$

17. (3 points) Find the exact value of x in the triangle below. Simplify your answer. (Note: the illustration may not be exactly to scale.)



18. (4 points) Let θ be an acute angle in a right angle triangle. If $\cos \theta = \frac{6}{7}$, find the exact values of $\tan \theta$, $\sin \theta$, and $\sec \theta$.

19. Given $f(x) = x^2 - 9$ and $g(x) = |2x - 5|$

(a) (1 point) Evaluate and simplify the following expression. $f(-2) + g(1)$

(b) (2 points) Solve $f(x) = 0$.

20. For the following function f , whose graph is given below, answer the following questions.

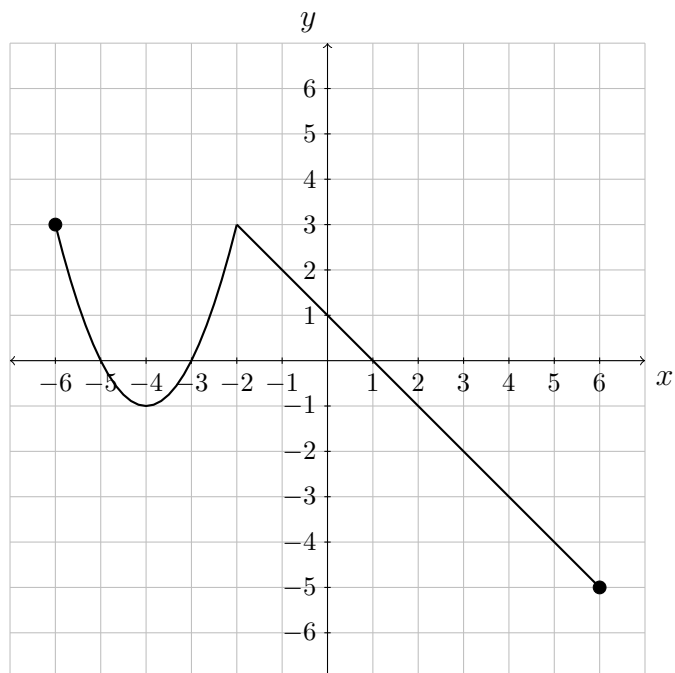
(a) (1 point) The domain of $f(x)$.

(b) (1 point) The range of $f(x)$.

(c) (1 point) The y -intercept.

(d) (1 point) The x -intercept(s).

(e) (1 point) The interval(s) where $f(x)$ is positive.



Answers:

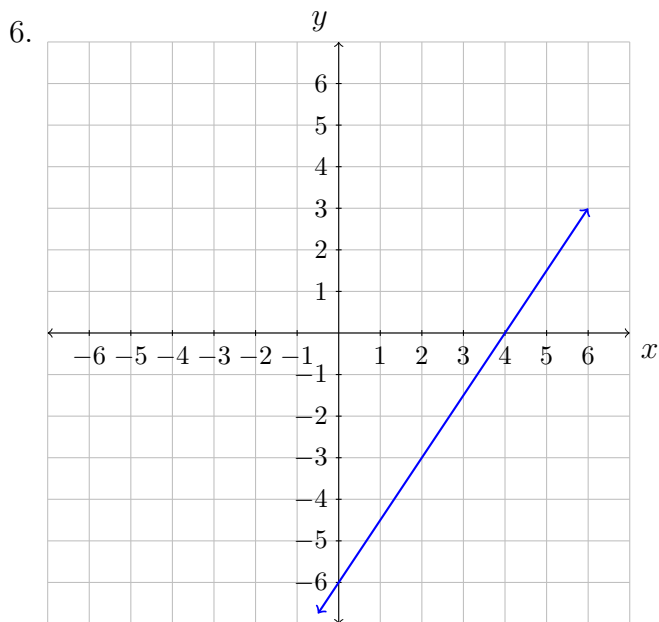
1. $-\frac{14}{3}$

2. $7x^2 + 6x + 13$

3. (a) -1 (b) $\frac{1}{2}$

4. (a) $y = -\frac{2}{3}x + 5$ (b) $(2, 1)$ (c) $2\sqrt{5}$

5. $y = \frac{5}{3}x - 2$



7. $x = -3, y = 5$

8. $\frac{-y^{12}}{8x^6}$

9. (a) $(2x + 5)(3x - 1)$ (b) $5(x + 10)(x - 10)$

10. $x = 0, 4, 7$

11. $5x^2y\sqrt{3x}$

12. $x = 9$

13. $x = -\frac{1}{4}, 1$

14. $3(\sqrt{5} + \sqrt{3})$

15. 1

16. $x = -3$

17. $x = \frac{5\sqrt{3}}{3}$

18. $\tan \theta = \frac{\sqrt{13}}{6}$, $\sin \theta = \frac{\sqrt{13}}{7}$, and $\sec \theta = \frac{7}{6}$.

19. (a) -2 (b) $x = -3, x = 3$

20. (a) $x \in [-6, 6]$ (b) $y \in [-5, 3]$ (c) (0, 1) (d) (-5, 0), (-3, 0), (1, 0) (e) [-6, -5) and (-3, 1)